

What kind of goods are plant genetic resources for food and agriculture? Towards the identification and development of a new global commons

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“The spread of the commons discourse in recent years has had a double effect; it has helped *identify* new commons and, in providing a new public discourse, it has helped *develop* these commons by enabling people to see them as commons.”

- David Bollier (2007)

Introduction

Over the course of the last forty years, under the auspices of the United Nations Food and Agricultural organization, the international community has been developing a system to support the conservation and sustainable use of plant genetic resources for food and agriculture that shares many of the characteristics of what scholars are calling ‘new commons’. The pinnacle of these efforts was the adoption (2001) and coming into force (2004) of the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA). Interestingly, neither the reports of the Commission on Genetic Resources for Food and Agriculture, the body responsible for the negotiation of the ITPGRFA, nor the information papers it generated to support its efforts, explicitly mention ‘commons’, much less identify the creation of (or support for) a plant genetic resources commons as the commission’s objective. The more recent sessions of the governing body overseeing implementation of the ITPGRFA are similarly characterized by the absence of commons-focused discourse. This paper seeks to achieve the ‘double effect’ David Bollier refers to in the epigram above. The paper identifies a new commons (or at least a potential, emerging commons) in the multilateral system of access and benefit sharing created by the ITPGRFA, and suggests ways in which it can be further developed or strengthened, drawing on lessons learned in the commons literature.

Plant genetic resources for food and agriculture (PGRFA) were traditionally openly shared, and moved rapidly around the globe, driven or pulled by adoption of agricultural practices and technologies, the need to respond to diseases and climate stresses, adaptation of new foods into local diets, colonialism, international aid, trade, and international public research and plant breeding. In the last 50 years, however, an increasing proportion of plant genetic resources for food and agriculture have been subject to various forms of capture, as a result of advances in applied biosciences and the promotion of exclusive legal protections. Some of these ‘capturing’ mechanisms have been so successful that excluding parties have been led to pursue various forms of pooling as corrective measures, to lower transaction costs of obtaining access to each others’ resources. The end result of these developments is that there is now considerable confusion about what kinds of ‘goods’ plant genetic resources actually are. Conceptual clarity regarding this issue is important for further discussion of what PGRFA can or should be ‘in’ or ‘out’ of the evolving PGRFA commons.

The first part of the paper argues that subsets of PGRFA can now be accurately described by (or located within) all four quadrants of the classic ‘goods’ classification in economics literature (See table 1). In so doing, the paper identifies the conditions under which PGRFA can (currently) be described as public goods, private goods, club goods or common pool resources.

Table 1: Categories of goods

		Rivalry	
		Low	High
Excludibility	Difficult	Public goods	Common pool resources
	Easy	Toll or club goods	Private goods

Source: Adapted from Hess and Ostrom (2007)

The second part of the paper identifies those subsets of plant genetic resources along the excludability and rivalry gradients that are appropriate candidates for inclusion in a global PGRFA commons. It will also compare what subsets of PGRFA are currently included (or meant to be included) in the multilateral system of access and benefit sharing.

Drawing on literature about successfully managed commons, the third part of the paper identifies, tentatively, some options for reforms of the International Treaty’s multilateral system of access and benefit sharing that would allow it to provide stronger support for a global PGRFA commons. Clearly it is beyond the scope of this paper to exhaustively analyze current challenges facing the multilateral system and identify the most efficacious possible reforms. However, what the paper does do, is demonstrate the potential utility of using commons discourse, and the design principles of enduring commons in particular, to analyze the international communities’ efforts to develop a globally coordinated system of conservation, sustainable use, and access and benefit sharing. Even in these few pages, readers will appreciate how looking at the multilateral system of access and benefit sharing through the lens of the Elinor Ostrom’s design principles highlights some weaknesses in the design and operation of that system as far as its support for a PGRFA commons is concerned.

Part 1: What kinds of good are PGRFA?

