World Food Day 2004

Biodiversity for Food Security

16 October 2004

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"Humankind needs to safeguard and further develop the precious crop gene pool that is essential for agriculture"

Jacques Diouf
FAO Director General,
29 June 2004

On 16 October each year the Food and Agriculture Organization of the United Nations celebrates World Food Day to commemorate its founding in 1945. This year the WFD theme, **"Biodiversity for Food Security"**, recognises the role of biodiversity in ensuring that people have sustainable access to enough high quality food to lead active and healthy lives. With the International Treaty on Plant Genetic Resources having come into force in June 2004, this is a particularly topical theme as the treaty lays the framework guiding national and international action for conservation of plant biodiversity.

It was also the theme of a symposium sponsored in 2003 by the Swiss Agency for Development and Cooperation (SDC) and the Syngenta Foundation for Sustainable Agriculture in Basel, Switzerland. Titled **"Food Security and Biodiversity: Sharing the Benefit of Plant Genetic Resources"** the symposium invited differing perspectives on protecting, sharing and using the world's plant genetic resources.

We are pleased to mark the occasion of World Food Day this year with this collection of presentations from our symposium.

The Swiss Agency for Development and Cooperation &
the Syngenta Foundation for Sustainable Agriculture
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Food Security and Biodiversity: Sharing the Benefit of Plant Genetic Resources
16 October 2003
Basel, Switzerland

We would like to acknowledge Susan Bragdon, Katharina Jenny and Therese St. Peter for organising and moderating the symposium.

Comments compiled and edited from presentations delivered at the Food Security and Biodiversity Symposium, 16 October 2003, Basel, Switzerland. Not all presentations were available for inclusion in this booklet. For a complete set of remarks, including presentation slides and annex notes, please visit www.benefitsharing.org

"Controversy and global events draw attention and resources away from the important task of saving and securing plant genetic resources"

Andrew Bennett

Reflections: Saving Genes through Improved Access and Benefit Sharing

Andrew Bennett Executive Director of the Syngenta Foundation for Sustainable Agriculture

The international response to the need to conserve and use plant genetic resources to meet the challenges of hunger, poverty and environmental protection has been to weave a complex and frequently ambiguous web of agreements to govern the actions of those engaged in the conservation and management of plant genetic resources for food and agriculture.

Such ambiguity has become the breeding ground for suspicion and mistrust. The polarities are fuelled by tensions in world trade, the use of new technologies and debates over the roles of the public and private sectors. Misconceptions seem to fly further and faster, finding easy access to media headlines. The rather less dramatic, but in the end more important, successes and lessons learnt are not so newsworthy.

Controversy and global events draw attention and resources away from the important task of saving and securing plant genetic resources. The Global Crop Diversity Trust, which aims to raise an endowment fund of $260 million to assure funding for the world's ex situ collections, is struggling to raise $100 million from public and private sources.

The need is to build partnerships and trust aimed at improving access to genetic resources and creating systems of benefit sharing that work and that are fair, particularly to resource poor people. These systems must provide incentives for good behaviour. Benefit sharing can take many forms: cash from royalties and agreements; new varieties and better yields; new crops with different market opportunities; crop varieties with improved resistance to pests and diseases; the cleaning up of traditional varieties that have been contaminated with viruses; and the restoration of traditional varieties that have been lost or destroyed by natural disasters or war.

We must also be able to assess progress towards the better conservation of plant genetic resources, improved access to the collections, and fair sharing of benefits for those involved. The most obvious of these is the safekeeping of and improved access to the genebanks. However, another way to measure success is through the impact on the income or food security of resource-poor farmers. Whichever measures are chosen, they must be published and progress must be assessed by the partners.

These are real challenges, but there are a growing number of examples of people and institutions that are trying to find ways forward. They are learning valuable lessons and building trust. It takes time to build these partnerships. The gap between accessing genetic resources and traditional knowledge and the release of a product is long. The investment needed to develop them into suitable and safe products for markets is high, and not all projects will result in a 'commercial success.' This means that access may not result in a flow of benefits. There are risks that should be identified and understood by all parties – there will be an art in spotting winners. Those who have charted new territory have always found critics, both constructive and negative, along the way. This is not an agenda for the faint hearted.

We need to identify the constraints and successes and to share experience. It is only through an open process that we can build accountability and trust. In the spirit of sharing, this booklet contains the learnings and lessons presented at this symposium.

"Maintaining a diversity of crops and varieties is a key to survival for millions of small farmers worldwide"

Opening Remarks

Ambassador Walter Fust Director General, Swiss Agency for Development and Cooperation (SDC)

It is my particular pleasure to welcome you all to this one day symposium on food security and biodiversity on the occasion of the World Food Day 2003.

We all – stakeholders from civil society, public, private and research sectors – share one common objective: To make sure that the world's plant genetic resources for food and agriculture remain widely accessible and that their benefits are equitably shared.

It will be our challenge today to review the respective mechanisms under the UN Food and Agricultural Organisation (FAO) Treaty in the wider context. Ensuring food security is part of the global effort towards a more sustainable future. But it is further influenced by other factors such as conflicts and failing states, by trade-related issues, and by the digital divide between North and South, to name but a few important context elements.

My perception is that the pace of economic globalisation today is not matched by the pace in international development. Some regional progress in the economic, health and education sectors in past decades cannot explain away the growing rift between rich and poor. This is not a North-South problem alone, but one between regions and between urban and rural areas. The struggle for access to ever-scarcer resources contributes to ethnic and religious tension. Conflict and international migration are some effects of this development.

On the other hand, borders are open today, there is a free flow of information, advances in technology and increasing awareness of the interdependence among nations all carrying the promise for a better future. Switzerland's development cooperation aims to help reduce the gap between rich and poor, not in a condescending way but according to the principles of justice and partnership with the people concerned.

The title of today's symposium is "Food Security and Biodiversity." Food is a human being's most elementary basic need. To achieve a food-secure world is perhaps the single most important goal on the development agenda for the coming decades. At the World Food Summit 1996, the global community agreed on the target of reducing by half the number of hungry people in the world by 2015. To reach this target, 22 million people need to escape from food insecurity every year. But so far only six million each year have been fortunate enough to do so. Over 800 million people still suffer from malnutrition and hunger – this in a world that is producing enough food for everyone. It did not come as a surprise that at the World Summit for Sustainable Development in Johannesburg in 2002, food security and biodiversity were recognised as key components in the reduction of poverty. The right of every human being to live in a world free from hunger has been re-emphasised ever since and is enshrined in the Millennium Development Declaration, which provides the guiding compass for international cooperation today.

Basically, global food security has at least three dimensions - availability, access and sustainability. Several critical driving forces will determine its future, such as:

- accelerating globalisation and trade liberalisation;
- the changing roles of key actors such as national governments vs. local governments, NGOs, private sector and other parts of civil society;
- the changing face of farming economies, in terms of labour, size and intensification;
- climate change, increasing incidences of natural disasters and the effects of these on food production;
- the degradation of natural resources and the emerging water crisis;
- the rapidity of urbanisation, with fewer producers feeding increasingly more people;
- current health and nutrition crises among the poor, with particular focus in Africa;
- continued tensions and conflict, obstructing both production and distribution of food to the needy population;
- the technological advances in modern sciences;
- a growing public awareness among nations that effective measures to address these complex challenges are urgent.

These and perhaps other critical factors will largely determine the ambitious goal of achieving a world free from hunger by 2015.

The world is still growing by an estimated 80 million people a year, resulting in a rapid increase of food requirements. On the other hand, crop diversity is at serious risk. An astonishing eight percent out of the known 250,000 species of flowering plants is likely to disappear before 2025. Over 15 million hectares of tropical forests containing the largest pool of biodiversity are lost each year. According to FAO, traditional crop varieties have dwindled by 90 percent in the past century alone.

Natural disasters, mismanagement of natural resources and population pressure all add up to this. This loss in diversity has serious implications on global food security. A number of international agreements to conserve crop diversity and species collections have been adopted. Among them are the Convention on Biological Diversity (1992), a Global Plan of Action (1996) that lays out the critical steps for the conservation and use of crop diversity; and the International Treaty on Plant Genetic Resources for Food and Agriculture (2001). The latter recognises the need for a multilateral system that establishes for the first time international law laying out rules for conservation, utilisation, access and benefit sharing for plants of agricultural importance.

The SDC is actively supporting these international instruments. They form an integral part of our development agenda. Sustainable use of natural resources through promoting biodiversity-conform agricultural and agrobiological production is one of the five key policy domains of SDC.

Regarding the implementation of the Treaty, we consider a first objective to be the establishment of a system that keeps the diversity of plant genetic resources in perpetuity. The Global Crop Diversity Trust – an initiative of the Future Harvest Group together with World Bank and FAO – is one such financing instrument for the Treaty. Switzerland has been committed to this Trust since its inception.

Secondly, genetic resources for food and agriculture are important for agriculture in both developed and developing countries and for commercial enterprises and small farmers alike. Recognising this shared goal, the success of the Treaty will depend on the final layout of the material transfer agreement and its conditions for access and benefit sharing. Undoubtedly, it is here where public and private partners, NGOs and civil society have to work hand in hand.

Maintaining a diversity of crops and varieties is a key to survival for millions of small farmers worldwide. For thousands of years

they have used the genetic variation of wild and cultivated plants to develop their crops and raise more nutritious, resistant and productive new breeds. Such crops are the life-line in the fight against poverty and hunger. Farmers and breeders must constantly bolster crops against pests, diseases, weeds, drought, poor soils and other farming problems by breeding in new characteristics to protect them. Crop diversity is the pool from which they draw these traits. Today 75 percent of the 1.2 billion people earning a dollar a day or less live in rural areas. It is here where SDC undertakes its key mandate and is engaged in securing biodiversity for food security.

I would like to express the hope that we will have a frank and open dialogue on these concerns. Moreover, I am extremely pleased to see so many stakeholders and interested parties who have accepted our invitation to learn from international collective experiences on the subject.

My special thanks go to the Syngenta Foundation and the International Plant Genetic Resources Institute. Without them and their tremendous efforts, the symposium would not have reached where it is today.

This symposium is, I am convinced, a starting point for cooperation that can strengthen the international systems from different perspectives, but with a common goal for the long-term conservation of plant genetic resources for food and agriculture. I wish you very fruitful deliberations in an open and constructive spirit.

"Crop genetic diversity is and will continue to be an essential asset in the race to reduce hunger and poverty. There is a real danger that if we do not agree on ways to conserve and use this diversity, we shall surely lose it"

Heinz Imhof

Opening Remarks

Heinz Imhof Chairman of the Board of Trustees,
Syngenta Foundation for Sustainable Agriculture, and
Chairman of the Board of Directors of Syngenta AG.

We are delighted to co-host this symposium with the Swiss Development Cooperation and the International Plant Genetic Resources Institute for three reasons:

- First, today is World Food Day.
- Second, we must find fair and sustainable ways of sharing the benefits of plant genetic resources, for the well being of all parts of society and for meeting the challenges of hunger, poverty and environmental degradation.
- Third, today also marks the second anniversary of the Syngenta Foundation for Sustainable Agriculture.

Let me briefly cover each of these three points:

Why is World Food Day important?
World Food Day marks the birthday of the Food and Agriculture Organisation in 1945. However I think that it has a greater significance. There have been some remarkable achievements over the last 58 years in increasing agricultural production and productivity and yet, I think we should all pause and ask – why in a world of plenty do more than 800 million people live in fear of hungry and malnutrition? Who are they? Why are they hungry? Where are they? And what can we do – individually and together – to reduce their vulnerability?

Ambassador Fust has already eloquently outlined the challenges – they are huge and will only be tackled through partnerships and coalitions between many players in the public and private sectors, working with civil society. We must meet these challenges without ploughing under natural habitats or causing further deforestation and loss of biodiversity. We must also be more efficient in our use of fresh water. The solution lies in increasing productivity – sustainably – in ways that take into account environmental and social concerns.

In 1960, one hectare of land fed two people; by 2025 it will have to feed five people and most of these people will live in developing countries. The World Bank estimates that 90 percent of the increases must come from raising yields on existing land. The solutions that will raise productivity, improve food quality and help poor people break out of the vicious cycle of poverty, hunger and disease, can only be achieved through working together.

It is tragic that faced with such real and daunting challenges there is so much controversy over how we should resolve them: Trade, intellectual property, technology, the roles of the public and private sector, food quality are all areas of polarised debate.

Today's symposium will not solve these questions, but I hope it will be an opportunity for open and frank discussion and that it will be a step in the right direction. These controversies will not go away, workable solutions must be found. The World Food Day is here to remind us that it real progress is urgently needed.

