

# OPINION

## Intellectual Property and Facilitated Access to Genetic Resources under the International Treaty on Plant Genetic Resources for Food and Agriculture

**Christine Frison, Tom Dedeurwaerdere, Michael Halewood\***

 Biodiversity; Genetic resources; Intellectual property; Plant varieties

Since the dawn settled agriculture, farmers have developed, conserved and exchanged crop and forage varieties.<sup>1</sup> The generally open patterns of use, established by early farmers and continued by public researchers and plant breeders, has led to a situation where countries all over the world are reliant on plant genetic resources for food and agriculture (PGRFA) located within each other's borders.<sup>2</sup> There is not a single country that does not need crops from other countries to feed their population.<sup>3</sup> The relatively recent entry of private companies into the plant breeding business, from the late 19th century onwards, has been attended by the development of intellectual property rights (IPRs) for plants and plant varieties.<sup>4</sup> While these IPRs are intended to create incentives for investment in the private plant breeding sector, they also represent a break in the earlier tradition of unfettered access. In particular, it is frequently argued that IPRs' power to interrupt the open flow and use of germplasm threatens food security and poverty alleviation in developing countries in particular, by reducing their access to essential PGRFA.<sup>5</sup>

The International Treaty on Plant Genetic Resources for Food and Agriculture<sup>6</sup> (the Treaty) of the Food and Agriculture Organisation (FAO)

\* Christine Frison is a PhD candidate at both the Centre for Intellectual Property Rights of the K.U.Leuven (Belgium) and at the Centre for the Philosophy of Law, Université catholique de Louvain (Belgium). Email: frison.christine@uclouvain.be.

Prof. Dr. Tom Dedeurwaerdere, Centre for the Philosophy of Law, Université catholique de Louvain and Fonds de la Recherche Scientifique, Belgium. Email: tom.dedeurwaerdere@uclouvain.be.

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Dr. Michael Halewood, Head of the Policy Research and Support Unit at Bioversity International. Bioversity International is one of the 15 International Agricultural Research Centres. Email: m.halewood@cgiar.org.

1 R. Pistorius, “A History of Plant Genetic Resources Movement” in *Scientists, Plants and Politics* (Rome: IPGRI, 1997), pp.7–10. See also D. Bommer, “The Historical Development of International Collaboration in Plant Genetic Resources”, in *Crop Networks: Searching for New Concepts for Genetic Resources Management* (Rome: IPGRI, 1990), p. 3.

2 C. Frison and M. Halewood “Annotated Bibliography Addressing the International Pedigrees and Flows of Plant Genetic Resources for Food and Agriculture” (2005), information document submitted by the System-wide Genetic Resources Programme of the CGIAR to the Eighth Conference of the Parties to the Convention on Biological Diversity (COP 8) and the Ad Hoc Open-ended Working Group on Access and Benefit-sharing, Bioversity International (Rome: CGIAR), available at <http://www.bioversityinternational.org/publications/publications/search.html> [Accessed October 10, 2009].

3 X.F. Palacios, “Contribution to the estimation of countries' interdependence in the area of plant genetic resources”, Background Study Paper No. 7, rev. 1 (Rome: FAO Commission on Genetic Resources for Food and Agriculture, 1998), available at <http://www.fao.org/nr/cgrfa/cgrfa-back/en/> [Accessed August 20, 2009].

4 For an explanation on the patentability of plants see G. Van Overwalle, “Biotechnology and Patents: Global Standards, European Approaches and National Accents”, in D. Wüger and T. Cottier (eds), *Genetic Engineering and the World Trade System* (Cambridge: CUP, 2008), pp.77–108.