Many resources are not entirely rivalrous or non-rivalrous, nor are they entirely excludable or non-excludable. Instead, they fall somewhere on a gradient between these poles. In this section I will identify where different subsets of PGRFA are located on those gradients, and attempt to identify the ‘goods’ quadrant in which they belong.

PGRFA’s rivalry

It has been argued elsewhere by the author (Halewood et al 2012) that PGRFA are generally not rivalrous, that is to say, one person’s use of a PGRFA does not detract from the availability of that resource to be used by others. PGRFA are comprised of both physical and informational components. Only a small number of ‘units’ of the ‘stock’ (to use the vocabulary adopted by Ostrom (1990)) of the physical component of the resource is required as inputs into most conservation, plant

breeding and research activities. Additional 'units' likely exist in *in situ* conditions or as samples in *ex situ* collections and can be (re)generated at no or relatively low costs to maintain supply for other users. That said, PGRFA may be rivalrous when *in situ* populations are so small that additional collections, even of limited samples, threaten their existence. Or when the number of units/samples maintained in *ex situ* is similarly limited, a situation that can arise when a genebank lacks resources to 'regenerate' the reproductive materials of conserved material, creating samples for distribution in the process. This is more likely to be the case with vegetatively propagated plants than for cereals, the seeds of which can be stored cheaply for a long time with less investment.

There is, however, another way to look at this, with the conclusion that all *ex situ* PGRFA are more rivalrous than the previous analysis suggests. While it is true that the price per sample of an accession in a genebank is relatively low, the entire infrastructure contributing to the conservation of that accession is, overall, expensive. It has been estimated to cost XX/year to maintain the CGIAR hosted *ex situ* PGRFA collections. In the absence of that annual cumulative investment by a number of governments and organizations, the ability to generate, maintain and supply low cost samples would be lost. Eventually, the number of available samples would be reduced to the point where one person's use of those samples would deprive availability of the underlying accession to be used by others. It may only be the fact that the *ex situ* collections have existed for so long, with relatively solid funding and impressive record of international distributions that this conclusion does not 'leap to the fore' more readily. The argument is further strengthened when one considers that some (possibly much - we don't actually know) of the materials maintained in the genebank no longer exist 'in the field'.

The situation with respect to the information component of PGRFA is not subject to such a proviso; one's use of the information will not limit its availability for others.

While considering rivalry, it is important to highlight an issue that distinguishes PGRFA from natural resources, *strictu sensu*. PGRFA is the result of millennia of interactions between the environment, the breeding systems of plants, and human intervention. In the absence of human intervention plants would not be domesticated and the genetic diversity within domesticated species would not exist. In the absence of human intervention/use, PGRFA would not continue to evolve, and much of what currently exists would disappear. The literature is replete with examples of varieties of crops, trees, forages that no longer exist because they fell into disuse, and were not subsequently subject to dedicated conservation efforts. Unlike the situation with natural resources, wherein one's use of a resource can negatively affect the availability of that resource for others, with PGRFA, underuse of PGRFA can also negatively affect their evolution, conservation and ultimately, availability for use by others. This aspect of PGRFA informs the kinds of collective action that are necessary to ensure that PGRFA is sustainably conserved and available for use.

PGRFA's excludability

Ravi Kanbaur (2002) states that 'while rivalry can be characterized as a property given by a technology, excludability is man made'. For millennia, PGRFA were generally not subject to any forms of restriction. Plant genetic resources were widely available, without legal restrictions, driven around the world by the spread of different forms of agriculture, adoption of new foods into

national diets, colonialism, imperialism, immigration, international trade, humanitarian assistance and internationalized agricultural research and development and plant breeding.¹ However, as highlighted below, in recent decades, humans have dedicated considerable resources to attempt to create technological and legal means to exclude others from being able to freely access and use subsets of PGRFA.

In some situations, it is very difficult to exclude access to PGRFA. Consider how easy it is to put a seed, or leaf in one's pocket. Or to buy seed on the open market and then use it in a breeding programme. PGRFA collected decades ago are openly exchanged between researchers around the world.