Food Security and Biodiversity: Sharing the Benefits of Plant Genetic Resources

To increase the productivity of our crops and their reliability and nutritional quality we must make full use of the genetic diversity of the world's major food crops. This is why finding practical ways to conserve and use crop genetic diversity is so vital.

The agreement on the International Treaty on Plant Genetic Resources for Food and Agriculture was an important step forward. We hope that sufficient governments will ratify the Treaty so that it can enter into force quickly. [Note: the Treaty went into force in June 2004.]

However, ratification is not the end of the story. Many practical issues in both the Global Plan of Action and how the Treaty will work remain to be resolved, such as:

- The nature of the Material Transfer Agreements, though which germplasm will be released.
- The elaboration of a Funding Strategy to support the workings of the Treaty.
- The development of 'access and benefit sharing' arrangements that are fair, realistic and sustainable. Syngenta and the Foundation support the objectives of the International Treaty and we are committed to working with all parties to find fair, practical and sustainable answers to these questions.

In addition, Syngenta has already committed to declaring the sources of the genetic materials it uses. Also, at the World Summit for Sustainable Development in Johannesburg, Syngenta made the commitment not to pursue new applications for patent protection for seeds and biotechnology in the least developed countries.

Syngenta has also made available several technologies on a 'royalty free' basis for the benefit of subsistence farmers and will continue to do so.

I am very pleased that today we will learn more about the purpose of the Global Crop Diversity Trust and progress with its establishment as a public/private partnership and an essential element of the Funding Strategy of the International Treaty.

I would also like to reconfirm Syngenta's financial support for the Global Crop Diversity Trust once it is established. In the meantime, our Foundation will continue to provide support for the development of the Trust.

Why did we establish a Foundation and what role do we see it playing?

Many of the issues and challenges facing sustainable agriculture go beyond industry and the normal boundaries of agriculture, profitability and corporate social responsibility.
Being a good global citizen requires that we search for ways to increase opportunities and options for poor and marginalized rural communities to improve their livelihoods – particularly in the drier parts of the world and for those who do not have access to markets.
We created the Foundation to go where the needs are greatest.

The Foundation is helping to build public/private partnerships and working with partners:

- in programmes aimed at bringing benefits directly to poor farmers;
- to encourage dialogue towards finding fair, realistic and sustainable solutions to the many controversial issues that seem to impinge on sustainable agriculture and its ability to meet the needs of society now and in the future.

This symposium is an example of a unique partnership with colleagues in the public sector and the international research community.
It is a first for the Foundation – but it should not be the last!

The purpose of this symposium is to help identify what has been done to improve access to Plant Genetic Resources and benefit sharing. What needs to be done and by whom? And are there examples of good practice and lessons to be learnt on what works and what does not?

Crop genetic diversity is, and will continue to be, an essential asset in the race to reduce hunger and poverty. There is a real danger that if we do not agree on ways to conserve and use this diversity, we shall surely lose it.

"The provisions of the IT cover matters such as the conservation, exploration, collection, characterization, evaluation and documentation of PGRFA, as well as sustainable use of PGRFA, farmers' rights and the Multilateral System of Access and Benefit Sharing"

International Treaty on Plant Genetic Resources and its Benefit Sharing Provision

Alwin Kopše Swiss Federal Office for Agriculture

"Negotiate within the framework of the Convention on Biological Diversity, bearing in mind the Bonn Guidelines, an international regime to promote and safeguard the fair and equitable sharing of benefits arising out of the utilization of genetic resources"

Plan of Implementation of the World Summit on Sustainable Development §44 (o)

The objectives of the International Treaty (IT) are:

- the conservation and sustainable use of plant genetic resources for food and agriculture (PGRFA);
- the fair and equitable sharing of the benefits arising out of the use of PGRFA; and,
- fostering sustainable agriculture and food security.

These objectives are in harmony with the Convention on Biological Diversity (CBD) and have close linkages to the FAO and the CBD.

The provisions of the IT cover matters such as the conservation, exploration, collection, characterisation, evaluation and documentation of PGRFA, as well as sustainable use of PGRFA, farmers' rights and the Multilateral System of Access and Benefit Sharing (MS).
Ex situ collections held by the International

Agricultural Research Centres (IARCs) of the Consultative Group on International Agricultural Research (CGIAR) and other institutions are also covered by the IT, along with international PGR networks such as the Global Information System (GIS) on PGRFA. The Treaty also deals with financial strategy and institutional provisions, such as for the governing body, the secretariat, and with compliance and similar.

The Multilateral System of Access and Benefit Sharing

Designed for efficiency, effectiveness and transparency, the MS facilitates access to PGRFA and ensures that benefits are shared in a fair and equitable way. The MS covers those PGRFA listed in Annex I (65 crops and forages) and under the management and control of the contracting parties and in the public domain. It also covers PGRFA held in ex situ collections of the international agricultural research centres (IARCs) as listed in Annex I. Other holders of PGRFA listed in Annex I are invited to include these resources in the Multilateral System.

Access provisions

Facilitated access to the MS is provided pursuant to a standard material transfer agreement (MTA) to contracting parties, as well as "legal and natural persons under the jurisdiction of any Contracting Party". Within two years of the entry into force of the IT, the Governing Body shall decide whether access shall continue to be facilitated to those natural and legal persons who have not included the PGRFA in the MS. No tracking of individual accessions is necessary and it is free of charge, or, when fee is charged, it shall not exceed the minimum costs involved.

The IT also states that access to PGRFA under development is to be at the discretion of their developer and that access to PGRFA found in in situ conditions is to be provided according to national legislation or, in the absence of such legislation, in accordance with such standards as may be set by the Governing Body. Access to PGRFA protected by IPRs and other property rights is directed to be consistent with relevant international agreements, and with national laws, with the availability to seek recourse in case of contractual disputes arising under the MTA.

However, the content of the MTA is not yet completely defined. The MTA has to contain the following:

- access to be provided only for the purpose of utilisation and conservation for research, breeding and training for food and agriculture (12.3 a)
- "recipients shall not claim any intellectual property or other rights that limit the facilitated access to the PGRFA, or their genetic parts or components, in the form received from the MS" (12.3d)
- continued availability of the PGRFA (12.3g)
- provisions on monetary benefit sharing (13.2d ii)
- other relevant provisions of the IT (e.g., on data to be made available)

Benefit sharing and the MS

Facilitated access constitutes itself a major benefit of the MS. Other benefit sharing mechanisms include the exchange of information, access to and transfer of technology, capacity building and the sharing of monetary and other benefits of commercialisation. Benefits are to flow primarily (directly or indirectly) to farmers in all countries, especially in developing countries, although the importance of the involvement of the private sector is recognised.

Sharing the benefits of commercialisation

Two types of monetary benefit sharing are covered in the IT: mandatory – if the product incorporating material from the MS is not available without restrictions to others for further research and breeding; and voluntary – if such a product is available without restrictions to others for further research and breeding. The level, form and manner of the payment is to be determined by the Governing Body, in line with commercial practice and payment is to be made to an appropriate mechanism, such as a Trust Account. The Governing Body also has rights to assess whether the mandatory payment requirement shall apply in cases where the product is available without restriction to others for further research and breeding within five years from the entry into force of the IT.

As well as the overall content of the MTA, some issues remain for further discussions at the international level. Interpretation of the terms "in the form received" (12.3d) and "available without restrictions" (13.2d ii) remain contentious and it is important to develop further the strategy and criteria for distributing the benefits and those strategies and mechanisms involving the private sector.

In short, the rules for access and for benefit sharing have to be seen as a package and it must be held in mind that the MS still under construction. Although the IT may be imperfect, it stands as a reflection of how far the international community was prepared to go in November 2001 and should be recognised as one international regime for benefit sharing as called for in the final documents of the World Summit on Sustainable Development (WSSD). We look forward to the upcoming negotiations as an additional instrument to improve the system of access and benefit sharing for PGRFA.

"No longer, as has been the case for most of its recent history, can intellectual property be treated as a domain of its own, but one that crucially affects social development"

Geoff Tansey

Balancing Interests

Geoff Tansey* Consultant, Quaker United Nations Office

I was asked to stand back from the detail of the two treaties and look at the broader process of change going on. In this, the global rules on intellectual property are crucial and the question is whose interests are we talking about, and where are they focused? I suggest we have to look at interests at different levels – from the international environment, to the dynamics within the food system itself.

During the 1990s, the rules affecting food and agriculture were re-written in various international negotiations such as those in the Convention on Biological Diversity (CBD) and International Treaty. But a different set of rules overshadows these two and may prove to be key to what happens to our food future. And these rules are in a body, the World Trade Organisation (WTO), which, unlike the others, requires its Members to implement and enforce them. It also includes a binding dispute settlement mechanism where non-compliance can end in trade sanctions.

Now there are many agreements in WTO. But the key one affecting benefit sharing is not in agriculture but deals with things such as copyright, trademarks and patents. It is the Trade-Related Aspects of Intellectual Property Rights Agreement, or TRIPS. It introduces more or less global rules on so-called intellectual property. These matter because they increasingly affect who has what power and wealth, who drives and controls the direction and pace of change and what individuals can do.

Other institutions are also involved in shaping the intellectual property rules affecting food. The World Intellectual Property Organization (WIPO) has an intergovernmental committee looking at genetic resources, traditional knowledge and folklore and the International Union for the Protection of New Varieties of Plants (UPOV) deals with plant breeders' rights in a growing number of countries.

It is not easy to influence the deliberations in these bodies unless you have access to the policy makers in the capitals that set the positions – and that is something poor farmers generally lack.

Even governments have a difficult time in holding a coherent position across the different bodies, and often don't. Different international bodies are usually dealt with by different government departments and joined-up thinking may not result, as a report initiated by the World Bank illustrated. It was aptly titled "Why Governments Can't Make Policy – the Case of Genetic Resources in the International Arena". Today these international institutions themselves are not balanced in their ability to ensure treaty obligations are carried out, nor are governments in their capacity to negotiate in them – and that takes me back to the WTO but via the food system.

At the heart of the food system lie issues of power and control, risks and benefits – who has what power to control their part of the food system, minimising or optimising risks and maximising or optimising benefits? It is a dynamic system in which the key drivers of change have come from competition between and among the various actors involved in the over-productive, over-subsidised and saturated markets of the rich countries. They need new markets in the developing countries.

Two key trends are evident in this system. One is an increasing concentration of economic power so that fewer and fewer enterprises in any one area control more and more of the market in that area – from farm inputs to food retailers. The other is use of various tools by the different actors in the system to maximise control of the operations they perform. To do this they use science and technology, information and management tools within a framework of laws, rules and regulations in which they try to influence the broader political process that sets the rules.

Now these various actors in the system – the input suppliers, farmers, traders, workers, manufacturers, processors, distributors, retailers, caterers and consumers – are not equal in their ability to use these various tools and affect the rules. Increasingly, it is those subject to economic concentration, who are best able to influence rule-making processes. The interplay of these larger actors does not leave much room for small farmers, who are being progressively squeezed out and receiving less of the money being made from food.

Changes in the food system are part of a bigger picture of economic globalisation and revolutions in our understanding of the biological and information sciences. The scientific revolution in biology promises improved means of control of plants and animals for different actors in the food system. However, the products and processes of these scientific revolutions may be easily copied and some are self-reproducing. They require extension of the intellectual property rules, among other things, if private innovators and corporate rather than public developers are to secure returns on their investments. This for me is the context of the revision of rules governing genetic resources and Intellectual Property (IP).

Intellectual Property rules underpin the ability of private actors to win from the knowledge economy and today's scientific and technological revolutions. Patents, trademarks, and copyright are also important tools used in market development and seeking market share, and in firms' competition and R&D strategies, and have been for well over a century. They are a means to capture and appropriate benefits. And this takes us back to the WTO. For it is the TRIPS agreement that has introduced essentially global intellectual property rules.

Intellectual property is one of the three key pillars of the WTO. These pillars are all linked by a binding dispute settlement mechanism backed by sanctions. Indeed, this is the reason intellectual property was pushed into the WTO and not left for the existing body, WIPO, to deal with.

As various authors have shown – and Peter Drahos' Information Feudalism has a riveting account of the process – a high level group of industrialists initially from the U.S. led by the pharmaceutical industry but including the motion picture, recording and software industries, recognised that in a global market with the new technologies they needed enforceable global intellectual property rules. Over a 20 year period they worked to secure the TRIPS Agreement, taking discussions out of WIPO, where they could not get binding agreements, into the WTO.