5 E. Bonadio, “Crop Breeding and Intellectual Property in the Global Village” (2007) 5 E.I.P.R. 167–171.

6 *International Treaty on Plant Genetic Resources for Food and Agriculture*, FAO Resolution 3/2003, November 3, 2001 (entered into force June 29, 2004), United Nations Treaty Series I-43345, registered on December 13, 2006. To this date, there are 121 contracting parties.

of the United Nations is an attempt to strike a balance between IPRs and totally unregulated open access. The Treaty creates a common pool of the world's major crops and forages (the Multilateral System of Access and Benefit-Sharing of the Treaty, hereafter the MLS),<sup>7</sup> with a provision for benefit sharing which is described by some commentators as a limited compensatory liability mechanism.<sup>8</sup> Indeed, the Treaty and the Standard Material Transfer Agreement (for transfers of material within the MLS, hereafter the SMTA) establish rules for what is included in the MLS,<sup>9</sup> and the terms and conditions about how it will be used, including how financial benefits shall be shared. The MLS provides a facilitated access to MLS crops "solely for the purpose of utilization and conservation for research, breeding and training for food and agriculture, provided that such purpose does not include chemical, pharmaceutical and/or other non-food/fee industrial uses".<sup>10</sup> The Treaty does not seek to alter IPR laws in any way; it works around whatever laws are in place. By providing a secure basis for the pooling of PGRFA, and a framework for conservation and sustainable use, the Treaty represents invaluable support for public, private, and hybrid public/private innovation. However, as stated below, further action both at the national and international level is needed to take its implementation forward.

This opinion note addresses some of the questions raised by Charles Lawson in his contribution on "Intellectual property and the Material Transfer Agreement under the International Treaty on Plant Genetic Resources for Food and Agriculture",<sup>11</sup> which discusses the challenges faced by the Treaty, especially in relation to its effectiveness to stimulate innovation. This article notes concerns raised by Lawson, introduces some additional considerations with respect to those concerns and highlights the areas where further progress is needed for the effective implementation of the Treaty. Three specific concerns on the effectiveness of the Treaty, which have been identified by Lawson, will be dealt within this note: (i) the interface between IPRs and the MLS, (ii) the limited scope of the Treaty, and (iii) the wider framework for conservation and sustainable use of PGRFA within which the MLS is situated.

### Preliminary remarks on the interface between IPRs and the Treaty's MLS

Lawson states that in order for IPRs to support the Treaty's objectives, IPRs should not limit the facilitated access to PGRFA in the multilateral system, and they should be a means to capture value from the development

For a detailed analysis, see G. Moore and W. Tymowski, *Explanatory Guide to the International Treaty on Plant Genetic Resources for Food and Agriculture* (IUCN Environmental Policy and Law paper No.57, 2005). For a specific analysis on sustainable development law and the Treaty see C. Frison, "Principles of Sustainable Development in the Context of the Implementation of the International Treaty on Plant Genetic Resources for Food and Agriculture" (2006) 2(2) J.S.D.L.P. 155–174.

<sup>7</sup> This common pool contains more than 1.2 million accessions conserved in collections and genebanks of contracting parties all over the world.

<sup>8</sup> For the general concept of compensatory liability regime, see J.R. Reichman, "Of Green Tulips and Legal Kudzu: Repackaging Rights in Subpatentable Innovation" (2000) 53 *Vanderbilt Law Review* 1743–1798. For an explanation of this mechanisms as a take-and-pay-rule, where the right to exclude is turned into a right to remunerate (i.e. users take and pay for the material they use), see A. Rai, J.H. Reichman, P.F. Uhlir and G. Crossman, "Pathways Across the Valley of Death. Novel Intellectual Property Strategies for Accelerated Drug Discoveries" (2008) *Yale Journal of Health Policy, Law and Ethics*, Vol 8, issue 1, pp. 1–36. For an application of this theory to PGRFA, see V. Henson-Apollonio, "Case 10. The International Treaty on Plant genetic Resources for Food and Agriculture. The Standard Material transfer Agreement as implementation of a limited compensatory liability regime" in G. Van Overwalle (ed.), *Gene Patents and Collaborative Licensing Models* (Cambridge: CUP, 2009), pp.289–293.

<sup>9</sup> The 64 crops and forages included in the MLS are listed in Annex I to the Treaty. They may take the form of plantlets, tubers, seeds, cuttings, etc. In this article, we will refer mainly to "material" when speaking about PGRFA crops and forages of the MLS.

<sup>10</sup> ITPGRFA art.12.3(a).

<sup>11</sup> C. Lawson, "Intellectual Property and the Material Transfer Agreement under the International Treaty on Plant Genetic Resources for Food and Agriculture" (2009) 5 E.I.P.R. 244–254.

and commercialisation resulting from the facilitated access to crops in the multilateral system. We believe that the Treaty is structured in such a way that these two conditions are fulfilled.