In other situations, availability of PGRFA can be more limited. The most significant collections of *ex situ* diversity are usually behind locked doors, in refrigerators, in genebanks hosted by international and national public organizations and companies. It would be an easy matter, from a purely physical point of view, to 'turn off' supply of PGRFA from those collections.² Fortunately, the international collections hosted by the CGIAR Centres, CATIE for example, were created with the objective of providing world-wide supply of PGRFA to support agricultural research and breeding, and they have committed themselves, legally, to continuing supply (more about legalities below). Most national genebanks (with the exception of those in the USA, Canada, the Netherlands and Germany) do not generally provide materials directly to recipients outside their borders, but most do have policies to supply domestic researchers and breeders. National genebanks sometimes deposit backup copies of materials in international genebanks on the understanding that the latter will make them available internationally. Private companies generally do not make any of their collections publicly available.

In situ PGRFA diversity often exists in marginal farmlands or 'in the wild' and can most practically be reached through formal collecting missions, often relying on the expertise of national scientists or local farmers to locate the plant populations concerned. Without cooperation of national and local authorities and experts, the *de facto* availability of those resources can be limited.

Technological exclusions

Technological exclusions were introduced, in the form of hybridized maize, in the early part of the 20th century (Swanson 2012). Since then, a range of other hybrid crops have been developed (Kingsbury 2009). Progeny of hybridized parents generally do not perform well; as a result, farmers are required to return each growing season to (usually commercial) suppliers of hybrid seed, who maintain (and generally do not share) 'parental lines' which are crossed to produce the seed of the hybrid crop. Farmers generally do not have the capacity to create, maintain, and cross the parental lines. While use of hybrids started in developed countries, they are now widespread in many developing countries as well, particularly in Asia and Latin America. Hybrid maize is now found all around the world, planted on approximately X hectares, contributing to seed sales of approximately Y per year. The use of hybrid pearl millet and sorghum is now widespread in India, and many agencies

¹ There was also little to no concern about their conservation, so there was little discussion about responsibilities to conserve and sustainably use them at national or international levels. Discussion of responsibility to use PGRFA sustainably and maintain them for future generations was first introduced, at international policy levels, with the International Undertaking, 1983.

² Of course, there are duplicates of many of these resources in *ex situ* collections around the world, opening up the possibility of alternative sources of supply.

are working together to support their introduction into Africa. This effort involves building capacity of national public agencies and companies to maintain the parental lines, do the requisite crossing, bulk up and distribute/sell certified seed, and development of policies to support more participation of private sector in the seed system (Lopez et al 2012). Other forms of technological restrictions have been introduced in the interim, nicknamed by concerned civil society organizations as genetic use restriction technologies (GURTS) which are transgenic events.

Legal exclusions

Until the 1960s, international law was silent with respect to plant genetic resources. Subject to a few notable exceptions of national or colonial governments issuing edicts against exporting the planting material of particular species, plant genetic resources were also largely ignored by national law. This started to change in the 1960s, with the UPOV Convention 1961 (later revised in 1972, 1978, 1991) which sought to harmonize approaches to plant variety protection laws, but for a long time their membership was limited to a small number of developed countries, mainly in Europe. In 1983, however, the FAO Council adopted the non-legally binding International Undertaking on PGRFA³ which proclaimed the ‘universally accepted principle that plant genetic resources are a heritage of mankind and consequently should be available without restriction.’ Not surprisingly, countries in favour of private appropriation of subsets of PGRFA through plant variety protection laws refused to endorse the International Undertaking. To accommodate the hold-outs, in a remarkable ‘about face’, the FAO Council adopted a resolution in 1989 which recognized the primacy of plant variety protection law over the common heritage principle.⁴ The idea that PGRFA ‘should therefore be made available without restriction’ was further undermined by a subsequent FAO Council resolution, in 1991, which recognized that ‘nations have sovereign rights over their genetic resources’.⁵ In the period following those resolutions, up to the present day, there has been a rapid proliferation world-wide of intellectual property (IPR) and access and benefit sharing (ABS) laws that allow owners, countries, communities, individuals the ability to exclude others access to various subsets of PGRFA.⁶