Now TRIPS (Trade-Related Aspects of Intellectual Property Rights) Agreement introduces these minimum enforceable standards for various areas of intellectual property, notably in copyright, trademarks and patents. However there is no special and differential treatment for developing and least-developed countries, except some extended deadlines for compliance. While the claim is made that it will bring benefits in the long run, the immediate costs

are considerable and the financial transfers from developing to developed countries are enormous – some $19bn a year from patents alone to the U.S. according to a World Bank study.

In agriculture, TRIPS requires countries to introduce intellectual property rules for the first time in many cases. Article 27 on patents requires any invention, product or process in all fields of technology to be patentable. In Para 27.3(b) it allows exceptions for plants and animals but not microorganisms, but requires some form of protection for plant varieties. This highly contentious clause was up for review in 1999 but has still not been completed. Unlike in the CBD or International Treaty no terms are defined in TRIPS. Although some developing countries resisted the inclusion of TRIPS into the Uruguay Round of Trade Negotiations, and gained some modest concessions, most were little-involved and ill-prepared for the review in 1999.

Indeed the current negotiating process is rather like having Manchester United playing downhill, against a team only some of whom are professionals and some of whom have never played the game before. Even worse, some of the big players are busy leaning on people in the capital not to cause any problems on the pitch and let them through.

It was on the basis of trying to make the process a little – and I stress the word little here – more balanced that the Quaker UN Office became involved with negotiators in 1999 and has been working with them ever since. It has worked to provide a quiet space for negotiators to meet, hear each other and those with a wide range of views, and have access to various background materials. It has also helped them have some greater contact with people working on these issues in various regions of the world.

This experience has shown that the processes by which rule-making operates are flawed and unbalanced, with unequal parties of greatly differing legal capacity. It also highlights the difficulty of treating issues, such as medicines or genetic resources, on their merits and seeking solutions that would address particular development needs without requiring trade-offs in other areas of WTO negotiations. Moreover, developing countries face continued pressures in bilateral and other multilateral arenas to go beyond what was agreed in TRIPS. The sense of injustice this leaves behind, not to mention the feelings of bad faith generated by subsequent experience in trying to address developing country concerns in health and access to medicines, has undermined trust in the WTO as a multilateral institution, in which the interests of developing countries and their peoples can be taken sufficiently into account. And increasingly, if big actors cannot get what they want in one place they will move to other multilateral fora, or to bilateral pressures to do so.

Another challenge, as suggested in a recent Food Ethic Council report, is to do what feminists did about gender and change the language we use to talk about so-called intellectual property rights (IPRs) to reflect more accurately what they are: privileges granted by society to a few to exclude the rest as a form of business regulation. It is time to take up Peter Drahos' suggestion that "the language of property rights…be replaced by the language of monopoly privilege." What we should be talking about are intellectually-based monopoly privileges – IMPs – not IPRs. They can enrich the few in the name of producing things society wants or as a means of rewarding their creativity, but more often they are a means of protecting investment and minimising corporate risk. They are not inalienable rights, but assignable; not reserved for people, but apply to corporations and their effects are linked to market structures. Such a change in language will help regain sight of the social contract that lies behind policy in this area, which is essential in food and farming.

There are real costs to these monopoly privileges as the World Bank has pointed out. They shift market power to the larger players, lead to higher consumer prices, increase the cost of acquiring knowledge – the international treaty is a crucial attempt to avoid such costs in food and agriculture – and, unless there is a robust anti-trust and competition regime, which is not usually the case in most developing countries, these monopoly privileges may facilitate anti-competitive practices that can keep new players out.

Today, as a growing number of reports are suggesting, from the UK Commission on Intellectual Property Rights to the World Bank, the intellectual property regime that is developing – and which is the éminence grise behind the CBD and International Treaty – is not meeting human needs but rather bolstering a rather dubious status quo. While technological innovation is automatically assumed to be a good thing, we are less ready to look at innovation in our institutions and the rules that shape them. So much of the current pressure to expand and extend IP protection is, in reality, a very conservative force, aimed at protecting the institutional structure of narrow private interests rather than enhancing the opportunities major scientific revolutions are opening up and expanding the public domain. A real

challenge is to think beyond the 19th century rules structures into which current scientific and technological innovation is being squeezed. There is no divine right for existing corporate forms of institutions to survive and be protected behind more and more IP legislation – from copyright extensions for long dead creators to patent rights given in lax regimes for dubious inventiveness. In reality, the current IP regime helps bolster the creation and maintenance of unaccountable oligopolies, able to capture the rule-making processes, and gives them almost government-like power to impose a kind of private taxation on the population built around their monopoly privileges. Software companies and big pharma as agencies of private taxation as much as innovation, perhaps?

No longer, as has been the case for most of its recent history, can intellectual property be treated as a domain of its own, but one that crucially affects social development. This is particularly urgent given its widespread introduction into the food system globally, and the pressures to increase its use there. Within the current scheme of things, it means ensuring that the privileges granted through patents etc. are matched by not just responsibilities but also by liability regimes – as is still to be negotiated in the Biosafety Protocol – prevention of restrictive practices, unfair contracts law, open access research and so on. The rules bestowing monopoly privileges should not be used to promote narrow sectional or national interests of the currently powerful but, if possible, to empower the poor and weak, and, if not, be rejected in favour of something better. That will almost certainly mean changing the rules of the game internationally, and resisting processes and pressures to seek ever higher levels of intellectual property protection.

So how is such change even to begin to happen? In part, by a broader public involvement in the rule-making processes in a range of institutions. Without public concern about access to medicines, TRIPS would not have made the headlines around the world over the past couple of years. Such concern will not go away and should also be entering into the questions of food security. For that to happen, these issues need to become accessible to the public, of political importance to societies at large. Only then will pressures arise to make the connections often not made at present between the various interests affected. One challenge, then, is to take the discussion and debate from here to a more general public and

engage them in ways that will help reshape the rules for a new millennium. Another is to make the rule-making processes more just within and between countries and in ways that prioritise the needs of the poor and will empower them in their development, in sustainable ways that will maintain food security at all levels. For without that, the danger, and prospect, is of rules that will bolster the current and growing divide in wealth and power around the world, and a food system in which poor farmers are further marginalised.

So, as we discuss in more detail the International Treaty, it is the poor and marginalised who should be our measure. The many ambiguities in the text should be resolved in good faith in their interest. A key aim of the extension work I was involved with over the years was sharing knowledge of techniques and practices to increase the wellbeing and productivity of farmers and rural people – and through that the society as a whole. The International Treaty is an island of multilateralism aimed at the sharing of things that we all need for food security, in a growing sea of bilateralism and proprietarianism that reduces the public domain. The short-term interests of the few may not favour the treaty's approach, but the long-term interests of the many certainly do. A key challenge to achieve that is for the interests of the many to be more effectively represented in the rule-making processes, as the rhetoric of the Treaty suggests. Then any benefit sharing that does accrue may get to those who need it.

* *Geoff Tansey spoke in a personal capacity and not on behalf of any organisation.*

"When speaking of benefit sharing, the IT clearly shows that one may not limit oneself to a monetary concept"

Sharing the Benefit of Plant Genetic Resources

Fair and equitable benefit-sharing within the International Treaty on Plant Genetic Resources for Food and Agriculture: The View of the Berne Declaration

Bernhard Herold Berne Declaration

I was asked by the organisers of this symposium to present the non-governmental organisation (NGO) viewpoint on how the benefit sharing provisions of the International Treaty on Plant Genetic Resources for Food and Agriculture (IT) should be practically applied for all parties concerned and what the main ingredients would be for the determination of the term "fair and equitable" with respect to benefit sharing. But let me first make some introductory remarks:

First, I should point out that there is not one NGO viewpoint on this issue and that I therefore only speak on behalf of the Berne Declaration, a medium-size Swiss NGO which promotes fairer, more equitable, sustainable and democratic relations between developing countries in the south and the industrialised countries in the northern hemisphere. We do this mainly through advocacy work, research and public education.

The Berne Declaration has been quite strongly involved in the whole process surrounding the implementation of the Convention on Biological Diversity (CBD) in Switzerland; in particular with respect to access and benefit sharing provisions and the relationship to intellectually-based monopoly privileges (IMPs). I prefer to use this expression, introduced previously by Geoff Tansey, because it reflects more accurately what they are about than the term "intellectual property rights" (IPRs).

Second, I can inform you that during the recent internal consultation process in Switzerland concerning the ratification of the IT, the Berne Declaration – like all other stakeholders that participated in the process – welcomed the Treaty in principle and recommends its ratification by the Swiss Government and Parliament. But at the same time we pointed out some problematic aspects of the IT in particular with respect to farmers' rights and IMPs.[1]

The points we made were taken up by a number of other NGOs and political parties but it remains to be seen if they will be taken into consideration by the Swiss Government and its representatives in the future Governing Body of the IT. It is no secret that we have had many disagreements with the Swiss Government and in particular its Federal Institute of Intellectual Property on these topics.

We have been particularly disappointed that while the Swiss Delegation has often worked constructively in negotiations over the CBD and the Bonn Guidelines as well as on the IT, at the end of the day IMPs have always become central and on this issue the Swiss Delegation fought for provisions which essentially emptied the agreements of their original goals.

To give you a typical example: on 3 November 2001, the day the IT was adopted at the 31st United Nations Food and Agriculture Organization (FAO) Conference, the Swiss Delegation made an extremely problematic declaration with respect to Article 12.3d of the IT, which states that "Recipients shall not claim any intellectual property or other rights that limit the facilitated access to the plant genetic resources for food and agriculture, or their genetic parts or components, in the form received from the Multilateral System". The Swiss Delegation stated in its declaration that this article does not aim at reducing the protection through patents at the international level.[2]

Does benefit sharing depend on the granting of patents?

The main point I want to make here, and I can't stress it enough, is that it is erroneous to link benefit sharing to patents, be it in the framework of the CBD or the IT. This is an argument which is put forward constantly by the pharmaceutical, agrochemical and seed industry, including Syngenta. They always say that without patents there are no profits and thus no benefits to be shared. I've heard this again and again. The industry actually uses – I would even go further by saying misuses – both the CBD's and the IT's benefit sharing provisions to advocate patents on plants or parts thereof. If these agreements are being used to push further the industry's patenting-of-life agenda, then we are really on the wrong track and must reflect whether these agreements will not turn out to be counterproductive.

At a meeting in Hyderabad, India, in June 2003, a number of civil society organisations and NGOs from Africa, Asia, Europe and Latin America adopted a declaration[3] which says: "We have come to the conclusion that the concept of access and benefit-sharing must be understood in its own right without a linkage to patents."

When speaking of benefit sharing, the IT clearly shows that one may not limit oneself to a monetary concept. The first point made by the Contracting Parties in Article 13 of the IT is that they "recognise that facilitated access to plant genetic resources for food and agriculture which are included in the Multilateral System constitutes itself a major benefit of the Multilateral System and agree that benefits accruing there from shall be shared fairly and equitably in accordance with the provisions of this Article."

They then go on to list four specific mechanisms through which the benefits arising from the use of plant genetic resources for food and agriculture (PGRFA) under the Multilateral System shall be shared fairly and equitably: exchange of information; access to and transfer of technology; capacity-building; and the sharing of monetary and other benefits arising from commercialisation.

So the benefit sharing option in form of a payment into the trust account foreseen in Article 19.3f is only one of the options, and in my opinion definitely not the most important form of benefit sharing in the framework of the IT. And even this option isn't necessarily linked to patents. In an paper[4] by Susan Bragdon from the IPGRI (International Plant Genetic Resources Institute) in Bridges, the publication of the ICTSD (International Centre for Trade & Sustainable Development), Bragdon commented that "Benefit-sharing in the form of a payment into an international fund at FAO will be mandatory when genetic material from the MLS is used to produce a "product that is a PGRFA" (e.g., a line or cultivar) that is commercialised, unless this product is made available without restriction for further research and development. In effect, patenting will likely trigger the benefit-sharing mechanism, plant breeders' rights probably will not."

If we look at the Article in question – Article 13.2d(ii) – it says that "a recipient who commercialises a product that is a plant genetic resource for food and agriculture and that incorporates material accessed from the Multilateral System, shall pay to the mechanism referred to in Article 19.3f, an equitable share of the benefits arising from the commercialisation of that product, except whenever such a product is available without restriction to others for further research and breeding, in which case the recipient who commercialises shall be encouraged to make such payment."

Now, a patent clearly restricts availability so it triggers the paying mechanism, as Susan Bragdon points out in the paper cited above. But, in many cases, plant variety protection schemes also restrict availability to others for further research and breeding. I only need refer to Article 14 of the 1991 version of UPOV (International Convention for the Protection of New Varieties of Plants), which extends breeders' rights to "varieties which are essentially derived". So, in many cases, breeders' rights should, in my view, also trigger off the payment mechanism, not only patents.