### IPRs and identifying what is in the MLS

The Treaty specifies that Annex I materials that are ‘under the management and control of the Contracting Parties and in the public domain’ are included in the multilateral system. If, as a result of IPR on PGRFA, the latter is not in the public domain, then one of the conditions for being automatically included in the MLS is not satisfied. That is not to say that IPR owners could not elect to place their materials in the MLS; they could. Further, if a public research organisation elected to seek patent protection for a new PGRFA, it would not be automatically included in the multilateral system. In this way, IPRs can function to limit what goes into the MLS.

### IPRs and materials received from the MLS

The Treaty 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.”<sup>12</sup> It is clear that a recipient cannot take IPRs that prevent others from obtaining, from the multilateral system, a PGRFA in the same form than it was originally sent to the first recipient, for example, as a seed or a cutting. It is still not clear however, if a recipient can seek IPRs over isolated parts and components of those seeds or cuttings from materials within the MLS, such as genes. In any case, independently of the outcome of this debate, such property rights must not prevent future recipients from obtaining the same seeds or cuttings<sup>13</sup>.

### IPRs and mandatory financial benefit sharing

The Treaty does not prevent recipients from seeking IPRs over improved products that incorporates materials received from the multilateral system. However, it does require recipients to share a percentage of the commercial benefits generated from the sale of those PGRFA products when they are not “available without restriction for further research and breeding”. The restriction may be technological or legal, such as for example, with a patent.<sup>14</sup>

Given that UPOV-compliant Plant Breeders Rights (PBRs) allow third parties to use protected materials for further research and breeding (to the extent that this provision is transposed in national laws), they would not trigger the Treaty’s mandatory benefit sharing provision. On the other hand, it is generally understood that most country’s patent laws would trigger the benefit sharing clause.

The Treaty is silent about why it has drawn this line in the sand with respect to benefit sharing. One could consider it as a compensation for

12 ITPGRFA art.12.3(d). The SMTA reproduces similar but not exact terminology in its art. 6.2 “The Recipient shall not claim any intellectual property or other rights that limit the facilitated access to the Material provided under this Agreement, or its genetic parts or components, in the form received from the Multilateral System”. These terms may be interpreted in different ways and have not been clearly defined yet by the Governing Body of the Treaty nor by a settlement of dispute decision. See L.R. Helfer, “Using IPRs to Preserve the Global Genetic Commons: The International Treaty on Plant Genetic Resources for Food and Agriculture”, in K.E. Maskus and J.H. Reichman (eds), *International Public Goods and Transfer of Technology Under a Globalized Intellectual Property Regime* (Cambridge: CUP, 2005), pp.217–224.

13 For a detailed analysis, see M. Halewood and K. Nnadozie, “Giving Priority to the Commons: The International Treaty on Plant Genetic Resources for Food and Agriculture”, in G. Tansey and T. Rajotte (eds), *The Future Control of Food* (London: Earthscan, 2008), pp.115–140. See in particular, M. Halewood, Box 6.4 on p.129.

14 In the SMTA art.2, a product is considered to be available without restriction to others for further research and breeding when it is available for research and breeding without any legal or contractual obligations, or technological restrictions that would preclude using it in the manner specified in the Treaty.

the unavailability for further research, breeding and training for food and agriculture of the new product developed with MLS material, which access is restricted through some forms of IPRs and/or technological means. Or one could consider it a means of indirectly supporting or endorsing UPOV-compliant PBRs over patents, given the negotiators' appreciation of the long tradition of keeping PGRFA available for research and breeding.