The range of IPR and ABS protection that are currently available are reviewed elsewhere (Santilli 2011, Tansey & Ragotte 2008, Crucible Group 2001). In this section, I will highlight the exclusions/availability of PGRFA that attend the predominant forms of legal protection that are now available in various jurisdictions and or included in international laws.

Patent laws: in some jurisdictions, patented PGRFA cannot be used for any purpose without the patent owner’s consent. In other jurisdictions, the PGRFA can be used in research and breeding, but must not be included in the final commercialized new product without the rights-holder’s consent.

³ International Undertaking on Plant Genetic Resources

⁴ Resolution 5/89

⁵ Resolution 3/91

⁶ [The UPOV convention has been revised (1991) to increasing the strength of IP protection, UPOV membership has substantially increased, the WTO/TRIPs agreement has come into force, and a number of countries have started to allow patenting various forms of PGRFA including plants, transgenic events, and gene sequences. The Convention on Biological Diversity reaffirmed the right of countries to regulate access to genetic resources, 58 countries have adopted national access and benefit sharing measures, and considerably more are in the process of developing such laws. The Nagoya Protocol, was negotiated, but has not yet come into force.]

Plant variety protection laws: protected PGRFA may be used in research and breeding, and the new PGRFA that is produced (in the form of a plant variety) may be commercialized without the consent of the rights-holder. Some national PVP laws include exemptions for farmers to save seed from harvested protected varieties for use on their own holdings, but also include an obligation on the part of the farmer to pay a royalty to the company in such cases.

Contractual restrictions accompanying seed sales: Many companies sell seed with 'bag tags' with additional restrictions, beyond those which attend national PVP or patent laws. For example, these contracts sometimes include clauses whereby farmers agree to forfeit their rights that may exist under national law, to save and re-use seed, or to open their farms for inspections by the company for proper use of the seed, etc.

Access and benefit sharing laws: most national laws that were designed to implement the access and benefit sharing provisions of the Convention on Biological Diversity do not allow access to any genetic resources (including PGRFA) in the country concerned without permission from an appointed national authority. Some laws also require permission of the communities or natural or legal persons involved in supplying the resources in question.⁷ Countries that have ratified or acceded to the ITPGRFA agree to provide facilitated access to the PGRFA of 64 crops and forages that are 'under the management and control' of the national government and 'in the public domain', for the purposes of training, research and breeding for food and agriculture. They agree to use a standard material transfer agreement (SMTA) when providing access. Countries that already had access and benefit sharing laws prior to joining the ITPGRFA will need to amend those laws so that PGRFA providers in the country are able to provide facilitated access in the manner set out in the ITPGRFA. The CGIAR centres hosting *ex situ* PGRFA collections have legally committed themselves, from January 2007 onwards, to provide facilitated access to ITPGRFA member states using the SMTA. They have also confirmed their policy that they will provide access under the same conditions to non-ITPGRFA member states, on the basis that nothing in their ITPGRFA legal agreements prevents them from doing so. European genebanks, coordinated under the aegis of AEGIS (a European integrated genebank system⁸) have also adopted the same policy of making materials to non-ITPGRFA members states based on the same rationale.

The multilateral system of access and benefit sharing is a mechanism that was designed by the international community to lower transaction costs that would otherwise prevail if each exchange of PGRFA in support of conservation, research and breeding for food and agriculture had to be subjected to bilateral negotiations. Natural and legal persons have also developed transaction lowering systems to lower transactions associated with high levels of exclusive protectionism. Patent pools, and research consortia with rules regarding facilitated access to research partners' PGRFA are examples. An important difference between these 'pooling' efforts is that under the multilateral system, the material included is in the public domain, and the system is set up to benefit open groups of users with environmental, development, conservation and social equity objectives. Patent

⁷ In some cases, PGRFA protected by IPRs are exempted from application of these laws (thereby allowing the 'owner' to decide on his or her own whether not to supply). Frequently, exchanges within and between local communities for traditional purposes are also exempted.