And then there is the reference in Article 13.2d (ii) that in cases in which the product is available without restriction, the recipient is "encouraged to make such a payment". Now, this sounds like a totally voluntary requirement, and as such one might have just as well left it out all together. But further down the IT goes on to say that the Governing Body "may also assess, within a period of five years from the entry into force of this Treaty, whether the mandatory payment requirement in the MTA shall apply also in cases where such commercialised products are available without restriction to others for further research and breeding." I interpret this as a sort of Damocles Sword hanging over the recipients: If they refuse to make the (voluntary) payments that they are "encouraged" to make in cases where the commercialised products are available without restrictions, the Governing Body will come under pressure to make payments also mandatory under such cases.

So, to sum up, my point is that patents are not necessary, or in fact desirable, for the triggering of benefit sharing because a) the IT foresees non-monetary forms of benefit sharing and, b) even the monetary option does not depend on patents, it can also be triggered by plant breeders' rights.

Practical application of the IT's benefit sharing provisions

The benefit sharing provisions of the IT have already been presented by Alwin Kopše from the Swiss Federal Office for Agriculture. Obviously the practical application of the IT's benefit sharing provisions will depend on the exact wording in the standard material transfer agreement (MTA), which will be adopted by the Governing Body and contain the provisions of Articles 12.3a, d and g, as well as the benefit sharing provisions set forth in the above mentioned Article 13.2d(ii) and other relevant provisions of the Treaty.

Now, Article 12.3d contains one of the most controversial passages of the Treaty. It says that *"recipients shall not claim any intellectual property or other rights that limit the facilitated access to the plant genetic resources for food and agriculture, or their genetic parts or components,* ***in the form received*** *from the Multilateral System."*

How will this be interpreted in the MTA? Obviously the phrase "in the form received" can not refer only to plant genetic material received as such, but also to parts of the form the material was received in. The material as such, be it entire PGRFA or parts thereof, can in any case not be patented, as it doesn't fulfil the basic criteria for patentability, since it is not an invention. So this can not have been meant.

The phrase only makes sense if it also refers to parts of the form the material was received in, e.g., genes or gene sequences of PGRFA received from the system. If these are not modified in a substantial way, they are obviously still "in the form received". Isolating and purifying them does not change them. And discovering the function of a gene or gene sequence is, obviously, a discovery and not an invention and can therefore not contribute to patentability.

Whether the benefit sharing provisions of the IT are applied in a "fair and equitable" manner will, in my view, depend among other things on how the Contracting Parties interpret this term. Because if it is interpreted in a way that actually allows PGRFA to be received from the multilateral system, for genes to be isolated and/or their functions discovered and patented, then this cannot be considered as "fair and equitable" as it would constitute nothing less than an act of "biopiracy".

With respect to the practical application of the IT's benefit sharing provisions there are further points which are difficult to interpret. I will only mention Article 13.2b(iii) in which reference is made to the transfer of technology, including that protected by IMPs to developing countries, which should be provided and/or facilitated under fair and most favourable terms. The last sentence of the Article reads: "Such access and transfer shall be provided on terms which recognize and are consistent with the adequate and effective protection of intellectual property rights."

But what do the words "adequate and effective" mean here? We have had some bad experience with the word "effective". In the case of Article 27.3b of the TRIPS (Trade-Related Aspects of Intellectual Property Rights) Agree-

ment for example many industrialised countries interpret the reference to an "effective sui generis system" as practically calling for an adoption of the International Union for the Protection of New Varieties of Plants (UPOV) convention. From our point of view, it is absolutely vital that the interpretation of this sentence does not undermine farmers' rights. Otherwise the option of benefit sharing cannot be considered "fair and equitable".

Main ingredients for the determination of the term "fair and equitable"

The term "fair and equitable benefit sharing" has been central in all discussions since the CBD was negotiated. The term is also used in the IT and in the Bonn guidelines. There are many papers that refer to the term, including numerous official contributions made in the context of the review of Article 27.3b of the TRIPS Agreement, but I haven't seen many papers which actually tried to interpret it.

In a study commissioned by the Swedish Scientific Council on Biological Diversity and published in 1995, the three authors, Marie Byström, Peter Einarsson and Gunnel Axelsson Nycander, tried to interpret the term "fair and equitable" as it is used in the CBD. The two words are usually used together and it can be assumed that "fair" refers more to the distribution process, while "equitable" focuses on the outcome of the distribution process.

Interestingly, the two words "fair" and "equitable" are not always used together in the IT. For example in Article 13.2d(ii) the term "equitable" is used alone. But in that context it makes sense because the outcome is obviously meant, as the process is practically given by the Material Transfer Agreement (MTA). So it is important that the process through which the MTA is negotiated is fair.

It is obvious that the meaning of "fair and equitable" will always be a question of individual ethical judgement. The authors of the study mentioned above have drawn up a list of criteria for the assessment of benefit sharing in the framework of the CBD. Adapted to the IT, the criteria to assess whether the benefit sharing mechanism envisaged (i.e., the mechanisms listed in Article 13 of the IT) can be considered as "fair and equitable" would be the following:

– The mechanism envisaged should contribute to strengthening the situation of the less powerful party/parties at all levels in the sharing relation. So if we look at the commercial option in the IT for example, we would need to evaluate whether this form of benefit sharing contributes to the strengthening of the situation of the farmers who have initially provided PGRFA to the multilateral system.

– The mechanism should contribute toward, or at least not counteract, the other objectives of the IT, e.g., "the conservation and sustainable use of plant genetic resources for food and agriculture" (Article 1 of the IT).

– The mechanism must respect basic human rights, including the "right to adequate food" presently discussed within the FAO.

– The mechanism must respect value and legal systems across cultural borders, including customary law. So, in the context of the IT, the granting of an IMP on a plant which in the culture where the PGRFA originally comes from is viewed as unethical would not fulfil this. In other words: No patents on things like basmati or jasmine rice, or any other rice for that sake, because this would be considered unethical by most people in the countries of origin.

– The mechanism must allow democratic and meaningful participation in policy decisions and contract negotiation by all stakeholders, including stakeholders at the local level. This point should, in my opinion, be taken into account in particular with respect to the negotiation process for the IT's "Material Transfer Agreement".

– The mechanism must include provisions for independent third party review.

– The mechanism must ensure that information about agreed terms is made publicly available.

Thank you for your attention.

Notes:

1 See http://www.evb.ch/cm_data/Saatgutvertrag_FAO.pdf for the Berne Declaration's statement on the ratification of the IT by Switzerland (in German only).

2 The exact wording of the Swiss declaration is: "Notre délégation tient à préciser que, selon son interprétation, l'article 12.3 (d) du traité n'impose pas de nouvelles obligations qui seraient contraires aux engagements internationaux que notre pays a contractés. Nous considérons que cet article ne vise pas à réduire la protection par brevet au plan international." While this is legally speaking not a reservation (Article 30 prohibits Parties from making any reservations) it is clearly politically a very questionable act which raises many doubts as to whether the Swiss Government is really willing to apply the IT in the right spirit. Other industrial countries unfortunately made similar declarations. The Swiss declaration can be found under: http://www.blw.admin.ch/nuetzlich/publikat/m/konfbericht_2001.pdf (see page 32)

3 The Hyderabad declaration can be read in full at www.benefit-sharing.org as an annex to this presentation.

4 Bridges, No. 6, July-August 2003, page 21 (see www.ictsd.org)

5 "Fair and Equitable: Sharing the benefits from use of genetic resources and traditional knowledge" by Marie Byström, Peter Einarsson and Gunnel Axelsson Nycander, September 1999. See http://www.internat.naturvardsverket.se/index.php3?main=/documents/nature/biodiver/biodiver.htm

"If successful, the Trust will bring direct benefits to holders of collections around the world, especially in developing countries"

Geoffrey Hawtin

The Global Crop Diversity Trust: Purposes, Priorities and Governance

Geoffrey Hawtin Interim Executive Secretary,
Global Crop Diversity Trust

Introduction: Why we need the Trust

Major collecting took place in the 1960s-80s in the face of a rapid loss of diversity. Today there are 1,470 genebanks in 150 countries holding over six million accessions. The CGIAR Future Harvest Centres alone hold over 600,000 unique accessions and have distributed more than one million samples since the 1980s, over 80 percent of these to developing countries.

However, the serious loss of genetic diversity continues, mainly due to variety replacement but also through changing farming systems, habitat loss, over-exploitation and such.

The 2002 "Crop Diversity at Risk" study undertaken by Imperial College, Wye, UK, surveyed 99 countries over a five-year period, based on GPA data (1996) and a follow-up United Nations Food and Agriculture Organization (FAO) survey (2000). Of the countries surveyed, approximately seven percent had lost portions of their collections, although collections increased in 77 percent of countries. Budgets declined or remained static in 65 percent of countries, with regeneration backlogs increasing in two-thirds of developing countries (66 percent). The situation is considerably worse in developing countries.

The report concluded that there is a need for long-term sustainable funding, such as an international endowment.

History

In 1995, the CGIAR review of Future Harvest genebanks identified the need for upgrading collections. This was followed in 1996 by the adoption of the United Nation's FAO Global Plan of Action adopted, with ex situ conservation one of the priorities. By 1999, an investment plan had been prepared for Future Harvest genebanks that recommended the creation of an endowment. Two years later the political

stage was set with the 2001 adoption of the FAO International Treaty. The FAO and CGIAR agreed to work together towards the establishment of the Global Crop Diversity Trust.

Objectives of the Trust

The main objective of the Trust is to ensure the long-term conservation and availability of the plant genetic resources for food and agriculture (PGRFA). The Trust will in particular:

- endeavour to safeguard collections of unique and valuable PGRFA held ex situ, including those held in trust for the benefit of the world community;
- promote a competent, goal-oriented, economically efficient and sustainable global system of ex situ conservation;
- promote the regeneration, characterisation, documentation and evaluation of PGRFA and the exchange of related information;
- promote the availability of PGRFA; and
- support national and regional capacity building, including the training of key personnel, with respect to the above.

How the Trust will work

Two main funding mechanisms have been put in place to support the Trust: a non-wasting endowment fund, the proceeds of which will support the maintenance of collections on a long-term basis; and a funding facility to support the future upgrading of collections and building genebank capacity. Funds will be raised from governments (70 percent), foundations (15 percent), the corporate sector (10 percent) and private individuals (five percent). Our initial target for the endowment is $260 million.

Resource allocation

We have drawn up a series of draft interim eligibility principles to determine the allocation of resources. Priority will be given to collections that are important for food security and for which there is a high degree of interdependence among countries (Annex 1 of the International Treaty). Other collections that will be eligible include: those deemed "at risk"; those with material available under internationally agreed terms of access and benefit sharing; those committed to conserving the collection over the long term; and those committed to working in partnership to develop and maintain an efficient and effective global conservation system.

Work is underway to develop the criteria, standards and priorities that will be used to allocate grants. Crop and regional models are also being developed.

Relationship with the International Treaty on PGRFA

The Trust's relationship with the IT is a vital component of the IT Funding Strategy (Article 18). This dictates that the Trust will operate within the framework of the IT and support the implementation of the FAO Global Plan of Action.

However, the Trust is not the benefit-sharing mechanism foreseen in the Treaty. As stated in the 9th Regular Session of the FAO Commission on Genetic Resources for Food and Agriculture (Rome, October 2002): "This initiative was universally appreciated and supported, and appeals were made to donors to assist in the establishment of the Trust. The Trust would, it was hoped, attract new and additional funds from a wide range of donors."

Governance

The Trust will be an independent international legal fund, governed by its own Establishment Agreement, Constitution and Relationship Agreement with FAO. The Governing Body of the International Treaty will provide overall policy guidance, whereas the Donors' Council will provide financial and other oversight. The Executive Board will be the key decision-making body, made up of up to 13 members broadly representative of all key stakeholder groups. The Board will serve to balance the interests of donors of funds and donors of genetic resources.

Status and next steps

An Interim Executive Board has been appointed and charged with establishing the Trust. An Interim Secretariat has also been established at FAO – working closely with International Plant Genetic Resources Institute (IPGRI), although the location of the permanent secretariat has yet to be determined. The governance instruments have been adopted and country signatures are being sought. On the financial side, interim financial mechanisms are in place and work is underway to develop the permanent financial policies and mechanisms. Approximately $33 million has been pledged to date in expressed commitments and a further sum of approximately $60 million is under discussion. It is hoped that the first grants for upgrading and capacity building can be expected in 2004, with operational support grants expected to begin in 2005.