### **A limited scope for more efficiency in facilitating access for research, breeding and training purposes**

In his article, Lawson argues that the scope of the Treaty is limited as the facilitated access mechanism only applies to PGRFA used for breeding, research and training purposes. He questions whether “the [S]MTA can *really* deliver appropriate value(s) for providers”, because for him, the limited scope of the Treaty could refrain providers from using the Treaty mechanism to facilitate the exchange and use of the genetic resources.<sup>15</sup>

The scope of the Treaty's MLS—materials listed in Annex 1 for the uses prescribed by the Treaty—is a reflection of the political climate during which the Treaty was negotiated, and which, in many ways, prevails until the present day. It is clear from the history of the negotiations, and the way in which the list of materials included in the MLS fluctuated over the negotiations,<sup>16</sup> that the Treaty might never have been finalised if some delegations insisted on the MLS covering *all* PGRFA for *all* purposes. That said, one should not underestimate the breadth of what is included in Annex 1; nor should one underestimate the broad range of activities that fall within the meaning of “utilization and conservation for research, breeding and training for food and agriculture”. This section reviews what type of materials are included in the MLS, how the MLS is already, in some ways, ‘de facto’ enlarged, and the conditions under which materials might leave the MLS.

### **A scope restricted to research, breeding and training for food and agriculture**

One of the clauses seen as a limit by Lawson is the fact that the Treaty allows for material to be sold directly as a commodity. It is true that, as far as the Treaty is concerned, a provider can directly sell material to a buyer, without using the SMTA, for purposes outside those listed in the SMTA. Such exchanges are outside the Treaty. The Treaty does not have the ambition to manage all the markets and sales of all PGRFA. The Treaty maintains availability of PGRFA for research breeding and training for food and agriculture.<sup>17</sup> The benefit sharing provisions kick in when such availability is restricted.

Most people would agree that the major benefit expected from the Treaty is not the money that will come back to the MLS as a result of the application of the benefit sharing provisions, but the access to as wide a range of PGRFA as possible for breeding and research and conservation-related activities. Through the system of facilitated access, the conservers (providers of material) are, for most of the time, also users (recipients) of materials out of the common pool of PGRFA. They benefit from the facilitated access at multiple entry levels. Other non-monetary benefits associated with the Treaty may also eventually outweigh the importance of mandatory financial benefit sharing, for examples, information sharing, capacity building and technology transfer.

Striking the proper balance between open availability and private enclosure was contentious during the negotiations, and continues to be to this date.<sup>18</sup> While the private sector has generally been supportive of

15 C. Lawson, “Intellectual Property and the Material Transfer Agreement” (2009) 5 E.I.P.R. at p.252.

16 E. Lim and M. Halewood, (2008) “A Short History of the Annex I List”, in G. Tansey and T. Rajotte (eds), *The Future Control of Food* (London: Earthscan, 2008), Annex 3, p.249.

17 This view is clearly expressed in the SMTA, Annex 2 art. 1 §(c).

18 M. Halewood and Nnadozie, K. *supra* note 13 at page 136



the Treaty, they have been openly critical of the balance struck in the negotiations of the SMTA.<sup>19</sup> Some industry groups would prefer to have had a higher threshold for incorporation of MLS materials in PGRFA products as a precondition for mandatory benefit sharing. It is currently any incorporation, and they would have preferred something between 10-25% of the pedigree of the finished product. Other industry groups—those on the ‘high tech’ end of innovation who traditionally seek patents instead of PVP—would prefer to do away with the distinction between materials being available, or not available, for further access and breeding as a precondition for benefit sharing.

### Patents may not take material out of the MLS

As discussed above, patents may limit what enters the MLS but not alter the material already included in the multilateral system. That said, material may be taken out of the MLS in other ways. For example, anyone can simply decide to stop conserving an accession that is in the MLS. There is no obligation under the Treaty to continue to conserve PGRFA material. If they happen to be the only organisation or country holding that accession, then the material will be definitely out of the MLS, unless someone else takes over the responsibility of conserving that accession. One would hope that such agreements will be arranged, at least when it comes to *ex situ* collections. It will be more complicated—though certainly not impossible—to address situations where *in situ* materials included in the MLS are being lost. Another way materials could be taken out of the MLS is by a contracting party simply withdrawing from the Treaty.<sup>20</sup>

### *De facto* enlargements of the MLS

#### *Transfers to recipients in non-contracting parties*

While the Treaty is silent on the issue, it appears there is nothing to prevent a provider in a contracting party to send materials to a recipient in a non-contracting party using the SMTA. Since the recipient in a non-contracting party would then be bound to the terms and conditions of the SMTA, and to use the SMTA for subsequent transfers of the same material (or new PGRFA incorporating the material received), the ‘reach’ of the MLS can *de facto* expand beyond the territories of contracting parties. The CGIAR Centres use the SMTA when sending materials to non-contracting parties to the Treaty. Any organization or competent political authority can decide to use the SMTA in this way; some European countries have adopted this approach.<sup>21</sup>