⁸ <http://aegis.cgiar.org/>

pools on the other hand, are constituted by agreements between private partners to make private property available to one another, for their own mutual, exclusive, benefits.

Table 2: Subsets of PGRFA characterized as different kinds of goods

		Rivalry	
		Low	High
Excludibility	Difficult	<p>Public goods</p> <p><i>Ex situ collections hosted by CGIAR centres and many European countries (global public goods)</i></p> <p><i>In situ and ex situ PGRFA in the multilateral system that are made available only to ITPGRFA member states (international public goods)</i></p> <p><i>Collections in national genebanks (national public goods)</i></p> <p><i>PVP protected PGRFA (for purposes of breeding)</i></p>	<p>Common pool resources</p> <p><i>PGRFA embedded in threatened situ populations and unique samples/units in threatened ex situ collections</i></p>
	Easy	<p>Toll or club goods</p> <p><i>Patent pools</i></p> <p><i>PGRFA subject to facilitated access in research consortia</i></p> <p><i>PGRFA subject to humanitarian use licenses</i></p>	<p>Private goods</p> <p><i>Patent protected PGRFA</i></p> <p><i>PVP protected PGRFA (for commercial exploitation)</i></p> <p><i>Hybrid parental lines, hybrid seed (that are not shared publicly)</i></p> <p><i>In situ PGRFA in private universities', companies' and farmers' fields, and in the wild (except those on public lands)</i></p>

Part 2: Using commons discourse to identify new commons: what PGRFA 'fit' in a global commons?

This section focuses on what subsets of PGRFA 'fit' in the PGRFA commons. This exercise involves comparison of those subsets of PGRFA that the commons literature suggests might be included in such a PGRFA commons with the PGRFA that are (or are meant to be) included in the multilateral system of access and benefit sharing under the Treaty.

Early commons scholarship focused primarily on cases studies of collective management, by a limited set of users, of rivalrous, non-excludible natural resources, distributed over a circumscribed geographic areas (Ostrom 1990). The ‘new commons’ literature has expanded to include consideration of resources that are not necessarily rivalrous in nature and for which the geographic scope and membership of the commons are not limited (Hess & Ostrom 2007). Commons can have various levels of membership, with ‘nested’ pods or units for managing the resource under question. Private goods, and voluntarily pooled private goods, are generally not conceived of as constituent elements of commons.

Out of the four quadrants in Table 2, the subsets of PGRFA that are ‘public goods’ and ‘common pooled resources’ are those with the clearest commons-characteristics.

Interestingly, there is a very high level of similarity between the subsets in those two quadrants and what is included (or at least what is meant to be included) in the multilateral system of access and benefit sharing.

Commonalities

PGRFA automatically included in the multilateral system are those which are ‘under the management and control’ of national governments of countries that have ratified the ITPGRFA ‘and in the public domain’. *Ex situ* collections hosted by national public agricultural research organizations constitute the bulk of PGRFA that answer to this description. *In situ* PGRFA located on national government controlled lands are also be automatically included. This was, of course, the easiest and most logical material for the negotiators of the ITPGRFA to commit to the multilateral system, that is to say, materials they already controlled (unlike PGRFA held by companies and private universities within their borders) and had a history of making publicly available, if only within the country.

The ITPGRFA commits state parties to encourage natural and legal persons to voluntarily include PGRFA in the multilateral system; their PGRFA are not automatically included. With a few notable exceptions, states are the subjects of international laws, not natural or legal persons. This is part of the reason that the formula for automatic inclusion in the multilateral system stops where it does. Another reason is that, as suggested above, rights and privileges with respect to privately owned and controlled PGRFA are already exhaustively defined in many countries, and many (if not most) of the ITPGRFA negotiators did not have a mandate to commit their countries to anything that would substantially alter those rights.