Conclusions

The Trust addresses an urgent need and one that is becoming increasingly recognised world-wide as the loss of genetic diversity impacts on everyone. Although it is an integral part of the Funding Strategy of the International Treaty, the Trust is not the formal benefit sharing mechanism of the IT. The Trust also addresses some key concerns and priority activities of the Global Plan of Action.

If successful, the Trust will bring direct benefits to holders of collections around the world, especially in developing countries. It will also bring huge indirect benefits to the whole world community, South and North; to plant breeders, farmers and ultimately all consumers.

The establishment of the Trust also raises many questions, a few of which demand our ongoing and serious attention:

- Why are the benefits of conservation and access often regarded differently by South and North?
- Is the characterisation of the South as gene-rich/ cash-poor and the North as gene-poor/ cash-rich justified? What is the true nature of gene-flow around the world?
- How can the plant breeding 'playing field' be levelled (investment in breeding in South, PPB approaches, breeding crops and traits of interest to the poor etc.)?
- Are there other important benefits to the South from conservation (e.g., restoration of agri-cultural systems) and how can they be enhanced (e.g., stronger genebank/rural community links)?

Thank you for your attention.

"Many genebanks, particularly the smaller ones, are not fulfilling their mandate, either to provide materials for breeders, or to conserve materials long-term"

Diversity and Protectionism Use of Genebanks: Trends and Interpretations

Cary Fowler Agricultural University of Norway
and Senior Advisor to IPGRI

I wish to make the important distinction between access to and availability of plant genetic resources for food and agriculture (PGRFA), and about the question of where the real value in PGRFA resides. Much of the noise of modern political discourse concerns access and benefit sharing; too little concerns availability and the question of how best the value and utility of PGRFA might be recognised and enhanced.

To set the stage, a brief trip back into history may be helpful. At least three discernable, if poorly delineated, periods of plant and genetic resource acquisition/transfer may be seen. In none of these is the story quite what you would expect from reading political tracts on the subject.

1. Ancient (Domestication to 1492): During this period spices and plants with medicinal qualities were the main subjects of acquisition, though the Sumarians collected vines, figs and roses in Asia Minor as early as 4500 BC. In general, there was no great difference in the capacity of one group or society versus another to utilise the materials. While the collectors were probably not adhering to the FAO Code of Conduct in their activities, there may not have been large conflicts. But who knows?
2. Colonial: The focus during this period was on industrial and plantation crops (tea, coffee, rubber, oil palm, cinchona, and indigo for example). By the time the first European set foot in the New World, maize had spread from Mexico to the tropical forests of Brazil and the Andean highlands. The spread of crops within the Americas and between Europe, Africa and Asia, largely accomplished before the colonial era, continued with the "Colombian Exchange."

For the most part, the aim was to acquire species as opposed to within-species diversity (though French sought to broaden variability of nutmeg and cloves). Medicinals continued to be important. Seeds and planting materials were collected, sometimes with the active opposition of local people. Colonial powers had the means to organise production systems and capitalise handsomely from their botanical acquisitions.

3. Modern (1800s >): During the modern period, imports and distribution of crop diversity were made in high numbers. The U.S. government, for instance, distributed 20 million packets of seed to farmers and gardeners in 1897 as part of a long-standing programme to introduce crops/diversity and promote adaptation and breeding in the country. From the 1940s onwards, concerted and well-organised efforts were made to collect genetic diversity for use in crop improvement programmes. Interest in plants of potential pharmaceutical value resurfaced in the 1980s. Materials had been collected for breeding programmes, but until the 1980s acquisition was not particularly controversial. PGRFA was considered the "common heritage" of humankind. For most of this period, the technologies used to develop PGRFA, like the PGRFA itself, were in the public domain and available to all. With the advent of the new biotechnologies and the application of intellectual property rights laws to biological materials, the picture began to change and by the 1990s differences in capacity to use again emerged along with restrictions in access.

The three periods are distinguished not so much by the calendar but by what was collected; the level of technology employed and how it was used; and the capacity of the collector and donor to exploit the biological materials, through technology and law.

Today, one might argue that the issue of "capacity to use" underlies most debates on PGRFA – the fact that someone else can do something with the materials that you can't. The issue is not, strictly speaking, about loss of property. Biological materials are not like gold; they can reproduce, thus their acquisition or removal does not diminish one's own property – it is how the material is used that poses the threat. It is about loss of opportunity, loss of commercial advantage. It is also about not giving any advantage to those you perceive to be adversaries. There is a strong "zero-sum" mentality evident in the discourse over PGRFA: "Your gain is my loss."

Germplasm Flows

It is certainly true that much of the diversity of cultivated crops now stored in genebanks was first found in and acquired from farmers' fields in developing countries. It is also true, that most of the crops and a considerable amount of their associated diversity had already departed their centres of origin long before the modern era. The history of the spread of crops is a fascinating story, but one must be careful in drawing political lessons today from events that took place hundreds or thousands of years ago. Contemporary flows of germplasm – not those of the Neolithic Age or even the colonial era – reveal contemporary interests and needs. This is why it is important to examine modern germplasm transfers and see what can be learned from them and why it is important to construct legal systems that address contemporary issues and not those of a bygone age that no longer exists.

During the peak period of PGRFA collecting for genebanks and scientific plant breeding programmes (1972–1991), developing countries received four times as many samples from CGIAR centres as they provided. At first glance this seems impossible, until you take into account the high degree of genetic resource interdependence among nations and the fact that while a country might be rich in diversity in two to five crops, it will likely be poor in and needful of diversity in all the others. Moreover, lack of functional storage facilities has meant that many countries have had to access and re-access materials repeatedly. This is unfortunate in every respect, but the fact remains that materials accessed the second time may be just as needed and valuable as they were the first time they were accessed. Thus access and availability, whether it is of a new accession or a sample of the same accession for the second time, is an indication of need, and a concrete benefit to those on the receiving end.

By 1992, the four to one ratio had widened. For every accession provided by developing countries in 1992, those same countries received 60 samples. Today the ratio is certainly better than 100 to one. Yes, I am making a distinction between accessions and samples. Accessions, in this regard, might be a single landrace or farmer variety, whereas numerous samples of that accession might be provided by a genebank. The reality remains the same, however: the flows of germplasm offer concrete evidence of the value of genebank collections, and of their value to developing countries, i.e., to the original suppliers. In the real world, this is not a zero-sum gain. Countries contribute what they have to the

global larder, and in an open-access system, they get access to the diversity everyone else has provided while retaining their own. Thus, a country contributing rice germplasm to the International Rice Research Institute has access to the diversity contributed by 109 other countries in addition to its own. This, in essence, is how developing countries can be both the major suppliers as well as the beneficiaries of such a system of exchange.

To give you a sense of the scale of transfers: in an average year, the CGIAR distributes some 70-100,000 samples. The United States Department of Agriculture (USDA) distributes about 30,000, and for the sake of comparison, I'll note that the Dutch genebank distributes about 2,500 and the Nordic genebank about 1,500.

Judging the value of genebank collections by the sheer volume of distributions is not wise. The "quality" of use – the ability of the recipient to find, use and perhaps even conserve the material received – affects the quantity of samples requested. Few genebanks distribute more than ten percent of their collection in a year. In general, CGIAR genebanks distribute more than others; and collections composed predominantly of non-cereals distribute a larger percentage of their total, in part because their total is smaller.

Comparatively little goes to the private sector. And, at least in the U.S., when the private sector makes a request it does so for an average of one third as many samples as others. Interestingly, companies receiving PGRFA from the U.S. are twice as likely to be from developing countries as developed countries.

Modern Collections

The first collections were assembled for use, not conservation. Refrigeration was available in the 19th century, but not surprisingly, the advent of genebanks awaited the use of Mendelian techniques and the organisation of scientific breeding programmes utilising PGFRA.

The U.S. government got medium-term storage in the 1940s (only five to 10 percent of 160,000 accessions recorded as entering the country since 1898 could be found, prompting considerable consternation and a more serious conservation effort. The U.S. and Russia (then the USSR) each constructed long-term facilities in the 1970s.

During the last three decades, the growth in the number of genebanks and the size of the collections they house has been remarkable. In the mid-1970s there were only five to six long-term facilities. By the mid-1980s there were more than 50, containing more than two

million accessions. Today there are more than 75 such facilities containing more than five million accessions. More than 135 countries now have genebanks, though many (100 or more) lack long-term storage capacity.

It is interesting, and sobering, to note that in the early 1970s as genebanks and genebank collections were being constructed, the vision of the leading scientists of the day was for a system of 50 base (major long-term) collections associated with 60 active collections. Something happened on the way to the (Roman) forum. Today there are more than 1,300 collections, the median size of which is 650 accessions. Take the top ten percent of genebanks, by size, and you are dealing with genebanks holding more than 7,438 accessions. A genebank with 7,438 accessions is a small genebank, one whose collection could probably be stored in fewer than ten home chest freezers. Top 20 percent: 3,222 accessions; top 25 percent: 2,325 accessions. It would be difficult to argue that this is an efficient or rational way to organise PGRFA conservation, a point conceded by governments when they adopted the FAO Global Plan of Action for the Conservation and Sustainable Use of PGRFA calling for the creation of a rational system.

Many genebanks, particularly the smaller ones, are not fulfilling their mandate, either to provide materials for breeders, or to conserve materials long-term. While approximately 75 countries have medium to long-term storage, only 35 or so have what you might describe as "secure" long-term storage, plus nine CGIAR centres and four regional facilities. Even many of these are not truly secure technically, politically or financially.

Conditions in most genebanks simply do not meet internationally accepted standards. Some observers have described such genebanks as genetic ghettos or morgues, and some are. Many more, however, are hospices – facilities where seeds go and wait to die. The deteriorating facilities are, on one level, the inevitable result of chronically low budgets. No genebank of which I am aware has secure and formal multi-year funding. But poor management and sheer governmental neglect plays a role that is rarely acknowledged.

It is also the case that many national genebanks house crops for which there are no breeders nationally, regionally or even sometimes globally! At least five countries in addition to IITA (International Institute of Tropical Agriculture, Nigeria) have major yam collections, but there may be as few as three yam breeders in

the world, two at IITA, meaning that four countries have collections, but no breeding programmes. This is a typical phenomenon. I have visited many, many genebanks housing PGRFA of 50 to 100 or more crops only to discover that the country had active breeding work underway with fewer than ten crops, and often fewer than five. It is little wonder that the genebanks are both under-funded and deteriorating. Many have undertaken to provide a service for which there is little demand and no constituency to provide political support.

From the breeder perspective, lack of information is the greatest problem genebanks must overcome. A 1988 article in Economic Botany by two Cambridge University professors asserted that the greatest need breeders had was for the names and addresses of the collections! Information systems have come a long way since then. Breeders know where the genebanks are. But there is still a serious lack of accession-level evaluation data, which is what a breeder really needs unless he/she is willing to play a genetic lottery game and hope for the best when requesting materials.

According to one 1984 study, the country from which the accession had been collected or acquired was the only information available for accessions in most genebanks. Again, the situation has improved, but is far from ideal. Only 15 percent of Egypt's and Zambia's collections have been characterised, meaning that they have only the most basic of information about 15 percent of their materials and even less information for the remaining 85 percent. Colombia stands at 20 percent. Regarding evaluation for one or more traits, the percentages are hardly better: Iran five percent, Egypt 15 percent, Bangladesh 23 percent, and Mongolia 20 percent, for example. Without good evaluation data, breeders cannot easily find what they need. The genebank is under-used. And finance ministries begin to question why they should pay the large electricity bills for museum collections.

The quality of storage provided by a genebank can be quickly judged in most cases by looking at the need for regeneration of accessions. Over time, germination rates will drop with all accessions stored in a genebank. Periodically, therefore, seed must be taken out and grown and new seed harvested and placed in the genebank to keep up viability rates. If a genebank has to regenerate its accessions once every ten years, then it would typically have a regeneration need of ten percent at any time. Given the fact that cereals constitute the bulk of PGRFA accessions and that cereals can easily be stored for many decades in long-term facilities, one would expect regeneration rates far below ten percent. In reality, the countries themselves, in communications with FAO, report a mean regeneration need of 50 percent. Some 95 percent of countries report a need of greater than ten percent, translating into the necessity to regenerate approximately one million accessions if the material is to be saved. This does not speak well for the safety of the collections.

The picture is likewise bleak when we look at systems of "safety duplication." For safety purposes, genebanks will often make provisions to store a "back-up" of their collection at another facility. In the mid-1990s, about 75 countries reported to FAO on this subject, but only 11 claimed that they had fully duplicated their collections, which totalled 400,000 accessions.