#### *Using the SMTA for non-annex 1 materials*

The Treaty anticipated, in Article 15, that the International Agricultural Research Centres of the CGIAR (CG Centres) would sign agreements with the Governing Body of the Treaty, placing the *ex situ* collections they host—both Annex 1 and non-Annex 1 materials—under the Treaty’s framework. The eleven Centres hosting such collections signed such agreements in 2006. The Second Session of the Governing Body<sup>22</sup>, in

19 See the International Seed Federation, “Contribution of ISF to the establishment of a Material Transfer Agreement (MTA) for the Multilateral System (MLS) provided for in Part IV of the International Treaty on Plant Genetic Resources for Food and Agriculture (PGRFA)” (Bangalore, June 2003), available at [www.worldseed.org](http://www.worldseed.org) [Accessed October 1, 2009].

20 ITPGRFA art.32. However, this situation seems unlikely to occur.

21 The European Genebank Integrated System, AEGIS, has decided to use the SMTA for all PGRFA transfers in the European Union. See their Strategic Framework and Memorandum of Understanding, which entered into force in July 2009. The Treaty’s SMTA with the footnote (see fn. 24 below) is used. Available at [http://www.ecpgr.cgiar.org/AEGIS/AEGIS\\_home.htm](http://www.ecpgr.cgiar.org/AEGIS/AEGIS_home.htm) [Accessed October 10, 2009].

22 The Governing Body of the ‘Treaty is composed of all its contracting parties. Its function is to promote the full implementation of the Treaty by inter alia providing policy directions, adopting implementation plans and programmes, adopting the budget, etc.: ITPGRFA art.19.

2007, decided that the CGIAR Centres should use the SMTA when distributing non-Annex 1 materials<sup>23</sup> (with a footnote explaining that the reference to annex 1 materials in the SMTA should not be interpreted as precluding the use of the SMTA for distributions of non-Annex 1 materials<sup>24</sup>). All recipients of those materials from the Centres (and other organizations that have signed article 15 agreements identical to those signed by the CG Centres) are receiving it on legal terms and conditions identical to those applying to materials in the multilateral system, and they are contractually bound, when passing them on (or new PGRFA incorporating those materials) under the SMTA. This represents a significant *de facto* expansion of the Treaty's MLS.<sup>25</sup> Some countries have also decided to use the SMTA when distributing non-Annex 1 PGRFA (when they have discretion to do so, taking into consideration their obligations under the CBD or other national and international laws).<sup>26</sup> Very recently, countries participating in the European Genebank Integrated System (AEGIS) have agreed that they will use the SMTA for distributing important PGRFA designated as European Accessions, whether they are of crops listed in Annex 1 or not.<sup>27</sup>

### Exhaustion

Exhaustion of rights and obligations deriving from the SMTA take place once the product is sold on the open market. When the material is transferred from a provider (P1) to a recipient from a contracting party, the exchange contract has to be the SMTA of the Treaty. The first recipient (R1) becomes the second provider (P2) and has the obligation to transfer the material with the Treaty SMTA. The new recipient (R2-P3) may in turn transfer the material to yet another recipient (R3) by still using a new Treaty SMTA. If material from the MLS is used in a chain of development of a new PGRFA product involving a number of different organizations, it can be transferred as "PGRFA under Development,"<sup>28</sup> using the SMTA. In such cases, providers are allowed to include additional conditions including the payment of monetary consideration.<sup>29</sup> The benefit sharing provisions of the SMTA are triggered when the new PGRFA product is commercialized on the open market (and the other conditions are also triggered).

### The wider framework for conservation and sustainable use of PGRFA

Perhaps the largest benefit of the Treaty is that it resolves decades of acrimonious debates about what should be the conditions of access and

23 Report of the Second Governing Body of the Treaty, held in Rome, Italy, October 29–November 2, 2007. GB-2/07/Report, §§66–68.