The ITPGRFA also invites international institutions, and in particular, the CGIAR centres, hosting *ex situ* collections to legally commit to manage those collection under the framework of the treaty, including using the SMTA when distributing PGRFA. The centres signed such agreements, and have subsequently become the single largest (by far) providers of PGRFA in the multilateral system. Similar to the case of national genebanks, inclusion of the CGIAR centre-hosted collections in the multilateral was a relatively uncontroversial and logical policy, , given the history of the development of, and open public access to, those collections. It was not in the power of the negotiators to automatically include those collections, but they could (and did) create a context and make an invitation, that would have been almost impossible for the CGIAR centres to reject.

The following PGRFA of the 64 crops and forages in annex 1 of the ITPGRFA are not included in the multilateral system, unless voluntarily placed in it by some combination of natural and legal persons, provincial and national governments:

- *In situ* materials located off government controlled lands, including (at least in most countries) farmers fields, private university and company controlled lands
- *Ex situ* collections, research collections, materials under development or simply under the control of provincial governments, companies, provincial and private universities, civil society and community organizations, private individuals

Differences

The multilateral system does not include PGRFA of any crops or forages beyond those listed in annex 1 of the ITPGRFA. Nor does it include PGRFA under the management and control of provincial or local governments. The earlier analysis of types of goods did not recognize these distinctions or restrictions on the scope of a PGRFA commons. Differentiation on a species or genera level did not factor into consideration of what could be defined as public goods or common pooled resources. Nor did differentiation on the level of public authority (national, provincial, local) play a role in identifying which collections or *in situ* material could be included in the commons.

Part 3: Using commons discourse to improve the PGRFA commons⁹

The logic, structure and functioning of the multilateral system are exhaustively described elsewhere (Frison et al, 2011; Manzella 2012; FAO 2011; Moore 2009; Halewood & Nnadozie 2008). Before proceeding, however, it is important to rehearse some basic information about the multilateral system of access and benefit sharing so that readers unfamiliar with it will be able to appreciate the rest of this section. The underlying logic of the multilateral system is that, in return for agreeing to include the PGRFA that is under its management and control and in the public domain in a common pool, a country (including all of its constituent individuals and organizations) will gain access to the PGRFA that are under the management and control of all other contracting parties (of which there are 127 to date). They will also gain access to *ex situ* collections placed under the ITPGRFA's framework by international organizations like the CGIAR centres, and to materials voluntarily included by natural and legal persons. The PGRFA is not centralized in a single collection, but remains virtually networked, in collections and *in situ* locations around the world, with member states taking responsibility to conserve those resources. States are allowed to discontinue their conservation efforts, dropping materials out of collections, or even closing collections entirely. However, as long as they maintain those collections, they agree to the basic rules of the multilateral system. Not all PGRFA is included in the multilateral system; it is limited to PGRFA of 64 crops and forages that were agreed to during the treaty negotiations. The governing body adopted a standard material transfer agreement (SMTA) to be used for all transfers of PGRFA in the multilateral system.

⁹ This section draws from, and builds upon, arguments set out in a forthcoming paper: M. Halewood, I. Lopez Noriega and S. Louafi, The Global Crop Commons and Access and Benefit Sharing Laws. Examining the limits of international policy support for the collective pooling and management of plant genetic resources. In M. Halewood, I. Lopez Noriega, S. Louafi, (Eds.) 2012. *Crop genetic resources as a global commons: challenges in international governance and law*. Routledge, London.

The SMTA prohibits recipients from seeking IPR rights over the materials in the form received, and requires recipients to share 1.1% of gross sales if they commercialize a new PGRFA product that incorporates PGRFA from the multilateral system and do not allow it to be used for further research or breeding.