This foregoing gives a hint about possible future genebank priorities. In the bullet-point list below I have identified some of these priorities and added a few which I think are important but which I will not have an opportunity to address in this lecture:

- Strengthening information about the accessions and to identify materials useful in addressing biotic and abiotic stresses such as drought
- Increased use of functional genomics
- Prebreeding to enhance the utility of the collections for breeders
- Use of genebanks to supply materials for in situ projects and to restore germplasm, as appropriate, following loss through natural disasters, war, civil strife, etc.
- Work to support the unique needs of urban agriculture
- Increased attention to vegetables and minor crops

In addition, we must keep in mind that collections are also used for basic scientific research, not just for breeding. More than a fifth of articles in Crop Science, Euphytica, Plant Breeding, and Theoretical & Applied Genetics, are based on genetic materials acquired from genebanks.

While the picture I have painted of global conservation efforts is not particularly pretty, it must be recognised that in the 1960s and 1970s collections were assembled under emergency/crisis conditions. It is understandable that the "System" was not completely thought through, or planned in detail. We owe the early pioneers of the PGRFA world a great deal. Compared to their efforts, our own can look quite meagre. It is also important to realise that serious problems beset most genebanks, a relatively small number of facilities operate

at a high level and meet international standards. The world literally depends on these genebanks – those of the CGIAR, plus a modest number of national facilities (in both developed and developing countries) as well as several regional genebanks.

In Situ

I have not mentioned the role of in situ conservation and propose not to do so now in any detail. However, one observation may be instructive: If, as many people assert, there has been a great deal of genetic erosion and if genetic erosion continues at a high rate today, and if a high percentage of the genepool of the major crops has already been collected (as several independent studies over some years seem to indicate), and if there are no tools for identifying exactly where specific materials are located in situ and no mechanism for easily accessing it, then it stands to reason that we must concentrate our attention on genebanks and ex situ collections if our concern is with access and availability.

In situ is a source of planting materials for farmers at the local or community level. It was the source of today's genebank collections, of course. But collecting is on the decline. And in situ is not at the moment a major source of germplasm for breeding or research programmes or even for farmers in other locales. Promotion of in situ or on-farm management of PGRFA is important, especially for the millions of farm families that are largely self-provisioning in terms of seeds. But, as no sizeable, coordinated systems of in situ collections exist, the subject falls largely outside the remit of this lecture.

The growth in the number of genebank collections and what is in them is a testament to the free exchange of PGRFA that existed from the early 1970s when the collections began to be assembled, up until the early 1990s. Some think of that "exchange" and indeed all exchanges going back to the colonial era as "biopiracy," but without it the world would be different in three important ways today:

1. Few countries and no international centres would have meaningful PGRFA collections;
2. Much of the material now in genebanks would be extinct. Genetic erosion would have taken care of it, in situ. Indeed, a great deal of the diversity found in the fields would not be there, because genebanks have been used to restore diversity lost in the fields of more than 40 countries by CGIAR since 1981; and,
3. There would have been no Charles Darwin or Nikolai Vavilov, no Jack Harlan, no Norman Borlaug, etc.

This prompts the posing of the counter-factual: Would anyone be better off today if crops had stayed in their regions of origin? At what point, or on the basis of what criteria, should transfers have ceased – at what point and under what circumstances would it have made sense to close the door on germplasm exchange? Would anyone be better off today had PGRFA been closely regulated and sold as a commodity from 1492 onwards? True, the "rich" countries would have paid for their access to the diversity of Asia, Africa, and Latin America. But African countries, many of which have a food system based on maize, a crop of the Americas, would have paid dearly too. Asia would have paid for its wheat, Latin America for its soybeans and bananas. The list goes on. Would there have been any winners? Or would everyone have become a loser?

Access

The new International Treaty on Plant Genetic Resources for Food and Agriculture removes most access barriers, at least for materials included in the Treaty's Multilateral System that are held by Parties to the Treaty. Unfortunately, most minor crops are not covered and it will be impossible to assemble working collections and begin breeding of these, unless you already have the collection. Moreover, most of the absolute germplasm embargoes in the past have involved crops not covered by the new Treaty, though in recent years access to almost everything has become difficult.

Nevertheless, the Treaty is a gigantic breakthrough that covers most of the world's ex situ PGFRA accessions. The Treaty, however, mainly takes care of the "access" question that we began the lecture with; it does not ensure "availability." This is where the newly-created Global Crop Diversity Trust, an endowment fund aimed at securing the future of collections, enters the picture in support of the objectives of the Treaty as well as the FAO Global Plan of Action.

The Treaty and the Trust provide a historically unprecedented opportunity: politically-guaranteed access (and benefit sharing) plus assured conservation and availability. Developing countries can use this combination and seize the opportunity to rationalise their systems and place more attention on active collections/breeding, thus improving efficiency and productivity while lowering the cost of their agricultural research programmes.

The crucial link between the Treaty and the Trust must be protected. Both entities are fragile and both will be subjected to short-term, opportunistic political pressures. And this is where we must keep in mind the second point raised at the beginning of this lecture – an appreciation for the nature of and the location of "value" in PGRFA. Its value is not as a commodity. As much as it may be the most useful and essential resource on earth, PGRFA is still not a resource having the same characteristics or commercial potential as gold or some other commodity. For both historical and biological reasons – as well as because of the dependence that all nations have on crops of foreign origin – PGRFA is a poor commodity and an inappropriate subject for geopolitical games.

These resources cannot and should not be used as a political football or seen as a potential mechanism for redressing past grievances. They cannot figure into a strategy for building a new international economic order. They cannot and need not even be used as pressure for building equal (and unnecessary) capacity for their conservation and use in every country. But they can be safely conserved. Access can be facilitated. Benefits can be generated and then shared. And food security can be enhanced. All of these things can happen if the international community accepts its responsibilities and if we seize the opportunity provided by the combination of the Treaty and the Trust. These should be our aims in working in the field of PGRFA. Expecting much more would be unrealistic and unwise.

Putting it all together

"The grand objective of the International Bureau of Plant Genetic Resources should remain the development of a worldwide genetic resource conservation network devoted to the needs of world agriculture"

IBPGR, 1986, now International Plant Genetics Resources Institute

This simple objective is not a bad place to start. If we start here, we will need to identify priorities – priority genebanks and priority collections. And we will need to focus on these. We will have to understand that our task is to secure diversity, not genebanks. Neither the Treaty nor the Trust can become a welfare system for genebanks. A "politically-correct" system of genebanks is not sustainable and not workable. Fortunately, it is also not needed. A sound scientific system for conserving PGRFA married with a robust legal agreement to ensure access and benefit-sharing is all we need – and this is precisely what we now have within our grasp.

I would insert one additional thought: In the post "9/11" world, we have all come to understand that "safety" is always relative. Nothing, it seems, is completely safe. The unthinkable has happened more than once. More unthinkable events probably lie ahead. To genebanks and PGRFA collections, it makes little difference whether we term something as an attack or as a defensive or retaliatory action. A bomb is a bomb. Will genebanks ever become involved either as targets or innocent bystanders? The time has come to consider and plan for the worst. Countries may wish to re-visit an offer once made by Norway to construct and house collections at a secure and remote location in the permafrost on the far-north island of Svalbard (Spitzbergen). Find it on a map. If a collection housed there were ever destroyed, it might turn out to be the least of our problems.

We face today the same basic challenge faced by the early pioneers – Frankel, Harlan, Hawkes, Bennett, Chang, Ochoa, Williams and others: How to build a workable system that serves world agriculture. We know that it will take strong political will. It will also take equally strong and independent scientific integrity and skill. Without the latter, and without a sound scientific plan, all the political declarations, demands and agreements will amount to little. The tools – the Treaty and the Trust – are now in place. Let us hope we have the good sense to use them wisely. And quickly.

"As with many things, we found that the development of policy benefited from real-life case studies, with many lessons 'learnt-on-the-run'. It is also important to bear in mind that genetic resources are common to more than one country"

Petro Terblanche

Case Study: San/CSIR Hoodia Benefit Sharing Model

Petro Terblanche Executive Director Bio/Chemtek, Council for Scientific and Industrial Research (CSIR), South Africa.

Biodiversity and South Africa's Botanical Reserves

South Africa boasts ten percent of world's plant biodiversity, with 24,400 indigenous species, 60 percent of which are endemic, and is home to the Cape Kingdom, one of the six floral kingdoms of the world.

With a long tradition of medicinal use of indigenous plants, over 70 percent of South Africans consult traditional healers, of whom there are 200,000 active throughout the country. Indigenous communities in Southern Africa, such as the San bushmen of the Kalahari (an aboriginal people considered "the oldest genetic stock of contemporary humanity"), have a wealth of unrecorded knowledge.

CSIR's vision for bioprospecting is to create economic and social benefit for the nation and the region based on its biodiversity and indigenous knowledge. We also seek to add maximum value to bio-resources through consortium-based research within South Africa.

From Hoodia to P57

In 1963, the CSIR included Hoodia Gordonii, a Kalahari desert cactus, in a research project on edible plants based on the ethnobotany of the San. Hoodia has been used for centuries by the San to suppress the appetite during long hunting trips. However, insurmountable technical problems arose and, in 1971, the Hoodia project was mothballed. These problems were not overcome until 1983-86 when technological advances enabled a scientific breakthrough – a new chemical entity was discovered in Hoodia, and its structure was determined. Over the next ten years, the CSIR continued its development of Hoodia and filed worldwide patents to protect its invention of a novel method of obesity control.

After identifying the relevant bioactive compound the CSIR obtained a patent in 1997, which we licensed to UK-based botanical pharmaceuticals company Phytopharm for further

development. In 1998, the CSIR published its Bioprospecting Policy, guaranteeing sharing of benefits from bioprospecting with the owners of the traditional knowledge that led to its initial discovery.

In 1998, Phytopharm sold the rights to the compound, now known as P57, to pharmaceutical company Pfizer to complete clinical development, obtain regulatory approval and undertake commercialisation. In 1999, the CSIR signed an historical bioprospecting agreement with South African Traditional Healers, and was invited by the United Nations to present details at the Lyon Summit on Trade and Development. However, in 2001, a newspaper reporter from the UK questioned the CSIR-Phytopharm-Pfizer P57 collaboration without the involvement of the San people. In response to this, the CSIR and San met regularly throughout 2002-3 to share information on P57. This involved including independent experts in workshops and negotiating a benefit sharing agreement, which was eventually signed on 24 March 2003.

On 30 July 2003, Phytopharm announced that Pfizer had decided to discontinue development of P57. Phytopharm continues its commercialisation strategies.

The Benefit Sharing Agreement

The benefit sharing agreement signed with the San states that "both parties commit themselves to the conservation of biodiversity by, inter alia, applying legal "best practices" with the collection of any plant species for observation, and by ensuring that no negative environmental impacts flow from the proposed bioprospecting collaboration".

The agreement also acknowledges the importance of traditional knowledge, stating that "...San people are custodians of an ancient body of traditional knowledge…related inter alia to human uses of the Hoodia plant…". It adds that "The CSIR acknowledges the existence and the importance of the traditional knowledge of the San people, and the fact that such body of knowledge, existing for millennia, predated scientific knowledge developed by Western civilisation over the past century".

The benefit sharing agreement will also benefit the San financially: the CSIR will pay the San eight percent of all milestone payments it receives from Phytopharm as well as six percent of all royalties that the CSIR receives once the drug is commercially available. Existing CSIR study bursaries and scholarships have also been made available to the San and talks will be held to agree future bioprospecting for the benefit of both parties.

The San Hoodia Benefit Sharing Trust

Potential money will be put into a San Hoodia Benefit Sharing Trust, whose Trustees will consist of one CSIR nominee; three San representatives from the Khomani, Xun and Khwe communities; one representative from the Working Group of Indigenous Minorities in Southern Africa (WIMSA); one South African professional; and a non-voting observer from the South African Department of Science and Technology.

Beneficiaries will include the San from the Khomani, Xun and Khwe communities of South Africa plus San communities elsewhere who are members of WIMSA and are identified by the Trustees as eligible beneficiaries. The Agreement will remain in force for the royalty period for as long as the CSIR receives financial benefits from the commercial sales of the products, with record-keeping provided by both the CSIR and the San Trust.

Challenges

We faced many challenges in the development of the benefit sharing agreement with the San. The San is spread across South Africa, Botswana, Namibia, Zambia and Zimbabwe, and neither their cultural legacy nor biodiversity respect man-made borders. It was important to find a balance between trade secrecy/commercial knowledge protection and transparency in our negotiations. It was also challenging to produce a contract when the revenue and benefits to parties were uncertain and linked to the outcome of clinical trials: it proved very important to manage expectations of all the parties involved and properly administer potential future benefits.