24 The footnote states that "In the event the SMTA is used for the transfer of Plant Genetic resources for Food and Agriculture other than those listed in Annex I of the Treaty: the references in the SMTA to the "Multilateral System" shall not be interpreted as limiting the application of the SMTA to Annex I Plant Genetic resources for Food and Agriculture, and the case of article 6.2 of the SMTA shall mean "under this agreement"; the references in article 6.11 and Annex 3 of the SMTA to "Plant Genetic resources for Food and Agriculture belonging to the same crop as set out in Annex I to the Treaty" shall be taken to mean "Plant Genetic resources for Food and Agriculture belonging to the same crop".

25 SGRP.2008. The Scope of access and benefit-sharing under the International Treaty. Bioversity International, Rome, Italy.

26 M. Halewood, and Nnadozie, K., *supra* note 13 at p 136.

27 ECPGR. 2009. A Strategic Framework for the Implementation of a European Genebank Integrated System (AEGIS). A Policy Guide. European Cooperative Programme for Plant Genetic Resources (ECPGR). Bioversity International, Rome, Italy. Available at [http://www.ecpgr.cgiar.org/AEGIS/Docs/AEGIS\\_StrategicFramework\\_PolicyGuide.pdf](http://www.ecpgr.cgiar.org/AEGIS/Docs/AEGIS_StrategicFramework_PolicyGuide.pdf) [Accessed November 19, 2009]

28 SMTA art.2: "Plant Genetic Resources for Food and Agriculture under Development" means material derived from the Material, and hence distinct from it, that is not yet ready for commercialisation and which the developer intends to further develop or to transfer to another person or entity for further development. The period of development for the Plant Genetic Resources for Food and Agriculture under Development shall be deemed to have ceased when those resources are commercialised as a Product.

29 SMTA art.6.5.

benefit sharing for PGRFA.<sup>30</sup> Monetary benefits from the exercise of the mandatory benefit sharing clauses of the SMTA are expected to flow back to the MLS in a few years time.<sup>31</sup> Meanwhile, governments are making contributions to the fund<sup>32</sup>, and the Third Session of the Governing Body adopted a Funding Strategy which includes plans to raise additional funds. Non-monetary benefits of information sharing, capacity building and technology transfer are also expected to make essential contributions to the conservation and sustainable use of PGRFA, contributing to their long term information and insurance values. All told, the Treaty represents an enormous step forward in setting the stage for international cooperation in research, breeding, information sharing and capacity building. In his article, Lawson notes that monetary benefits from the operation of the mandatory monetary benefit sharing provisions of the SMTA will not be sufficient for addressing this issue. In this context, he identifies two questions which have to be addressed in order to take the implementation of the Treaty forward. We attempt to provide additional consideration with respect to those questions.

## 1. Do the marginal private returns to the provider of the PGRFA from conservation and sustainable activities correspond at least with the marginal social returns?

The benefit-sharing mechanism of the Treaty mainly addresses the short-term informational value of PGRFA.<sup>33</sup> It triggers a compensation for the use by the plant breeding industry of the information value of genetic resources as a direct input to R&D.<sup>34</sup> However, the genetic resources need also to be conserved for future R&D, in particular for addressing still unknown biological threats that might arise in the sector, and for decreasing the vulnerability of the crop systems to new pests and diseases, which is of direct concern to the local farmers.<sup>35</sup> These long-term informational and insurance values cannot be addressed easily in private property rights, or by a direct compensation mechanism as embodied in the Treaty. They are externalities that should be by complementary public funding and public policies at the national and international level.<sup>36</sup>

## 2. Can intellectual property, as a central element of the benefit-sharing 'arrangements', deliver adequate monetary

30 This is what the Treaty places on secure legal footing, after years of political and legal insecurity. See K. Garforth and C. Frison, "Key Issues for the Relationship Between the Convention on Biological Diversity and the International Treaty on Plant Genetic Resources for Food and Agriculture" (Occasional Paper, July 2007, Quaker International Affairs Programme).

31 It takes approximately 10 years to develop a new variety for commercialisation. Therefore, material accessed now for research will provide monetary benefits in approximately 10 years time, although some people are of the opinion that they won't amount to a lot of money.