While ratification rates are high, and there are signs that the Treaty is having positive impacts (Halewood et al 2012) the system is, by some standards, not living up to its full potential. For example, while rates of distribution by the CGIAR centres and European genebanks are relatively high, but new germplasm is not being introduced into the system at rates that the author, at least, previously expected. Of the 127 country members, only approximately 20% have shared information about what materials are available from the, in the system, on a website maintained by the treaty secretariat.

The multilateral system is a remarkable achievement, representing years of hard work on the part of the international community to strike compromises on very difficult issues to develop a system that promotes facilitated access to PGRFA, supports conservation and agriculture research and development, promotes equity in benefit-sharing and ultimately, food security. While the system may not be perfect, it is by far the best alternative that currently exists. The following critique is not intended as an indictment of the multilateral system, but as a means to identify mechanisms to better support it attain its objectives through strengthening the support it provides the global PGRFA commons.

In the following paragraphs, I draw on Elinor Ostrom's eight design principles for long enduring commons (Ostrom 1990) to gain insight into what is contribution to this state of affairs, and make suggestions for how the multilateral system could possibly be reformed to support the PGRFA commons even more effectively.

Design principle 1: The boundaries of commons must be clearly defined, with certainty about who can appropriate resource units and how many. The boundaries of the multilateral system are not clear. As stated above, however, the largest providers of PGRFA under the multilateral system, the CGIAR centres, and many European countries, have adopted policies to make the same PGRFA available to non-parties to the Treaty, under the same terms, as set out in the SMTA. This reduces incentives of other participants to join the Treaty (they can get much of the worlds' PGRFA from these sources without joining) and it undermines the sense of cohesiveness and potential shared purpose of the countries that are members.

Design principle 2: there must be congruence between appropriation and provisioning rules for the operation of the commons. This principle also highlights a weakness or vulnerability of the multilateral system. There are no rules regarding *de minimus* contributions parties must make to the multilateral system as a precondition for obtaining PGRFA from the system. Once a country has ratified the Treaty, it may seek, as of right, facilitated access to materials in other countries in the multilateral system (and may apply for money from the Treaty's international benefit sharing fund to support local PGRFA-related project activities). To know what PGRFA within countries is actually automatically or voluntarily included in the multilateral system, countries need to publish lists of the accessions, accompanied by passport and other data. Unfortunately, such publication is not legally required under the Treaty. So a country can be a state party, but not provide enough information to become a *de facto* provider. Nor are there any conditions about minimum contributions countries

must make in terms of sharing responsibility for conserving, or regenerating or evaluating PGRFA in the multilateral system as preconditions for obtaining materials from the system.

Design principle 3: individuals affected by operational rules of the commons can participate in changing them to make the better fit circumstances, developments in the field, etc. As a creation of international law, the subjects charged with implementing the the overall multilateral system are countries. And only countries, through the mechanism of the governing body of the ITPGRFA, have the possibility of changing the rules. Countries, however, are not generally the users of the multilateral system. Instead, the users are individual scientists, plant breeders, farmers, hobbyists and so on. These individuals, and the organizations they work for, have first-hand experience as participants/users of the multilateral system. But they cannot participate in rule reformulation at the level of the governing body (except, perhaps, as observers at the meetings). This is an area where global commons are challenged as a result of their size in comparison to traditional natural resource commons, especially when some of the most important rules are established through intergovernmental processes. The same comment applies to design principles 4, 5 and 6 below.

Design principle 4: monitoring of compliance with should be done by appropriators of resources in the commons (or by people accountable to the appropriators). Here again, the global PGRFA commons, as it is supported by the multilateral system, is vulnerable to critique. The governing body of the ITPGRFA has developed compliance rules pursuant to which only state parties may direct complaints about non-compliance to a compliance committee. The compliance committee will include individuals who are themselves well known experts in the PGRFA field, but there will only be a few, and they will sit on the committee responsible for considering complaints, not actually monitoring compliance. Appropriators have no role as monitors, nor does anyone accountable to them (unless, one argues that the government representative to the governing body from the country concerned is accountable to the appropriators in as much as all governments are accountable to their citizens). Indeed, there is very little monitoring of compliance other than through state-initiated complaints and requests for information in the form of governments reporting on their own activities.