Lessons learnt from P57

The development of P57 has led to many important lessons for us. We have learnt that it is extremely difficult to operate in policy vacuum – without the draft format IKS policy and bill – and that it takes a very long time to progress from project idea to commercial success. Our experiences also underlined the importance of the active participation of the owners of traditional knowledge throughout the product development cycle – and that the heavy burden of communicating needs and expectations between all partners is part of operating in interdependent world.

We also need to underline that although traditional knowledge has intrinsic value, it requires significant value addition through technology and marketing for its true market value to be realised. As with many things, we found that the development of policy benefited from real-life case studies, with many

lessons ‘learnt-on-the-run’. It is also important to bear in mind that genetic resources are common to more than one country.

P57 Licensing: Benefits to South Africa

The development of P57 required the full involvement of South African scientists in development programme (capacity building) and led to the transfer of state-of-the-art phyto-medicine production technology to South Africa. Our country will also benefit from potential revenue from royalties through licensing of patented technology, with milestone payments having been linked to clinical trials. In addition to financial benefits, the development of P57 has helped raise global recognition of South Africa’s capacity for innovation.

"For the broader research community, the most important benefit that we share is information."

Pamela K. Anderson

Case Study: Genetic Resource Conservation and Benefit Sharing at the International Potato Center

Pamela K. Anderson Director of Research, International Potato Center

The International Potato Center, or CIP (Centro Internacional de la Papa), is an international agricultural research centre with 150 scientists, working together with national agricultural systems in almost 50 countries in the developing world. Our headquarters are in Lima, Peru, but we also have offices in China, Indonesia, the Philippines, India, Kenya and Ecuador. It is my honour and challenge to be the Director of Research for CIP.

CGIAR Future Harvest Centres

CIP is one of the 16 international agricultural centres belonging to the Consultative Group for International Agricultural Research (CGIAR). We refer to our centres as the Future Harvest Centres. Eleven of these 16 centres, including CIP, are "in-trust" centres. This means that we have signed an agreement with the United Nations' Food and Agriculture Organization (FAO) to hold "in trust" for humanity genetic resources that are critical for the food security of the world.

CIP is responsible for holding "in trust" the genetic resources for potatoes and sweet potatoes. In addition to this, we have also, in collaboration with Switzerland, agreed to assume responsibility for the conservation of genetic resources for nine species of what we call Andean root and tuber crops: Ulluco, Yacon, Ahipa, Oca, Mashua, Maca, Arracha, Achira, and Mauka.

Root and Tuber In-Trust Collections in CIP Genebank

The "in-trust" collection is composed of 4,049 accessions of the eight cultivated species of potato, 3,621 accessions of sweet potato, and 1,409 accessions of the nine Andean root and tuber species. We also hold collections of the wild relatives of the cultivated species as these are important to the plant breeding research, and we conserve the improved varieties that we develop for potato and sweet potato.

This collection is conserved in four states: ex situ we conserve in true botanical seed, in tuber form, and in cryopreservation. Some of the material is also preserved in in situ collections. We keep security back-ups (black boxes) for each of the collections. The conservation of these genetic resources is a costly undertaking, but it is a responsibility that we take very seriously.

I would like to stress two points before I continue: First, the CGIAR Centres are research centres. Our job is to produce global public goods that will contribute to the alleviation of hunger and poverty through sustainable production systems. Second, we develop and share the benefits of the genetic resources that we conserve, with a series of different end-users, or beneficiaries:

1. the broader research community,
2. the national agricultural research systems, and
3. the farmers and farming communities.

Now, I would like to provide some examples – in this case, potato – of the kind of benefits or global public goods we are developing and sharing with each of these different end-users.

Co-operators' Guide Variety Online Catalogue
For the broader research community, the most important benefit that we share is information.

When we talk of global public goods and genetic resources we tend think in terms of physical assets, for example improved potato germplasm. But information assets can be equally important, and we are beginning to make significant investments in developing information systems and information assets.

For example, we are currently developing an online guide so that when researchers and co-operators request improved germplasm they can also access and obtain the information that we have generated relevant to that germplasm, i.e., data from the Standard Evaluation Trials (SETs).

CGIAR Genebanks and SINGER
There is a system-wide effort to make information on genetic resources available in all 11 of the CGIAR "in-trust" centres. Under the leadership of the International Plant Genetic Resources Institute (IPGRI), the Centres have developed a system called SINGER. This is a standardised database and basic information system for the genetic resources available across the CGIAR system. Beyond the basic data in the SINGER database, the CIP is also developing additional information systems and databases, such as the Co-operators' Catalogue with the SETs data.

Genetic Resources Knowledge Development
Areas covered include:

- Information on the characterisation of wild and cultivated germplasm,
- Taxonomy and systematics of the genetic resources that we hold,
- Software tools to assess genetic diversity,
- Biological information on geneflow,
- Molecular information on genetic maps,
- Information on in situ conservation, and farmer-managed genebanks.

So, the primary benefits that we share with the international community are information and knowledge on genetic resources. We believe that we can increase the benefits of the genetic resources and the physical assets (varieties) that we have developed if they are accompanied by information assets that we have also generated.

Regional Seminar on Access to Plant Genetic Resources
Within the research community at the regional level, CIP is playing a critical role in convening a regional forum on access to plant genetic resources. In July 2003, we hosted a working seminar to address this issue.

The Andean region is in the unique situation of having the International Treaty, regional legislation (Decision 391) and national legislation in place.

Evolution of Germplasm Acquisitions into the CIP Genebank
Acquisition of new genetic resources essentially came to a halt in 1994, primarily as a result of the conflicting natures of the international, regional and national laws that are in place. The CIP regional team is working towards recommendations for lawmakers that will harmonise the international, regional and national laws on genetic resources. If we are not successful in this endeavour, the collection and movement of genetic resources will be paralysed.

CIP and CGIAR Intellectual Property Guidelines Related to Genetic Resources
In addition to generating and sharing scientific information on genetic resources and promoting the legal reform to guarantee continued

access to genetic resources, the CIP also has a committee on Germplasm Acquisitions and Distribution. This committee addresses critical policy issues on genetic resources, e.g., intellectual property. Our primary objective here is to protect the physical and information assets that have been developed as global public goods and guarantee that they remain in the public domain.

Distribution of Potato Germplasm

In terms of the national agricultural research systems, the most important benefit that we share is probably the germplasm itself. Over the last 30 years, CIP has distributed almost 100,000 samples of potato germplasm to more than 150 countries.

With that potato germplasm, Bolivia generated and released 26 potato varieties; Peru 24 varieties, and Ecuador 12 varieties between 1970 and 1990. As an example, just one of those varieties, the Canchan variety released by the national agricultural system of Peru, is estimated to have a benefit of $90 million per year.

Capacity Building

With national partners, we also undertake considerable training and capacity building in the area of genetic resources. For example, in the last three years we have conducted training in: taxonomic, morphological and molecular characterisation of genetic resources; in vitro/seed conservation; genetic diversity assessment; and database management.

The head of our Germplasm Bank, Dr. William Roca, is particularly worried about who will take care of and curate our genetic resources collections in the future. Dr. Roca has established a young curators' programme, through which CIP will train the next generation of genetic resources curators for the Andean region.

Virus-Free Native Potatoes for Restoration

The CIP has an active programme of restoration and repatriation of potato germplasm with farmers and farm communities.

It is estimated that potato farmers in the Andes are currently growing approximately 4,500 different native potato varieties (or land races), which serve as a main source of food and income generation for over 30 million people in the Andes from Colombia to Northern Argentina. However, quite often the farmers lose these varieties due to attacks by pests and diseases, severe climatic events or even social unrest. In the last five years, CIP has returned 2,200 samples of over 1,000 native potato varieties that we hold in the "in-trust" collection back to 31 farming communities in the Andes.

In mid-1997, a group of farmers from San Jose de Aymara in Central Peru requested help from CIP to recover the vigour and yield of the 200 native potato varieties that they were growing. These varieties had become low-yielding due to an accumulation of viruses. We took native potato varieties from the CIP Genebank, cleaned them, and were able to return 244 virus-free native potato varieties to the San Jose de Aymara farmers. The farmers reported yields up to 2.5 times higher with the restored material.

In 1998, due to an El Nino event, there was a severe potato late blight attack in the highlands of Peru and the farmers of two communities suffered total loss of 44 native potato varieties, which also meant that they had no planting material for the following seasons. Through a local radio programme, we invited communities to contact CIP and were able to restore 109 virus-free native potato varieties to those communities, including all of the 44 varieties that they had lost.

Repatriation

CIP is also working with a project in Cuzco called "The Potato Park". This is a grass-roots initiative to integrate local biodiversity conservation, the collection of local knowledge, and sustainable utilisation of local agro-biodiversity, and agro-ecotourism. Together with six farming communities around Cuzco, we studied the diversity of local potato varieties and in 2002 we repatriated 206 potato varieties to the Potato Park.

New CIP Methodologies

In addition to cleaning and returning varieties to local communities, CIP is addressing how to achieve greater impact on farmers' incomes through improved biodiversity-use strategies, and developing models for what we call a "Marketing Approach to Conserve Agricultural Biodiversity".

In essence, we are developing models for how to identify or create a market demand for products and then create an "agri-market chain" to link poor farmers to that market. The objective is to generate greater income for poor farmers, and simultaneously motivate increased conservation of their agricultural biodiversity because it has greater value.

Jalca Chips

One example is potato chips made from native potatoes. We considered that there should be a market for these potatoes, and began working on a marketing approach to develop this product and create a greater incentive to conserve and use this agricultural biodiversity. Others seem to agree that there is a market – my colleague at CIP, Dr. Roger Cortbaoui, recently returned from France, where he had seen an advertisement for "Terra Blues".

The CIP selected potatoes from more than 3,800 ancient varieties domesticated by pre-Incan societies. Jalca Chips are produced from native potatoes that flourish only in the mountainous Jalca region of the high Andes.

The lead scientist for Jalca Chips is Dr. Thomas Bernet, a Swiss scientist working with CIP on a Swiss Research Fellowship Partnership Project. We are extremely excited by the potential of the research that Thomas and his team are conducting. The lessons that we are learning from this experience are being shared in the region through several of the partnership platforms that CIP hosts and co-ordinates: Papa Andina, INNOVA and INCOPA.

We have designated that ten percent of the consumer price will go to the Native Potato Project, to help generate funds for biodiversity conservation, research and marketing activities specifically for native potatoes; provide information about native potatoes and promote social marketing, and help expand the demand and develop new products.

Using the case of potatoes, I have given you an idea of some of the benefits that are derived from genetic resources and how we are sharing them with different beneficiaries: other researchers, national agricultural programmes and the farmers themselves. What I have illustrated with potatoes is equally true for sweet potatoes and the Andean root and tuber crops.

In addition to discussing sharing the benefits from genetic resources, I also would like to reflect for a moment on sharing the costs, and specifically the financial costs, for genetic resources.

The collection, the conservation, the cleaning and characterisation of our "in-trust" genetic resources are the cornerstones for all of the "benefit sharing" activities. This is a costly endeavour. For example, the operational costs for the basic conservation of the Andean Root and Tuber collection, which CIP and Switzerland agreed to take on together, are $200,000 per year. That is just physically maintaining (i.e., reproducing) the collection and does not include new collections, cleaning-up, distribution, research or staff time. And that is our smallest collection.

Conserving the genetic resources in our collection is a non-negotiable responsibility that we take very seriously, but it is indeed a costly undertaking.

One of the reasons that I was so pleased to participate in this symposium is because Switzerland is one of our most committed donor partners, in terms of sharing the costs. I wanted to come and thank you personally. The results that I have shown you today are also your results, and I hope that you are proud of them and proud of what we are achieving together. And I hope that I have convinced you that the results and the benefits that are being derived and shared from the genetic resources merit continued support. If we cannot maintain the collections, then there will be no benefits to share.

On behalf of CIP, let me express my sincere gratitude to citizens of Switzerland and SDC for your continued support and contribution to our research, and to feeding the poor and hungry citizens of the world.

What's Next: A note on follow-up research

In light of the information presented at the symposium, the organisers believe additional research in building "demand driven" biodiversity conservation systems, outlined below, would be particularly useful. Both SDC and the Syngenta Foundation are currently evaluating research proposals on the topic.

"Plant Breeder Research – The User Side of the Rational Conservation System"
The premise is that a rational conservation system cannot be constructed without identifying and understanding the needs and constraints of the user community, particularly the plant breeders.

The initial goal would be to assemble a list of breeders for several of the so called "orphan" crops, that is, crops of little interest to commercial researchers but in some cases a staple in the diet of less developed countries. Breeders of those orphan crops would be contacted and interviewed to learn more about their sources of germplasm, the frequency of their access, whether they maintain working collections, what their breeding goals are, what constraints they are currently facing in regards to germplasm, etc. The results of the survey, placed in the public domain, would hopefully help guide conservation systems to serve and enhance plant breeding programmes in ways both responsive and practical.

