

“Facilitated access” to plant genetic resources: does it work?

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Published online: 11 September 2013

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Abstract The International Treaty on Plant Genetic Resources for Food and Agriculture entered into force in 2004 and is an important instrument by which plant breeders can access crop genetic diversity on the basis of multilateral “facilitated access”. To test how well access works, we sent seed requests to 121 countries that are Contracting Parties to the Treaty. Seeds were received from 44 countries, 54 countries did not respond, while for 23 countries contacts stopped for various reasons: loss of communication, the accessions we requested did not exist or were not in the multilateral system, or conditions or standard material transfer agreements were different from those specified in the Treaty. It is concluded that after nearly 10 years, “facilitated access” is not straightforward.

Keywords Facilitated access · International Treaty · ITPGRFA · Plant genetic resources

Abbreviations

ABS Access and benefit sharing
CBD Convention on biological diversity

IT International Treaty
ITPGRFA International Treaty on Plant Genetic Resources for Food and Agriculture
MLS Multilateral system
MTA Material transfer agreement
NFP National focal points
PGR Plant genetic resources
SMTA Standard material transfer agreement

Introduction

Access to genetic diversity—usually in the form of seed or clonal material—is crucial to any plant breeding program. A well-managed breeding program has a working germplasm collection—in freezer or field—that contains genetic variability they (may come to) need. However, diversity enabling adaptation to new challenges or new markets is sooner or later needed. Since most countries rely to a large extent on crops originating outside their territories, they need to access such diversity from their national gene banks or those in other countries.

The spread and diversification of crops since the Neolithic revolution witnesses the importance of genetic diversity. In the historical record, the pivotal roles of wheat introductions to agricultural development in North America in the nineteenth century (Olmstead and Rhode 2011) or the green revolution in the developing world starting in the 1960s are well known. The prevailing notion was that “genetic

Electronic supplementary material The online version of this article (doi:[10.1007/s10722-013-0029-6](https://doi.org/10.1007/s10722-013-0029-6)) contains supplementary material, which is available to authorized users.

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resources” were a common good, in the words of the nonbinding International Undertaking on Plant Genetic Resources adopted in 1983 by the FAO, *the common heritage of humankind*. In the 1980s the inequalities of this heritage as well as the intellectual property protection demanded by rapidly evolving biotechnologies soon eroded this concept [see Gepts (2004) for an excellent overview of the history up to 2004]. The convention on biological diversity (CBD) in 1992 explicitly covers both wild and domesticated diversity and in its Article 2¹ defines some crucial terms:

- “Country of origin of genetic resources” means the country which possesses those genetic resources in *in situ* conditions
- In the case of domesticated or cultivated species, (*in situ* conditions mean) in the surroundings where they have developed their distinctive properties

Then, in its Article 15, Paragraph 1 the CBD recognizes “the sovereign rights of States over their natural resources, the authority to determine access to genetic resources rests with the national governments and is subject to national legislation”. Although, in Paragraph 2 the CBD also admonishes that states “shall endeavour to create conditions to *facilitate access*” (our italics), there was in practice an “enclosure movement” of what was previously defined as a commons.

The effects on germplasm exchange in crops was soon realized by the FAO and led to the negotiation of the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA),² which builds directly on the CBD principles and definitions, and in recognizing mutual dependence, Article 10 declares that:

1. “In their relationships with other States, the Contracting Parties recognize the sovereign rights of states over their own plant genetic resources for food and agriculture, including that the authority to determine access to those resources rests with national governments and is subject to national

legislation in the exercise of their sovereign rights,

2. the Contracting Parties agree to establish a multilateral system, which is efficient, effective, and transparent, both to facilitate access to plant genetic resources for food and agriculture, and to share, in a fair and equitable way, the benefits arising from the utilization of these resources, on a complementary and mutually reinforcing basis.”

Then, in its Annex I it defines 35 species and genera subject to such facilitated access under the conditions defined in a standard material transfer agreement (SMTA, see Supplementary File S1). This “mandatory model for parties wishing to provide and receive material under the multilateral system” (MLS) allows recording of all material transfers and came into use on January 1st 2007. In this way the IT ensures access and benefit sharing (ABS), that access will be balanced by sharing of monetary and non-monetary benefits. The full potential of the SMTA in achieving effective ABS was recently thoroughly analyzed by Moeller and Stannard (2013).

During its first 10 years the ITPGRFA has been a great success, with 128 countries being Contracting Parties that have ratified, accepted or approved it as by May 2013. According to the ITPGRFA (www.planttreaty.org/sites/default/files/ACSMATA4Re.pdf), about half a million accessions have been reported by electronic means to the Governing Body of the IT. In Europe, a total of 94,930 transfers using the SMTA have been recorded by May 2013 (van Hintum and Visser (2013)). However, as mentioned by Moeller and Stannard (op. cit., page V) currently the “utilization (of PGR from the MLS) in crop improvement programmes is constrained by lack of effective access to resources held by Contracting Parties” who “have failed to make all or part of their plant genetic resources available as stipulated by the Treaty.” We have investigated how smoothly the “facilitated access” actually works, for a plant breeder who wishes to have that access. This short paper describes the results of a simple enquiry made to answer this question.