32 Since its inception, governments have funded the Treaty for a total of US \$10.95 million (Core Administrative Budget for US \$2.22 million, Special Fund for Agreed Purposes for US \$6.22 million, Benefit Sharing Fund for US \$0.96 million, Participation of Developing Countries US \$1.55 million). These figures have been obtained at the Treaty Secretariat, personal communication with Peter Hillery, October 6, 2009.

33 These contributions go to the multilateral fund and are invested for in situ conservation of agricultural biodiversity (see ITPGRFA art.18, in particular art. 18.4(e) and 18.5).

34 The plant breeding industry continues to rely on new inputs from in situ plant germplasm at an average rate of 8% per year. See T. Swanson, *Global Action for Biodiversity* (London: Earthscan, 1997), p.74.

35 T. Swanson, *The International Regulation of Extinction* (New York: MacMillan, 1993).

36 The marginal value of the in situ agricultural diversity is the aggregation of three distinct elements : (1) the contribution across time of genetic resources for the development of new innovations (informational value); (2) their role as a buffer against pest and pathogens epidemics which would spread rapidly in the absence of ecosystems with sufficient amount of natural enemies (insurance value); net of the (3) foregone production value (short-term loss in yield by allocating land use for in situ agricultural biodiversity). The second of these clearly are part of the long-term informational and insurance values. See T. Goeschl and T. Swanson, "The Social Value of Biodiversity for R&D" (2002) 22 *Environmental and Resource Economics* 477-504.

benefits? And is the Treaty configured in a way that will deliver an adequate monetary value to the conservers?

The entire costs of conservation and sustainable use of PGRFA was never meant to be paid for solely by funds raised through the operation of the mandatory financial benefit sharing provisions of the Treaty./SMTA. Indeed, the funding strategy adopted at the third Governing Body of the Treaty which established a target of US\$116 million (between July 2009 and December 2014) envisages raising funds from a wide range of sources, reflecting the understanding of all parties that the mandatory financial benefit sharing clauses of the Treaty/SMTA can not possibly provide what is necessary.<sup>37</sup> Farmers, conservationists, national agricultural research programs, the private sector, and other actors all have critical roles to play in the conservation and sustainable use of PGRFA. It is neither anticipated, nor possible, that the Treaty should suddenly be able to generate financial support for all of their activities. The Treaty can play a key role in generating some funds for exceptionally important activities involving key genetic resources and communities of users, and it can provide a key forum for the international coordination of those efforts. But it should not be expected to relieve the global community, individual governments, the private sector, and other actors of their responsibilities and or the need to contribute resources to the cause.

## Conclusion

The main benefit of the Treaty is the resolution of years of political and legal acrimony concerning access and benefit sharing relating to plant genetic resources for food and agriculture. As such, it has created a basis for facilitated exchange and benefit sharing that contributes to innovation and conservation. IPRs may contribute to the conservation and sustainable use of PGRFA within the framework of the Treaty vis-à-vis (1) potentially creating incentives for innovations which could contribute to sustainable use of PGRFA, (2) complementing the long-standing principles of sharing materials for research and breeding through the operation of research and breeding exemptions, and (3) acting as the trigger for mandatory financial benefit-sharing when they prevent further use of materials for research and breeding.

In these ways, IPRs may potentially make an important contribution to PGRFA conservation and sustainable use. At the same time however, one has also to look beyond IPRs to reach these goals. In particular, the provision of the public goods that are essential to promoting breeding, training and research require monetary and non-monetary contributions both from private, public and semi-public organisations. Therefore, further progression on the implementation of the Treaty's multilateral system of access and benefit sharing will depend on a combination of measures, and in particular on the efforts of States to (1) actually put the requisite infrastructure in place in their countries and regions to participate as providers and recipients in the MLS; (2) develop incentives for organisations within contracting parties to place materials voluntarily within the MLS such as companies and non-profit institutions (universities and botanical gardens, etc.); (3) make contributions to the international benefit-sharing fund and encourage private industry to do so as well; and finally (4) promote the enlargement of the multilateral system beyond Annex I.

<sup>37</sup> See the Funding Strategy adopted by the 3rd session of the Governing Body of the Treaty, IT/GB-3/09/Report. It is quite clear that funds raised from art.13.2(d)(ii) are not enough, and are not being relied upon alone.