Speaker Biographies

Pamela K. Anderson
Pamela K. Anderson has been Director of Research at the Centro Internacional de la Papa (CIP) in Lima, Peru since 2002, and, as of March 2004, Director General Designate of CIP. She is also Chair of the CGIAR Systemwide Programme for Integrated Pest Management. From 1996-2002, Pamela was Senior Scientist at the Centro Internacional de Agricultural Tropical Coordinator, CGIAR Whitefly IPM Project in Cali, Colombia.

Dr Anderson holds a D.Sc. in Population Sciences with concentration in vector entomology (1991) and a M.Sc. in Population Sciences with concentration in human ecology (1984), both from Harvard University, School of Public Health, Department of Population Sciences. She also received a M.Sc. in Entomology (1982) from University of Illinois, Department of Entomology and a B.A. in Biology with concentration in theoretical ecology (1977) from Northwestern University Department of Biology.

Andrew Bennett
Andrew Bennett is Executive Director of the Syngenta Foundation for Sustainable Agriculture. He is President of the Tropical Agricultural Association (UK) and a member of the Board of Trustees of the Centre for International Forestry Research, Indonesia. He was formerly Director: Rural Livelihoods and Environment for the British Department for International Development where he was responsible for advice to UK Ministers on policy and programmes in the fields of livelihoods, natural resources, environment, sustainable development and research. He has over 35 years experience in international development and disaster management, having worked in development programmes in Africa, Asia, Latin America, the Pacific and the Caribbean. He also has extensive experience of international negotiations on natural resources, research, environment and development.

Cary Fowler

Cary Fowler is Professor and Director of Research at the Centre for International Environment and Development Studies, Agricultural University of Norway, Senior Advisor to the Director-General, International Plant Genetic Resources Institute and Senior Technical Advisor, Global Conservation Trust.

As a Senior Officer for the Food and Agriculture Organization (FAO), Professor Fowler headed the Secretariat that drafted the first FAO Report on the State of the World's Plant Genetic Resources. He led negotiations for the FAO Global Plan of Action on Plant Genetic Resources, adopted by 150 countries in 1996, and was Secretary of the FAO 4th International Technical Conference on Plant Genetic Resources. He served as senior advisor to the Secretary-General of the World Food Summit in 1996, a position he also held at the Summit's follow-up conference in 2001.

Since 1997, Professor Fowler has represented the Consultative Group on International Agricultural Research in FAO negotiations for the International Treaty on Plant Genetic Resources for Food and Agriculture. He has also represented Norway on the Convention on Biological Diversity's Panel of Experts on Access and Benefit-Sharing. He has served on the Board of Trustees of the International Maize and Wheat Improvement Center, chairing their committee on programmes and research. In the 1980s, he was appointed by the U.S. Secretary of Agriculture to the National Plant Genetic Resources Board. Professor Fowler is past chair of the Board of Trustees of the American Livestock Breeds Conservancy.

Ambassador Walter Fust

Since September 1993 Walter Fust has served as Director-General of the Swiss Agency for Development and Cooperation (SDC). Mr. Fust is Chairman of the Board of the "Global Knowledge Partnership GKP", a network dealing with information and communication technologies (ICTs) within the scope for cooperation. He is also a member of the Panel of Advisors of the United Nations Task Force on ICTs. Furthermore he is member of the Steering Committee of the "Global Governance Initiative" of the World Economic Forum (WEF) and of the Policy Committee of the Global Coalition for Africa. From 1990 to August 1993 he served as Secretary General of the Swiss Ministry of the Interior. He attended St.Gallen University and graduated with a Master of Political Science.

Geoffrey Hawtin

Geoff Hawtin is the Interim Executive Secretary of the Global Crop Diversity Trust, based at the Food and Agriculture Organization of the United Nations (FAO) in Rome, Italy. Until July 2003 he was Director General of the International Plant Genetic Resources Institute (IPGRI) also in Rome, prior to which he was Director of IPGRI's predecessor organisation, the International Board for Plant Genetic Resources (IBPGR).

Geoff obtained his first degree in Agricultural Sciences and a Ph.D. from Cambridge University, UK, carrying out his doctoral thesis research on the genetic diversity of soya bean while working as a teaching assistant at Makerere University, Uganda. He joined Ford Foundation's Arid Lands Agricultural Development Programme (ALAD) in 1974 as a plant breeder, sponsored by the Canadian International Development Research Centre (IDRC), living first in Lebanon and then in Egypt. In 1976 Geoff was appointed Programme Leader of the Food Legume Improvement Programme of the International Centre for Agricultural Research in the Dry Areas (ICARDA) in Syria. Other positions he has held have included those of ICARDA's Deputy Director General for International Cooperation, and Director of the Agriculture, Food and Nutrition Sciences Division of IDRC based in Ottawa, Canada, where he was responsible for research programmes in agriculture, agricultural economics, post-harvest technology, forestry and fisheries. In addition to his current position, Geoff is on the Board of Directors of Future Harvest and Chair of the Board of Future Harvest-UK. He has broad farming experience in UK and Denmark, and has authored more than 80 scientific and technical publications.

Bernhard Herold

At the time of the symposium, Bernhard Herold, an Agricultural Economist (ETH Zurich), was responsible for the programme "Food and Agriculture" at the Berne Declaration. The Berne Declaration is an independent Swiss NGO specialised in promoting more equitable, sustainable and democratic North-South relations; mainly through research, advocacy and building public awareness. It is one of the Swiss NGOs most active with respect to the CBD and the FAO IT and their access and benefit sharing provisions, with a strong focus on IPR issues.

Before joining the Berne Declaration in January 2003, Bernhard worked for Switzerland's State Secretariat for Economic Affairs for 11 years. From 1996 to 2002 he was an expert for trade in agricultural products and participated in various bilateral and multilateral trade negotiations. From 1992 to 1996 he was responsible for Switzerland's bilateral economic relations to Central and Eastern European Countries and negotiated among other things a number of bilateral debt rescheduling agreements and debt-for-nature-swap agreements.

Since the symposium in 2003, Bernhard Herold has moved to Brot für alle/Bread for all.

Heinz Imhof

Chairman of the Board of Directors of Syngenta AG and Chairman of the Board of the Syngenta Foundation for Sustainable Agriculture. Previously Heinz Imhof was Head of Novartis' Agribusiness division and a member of the Novartis Executive Committee (1999-2000), Deputy Executive Head Novartis Agribusiness and Head of Novartis Seeds (1996-1998), Deputy Chairman and Chief Executive Officer of Sandoz Corporation in New York (1993-1995) and additionally Chairman and Chief Executive Officer of Sandoz Pharmaceuticals Corporation in East Hanover, New Jersey. Currently Heinz Imhof is a member of the Supervisory Committee of SGCI (Schweizerische Gesellschaft für die Chemische Industrie). He is a graduate of the Swiss Federal Institute of Technology in Zurich with a degree in agronomy.

Alwin Kopše

Alwin Kopše joined FOA in June 2002 where he is, among other things, responsible for the ratification process of the International Treaty (IT). He is a member of the FAO Expert Group on the Terms of the Standard Material Transfer Agreement of the IT. Alwin Kopše is the head of the Swiss delegation for the upcoming IT meetings as well as for the negotiations which are held within the Intergovernmental Working Group of the FAO for guidelines with regard to the progressive realisation of the right to adequate food. He is a member of Swiss delegations to several international bodies, including the WIPO and the Convention on Biological Diversity (CBD).

Eric J. Mathur (presentation unavailable)

Vice President Scientific Affairs and Molecular Diversity, Diversa Corp., San Diego, California. Diversa was founded in 1994 and is a global leader in developing novel gene products from biodiversity. Dr. Mathur was one of the principal negotiators in benefit sharing agreements among others with Costa Rica's National Institute of Biodiversity (INBio); The International Centre for Insect Physiology and Ecology (ICIPE) Kenya Wildlife Service (KWS); Yellowstone Center for Resources (YCR). At the symposium he spoke on private sector experience on benefit sharing negotiations.

François Pythoud (presentation unavailable)

Senior scientific adviser at the Swiss Agency for the Environment, Forests and Landscape and a plant biologist (PhD in science), François Pythoud has worked for the Swiss Agency for the Environment, Forests and Landscape on biotechnology and biosafety related issues since 1990. He has been involved in the implementation of the Convention of Biological Diversity (CBD) since 1995. Head of the Swiss delegation to the Working Group on Access and Benefit Sharing (ABS), he was closely involved in the negotiation and adoption of the Bonn Guidelines on ABS in 2002. He is now the Swiss CBD National Focal Point for ABS. At the symposium he spoke on benefit sharing under the Convention on Biological Diversity.

Geoff Tansey

Geoff Tansey is an independent writer and consultant. He is part-time consultant to the Quaker United Nations Office in Geneva on its TRIPS programme and has also worked on a number of IPRs, food and development issues recently including for the UK Department for International Development and the Food Ethics Council, of which he is a member. He helped found the journal Food Policy in the mid-1970s, has worked on various agricultural development projects, as a freelance writer and broadcaster, and co-authored the prize-winning book "The Food System: A Guide". He is also an honorary visiting fellow in Peace Studies at the University of Bradford, UK.

Petro Terblanche
Dr. Petro Terblanche is the Executive Director of CSIR Bio/Chemtek South Africa, one of the eight Divisions of the CSIR. Dr. Terblanche was the lead representative for CSIR in the development of the benefit-sharing model for Hoodia (P57) with the San people. In March 2004, Dr. Anderson was named Director-General Designate of CIP.

Before choosing a career in Management, she specialised in research on the exposure and impacts of air pollution. Bio/Chemtek is an organisation whose core business is the management of technological innovation in the fields of biotechnology, speciality and fine chemicals, agroprocessing and bioprospecting.

Apart from her Executive responsibilities, she is non-Executive Chairman of the Board of Biotechnology Partnerships for Development – BioPAD Biotechnology Regional Innovation Centre. She is also a non-Executive Board member in the following organisations: Egoli Bio-incubator; Sugar Milling Research Institute; Dysselsdorp Liquorice; Biosys Plant Extracts (Pty) Ltd; and Mbuyu Biotech (Pty) Ltd a joint venture company between Bioventures and Bio/Chemtek.

Glossary

ABS	Access and benefit sharing
Bio/Chemtek	Food, biological and chemical technologies
CBD	Convention on Biological Diversity
CGIAR	Consultative Group on International Agricultural Research
CIP	Centro Internacional de la Papa/International Potato Center (Lima, Peru)
CSIR	Council for Scientific and Industrial Research
FAO	United Nations Food and Agriculture Organization
GIS	Global information system
GMO	Genetically modified organism
GR	Genetic resources
IARC	International Agricultural Research Centre
IBPGR	International Board for Plant Genetic Resources - now IPGRI
ICTSD	International Centre for Trade and Sustainable Development (Geneva, Switzerland)
IITA	International Institute of Tropical Agriculture (Ibadan, Nigeria)
IKS	Information and knowledge sharing
IMP	Intellectually-based monopoly privilege
IP	Intellectual property
IPGRI	International Plant Genetic Resources Institute (Maccarese, Italy)
IPR	Intellectual property right
IT/ITPGRFA	International Treaty on Plant Genetic Resources for Food and Agriculture
LDC	Late-developing country
MLS/MS	Multilateral System of Access and Benefit Sharing

MTA	Material transfer agreement
NGO	Non-governmental organisation
PIC	Prior informed consent
PGR	Plant genetic resources
PGRFA	Plant genetic resources for food and agriculture
R&D	Research and development
SDC	Swiss Agency for Development and Cooperation
SET	Standard evaluation trial
TRIPS	Trade-Related Aspects of Intellectual Property Rights Agreement
TK	Traditional knowledge
UN	United Nations
UPOV	International Union for the Protection of New Varieties of Plants
USDA	United States Department of Agriculture
WFD	World Food Day
WIMSA	Working Group of Indigenous Minorities in Southern Africa
WIPO	World Intellectual Property Organization
WSSD	World Summit on Sustainable Development (UN)
WTO	World Trade Organization

Further information

World Food Day:	www.fao.org/wfd/index_en.asp
Convention on Biological Diversity:	www.biodiv.org/default.aspx
International Treaty on Plant Genetic Resources:	www.fao.org/ag/agrfa/itpgr.htm
Global Crop Diversity Trust:	www.startwithaseed.org
Syngenta Foundation for Sustainable Agriculture:	www.syngentafoundation.org
Swiss Agency for Development and Cooperation:	www.sdc.admin.ch