Design principle 5: sanctions are graduated, including the possibility of reducing access to the resource in question, and the sanctions are assessed by other resource users in the commons or by people accountable to them. The ITPGRFA compliance rules do not include potentially serious sanctions, other than, indirectly, loss of country reputation. Again, it is not resource users, or anyone accountable to them who assess the sanction, but a compliance committee made up of regional representatives and experts, often (statistically, usually) from other countries.

Design principle 6: appropriators have access to low cost, efficient, local dispute resolution mechanisms. Dispute resolution under the compliance rules is slow, and centralized, under the internationally appointed compliance committee. The SMTA (a contract between provider and supplier – it does not apply when there is a refusal to supply) includes dispute resolution terms – amicable resolution, arbitration, legally binding arbitration – that are certainly more responsive and tailored to address complaints that arise in day to day life of the PGRFA commons. But the SMTA is a contract only between individual providers and recipients, when they are actually providing and receiving materials. It does not apply to situations of non compliance that are discussed above, such as not making materials available through the multilateral system in the first place.

Design principle 7: appropriators have a recognized minimum ability to devise their own institutions in ways that are not challenged by external, national authorities. The multilateral system leaves considerable leeway for how conservers and users of PGRFA organize themselves at local levels. This design principle does not highlight a significant vulnerability in terms of the support that the multilateral system provides for the PGRFA commons.

The forgoing analysis suggests a few relatively straightforward-sounding reforms to tighten-up and invigorate the PGRFA commons. International organizations like the CGIAR centres and organizations within country states could be encouraged to discontinue their policies of making materials available to recipients in states that are not Treaty members. The paper is too short to analyze the motivations behind these policies, but they involve a combination of a) being concerned about the impact on agriculture research and development in poor countries which, for whatever reasons, have not yet ratified the ITPGRFA, b) administrative efficacy of using the SMTA whenever possible for distributing materials, c) indirectly encouraging non-parties to join by demonstrating to them that receiving materials at least under the SMTA is not problematic, and d) the fact that some of the biggest financial donors to the CGIAR (e.g. USA) are still not Treaty members. Are these factors more important than the advantages of invigorating the multilateral system? It is beyond this paper to offer the required cost-benefit analysis. It will have to suffice for now to point out the tensions involved.

Another possible reform to invigorate participation in the multilateral system would be to require minimum contributions to the system by member states as a precondition for accessing materials from it. These contributions could take the form of a) providing accession level information about all PGRFA within the country that is in the multilateral system, b) sharing responsibilities for conserving, regenerating, characterizing, evaluating materials in the system, bearing in mind the different capacities and resources of the countries concerned.

The insights drawn from principles 3-6, read together, suggest that mechanisms need to be developed to make space for participation of PGRFA users in monitoring compliance, making complaints, adjudicating complaints and devising appropriate sanctions. The compliance rules are still under development, and there may be opportunities for some reforms in this direction. Of course, there are limitations, as highlighted above, due to the fact that the multilateral system is a creature of international law, and governed by an intergovernmental body.

Conclusions

This paper attempted to (briefly) analyze the efforts of the international community, under the auspices of the UNFAO, to create an international system of PGRFA conservation and sustainable use, through the lens of recent commons scholarship. The paper asserts that a global PGRFA commons exists (or is coming into existence), and makes a test-run at using commons design principles to analyze the efficacy of the multilateral system of access and benefit sharing. While time and page length has not allowed an exhaustive analysis, the paper has, I hope, demonstrated the powerful potential of the extension of the commons narrative to provide insights into how the global PGRFA commons could be strengthened.

References

[to be added later]