Materials and methods

We intended to send requests for seed to 125 of the 126 contracting partners to the Treaty (excluding the European Union) that had ratified at time of start

¹ <http://www.cbd.int/convention/articles/default.shtml>.

² <http://www.planttreaty.org/content/texts-treaty-official-versions>.

(around October 15th 2012, before Swaziland and Serbia entered). We did not send requests to any of the International Research Centres of the CGIAR, since their seed transfers are well documented on the Treaty website (“Article 15 agreements”).

Addresses were found on the ITPGRFA website. However, three countries (Guinea-Bissau, Cook Islands and Kyrgyzstan) had no available addresses, and requests to Syria were returned due to the ongoing war, reducing the reported number to 121. Letters (on university letterhead and stamped) were sent by air mail and by e-mail to the respective National Focal Points (NFPs). However, for the 35 countries that did not have NFPs, we sent them to their Ambassadors to the FAO. In the few cases where we had personal contacts in the national gene banks, (Germany, the Netherlands and NordGen (on behalf of Finland, Sweden, Denmark, Norway and Iceland) requests were sent directly and by e-mail only.

The core text of the letter was: “for purposes noted below, I would like to make a request of the national gene bank. Specifically, could you send me samples of 15 landraces (farmers’ varieties) of the main cereal staple of your country (e.g., wheat, maize, sorghum, millets, barley, oat, etc.). I would request that these samples be of landraces that *originated or were collected in your country* that display a broad range of the diversity found in your gene bank. The sample size need not be large; 50 seeds per sample would be sufficient. In addition, I would like to request all available passport data, and subject to applicable law, any other associated available non-confidential descriptive information about these 15 samples. I intend to use this material only for the purposes of research, breeding and training for food and agriculture in our institution. I am prepared to sign the appropriate documents in regards to this request. I would appreciate your prompt reply.”

We did not inform the recipients that we (besides the seeds) also collected data for the current research purpose. We judged this unnecessary on the basis of Article 12.2 that “access *shall be provided* to natural and legal persons” (our italics). The issue of “Prior Informed Consent” or willingness to participate in an investigation is an option for a person, but not a country which has accepted certain legal obligations by becoming a Contracting Party. Therefore we also preferentially chose the formal channels defined by the

Treaty. By the “appropriate documents” we meant the SMTA defined as mandatory by the Treaty.

We responded to letters as they arrived. Since there were a number of cases where we had not received any responses, had the letters or e-mails returned or lost the contact again, reminders were sent again in January 2013. Contacts where seed delivery for various reasons (including our own) were delayed, we continued to pursue the contact until this paper went to print in August 2013, i.e. 10 months after the initial request was made.

Results

The responses are summarized in Table 1

Seeds were received from gene banks in 44 countries, while 54 countries did not respond. The remaining 23 countries had a variety of reasons to decline our request (Table 2). In cases where SMTAs had been signed, but seed shipments had formal delays, contacts were pursued and seeds arrived up to printing of the paper.

Several countries responded by e-mail in a few days, either directly or forwarded from the NFP. A few countries without NFP (Angola and Croatia) even made contact by phone (there was no difference in responses between countries with or without NFP). The fastest seed deliveries came from Estonia and NordGen. In other cases it took time (up to half a year), although responses often were prompt once received by gene bank staff. Many non-European countries sent seeds by air carrier companies, where we agreed to pay the shipment costs if asked. We arranged import permits. From most countries we avoided phytosanitary certificate costs by choice of species from the country, but some countries provided it on their own. In general, countries were very cooperative although seeds sometimes took time (also due to delays from our side). However, one country took more than 8 weeks to get an export permit after the signed SMTAs and Import Permits had been received.

The level of formalities asked for by respondents varied greatly. A few countries sent seeds without any SMTA at all, i.e. not the “Shrink-Wrap” Option in the SMTA Article 10, stating that receiving the seeds was equivalent to signing (accepting the obligations of) the

Table 1 Summary of responses to seed requests according to FAO regions

Region	Seed requests fulfilled	Other responses	No. responses	Total
Africa	9 (Angola, Ghana, Madagascar, Mali, Mauritius, Namibia, Tanzania, Uganda, Zambia)	9	19	37 (excl. Guinea-Bissau)
Asia	4 (Nepal, Indonesia, Philippines, Pakistan)	2	8	14
Europe	25 (Belgium, Austria, Croatia, Cyprus, Denmark, Estonia, Finland, France, Germany, Hungary, Iceland, Ireland, Italy, Lithuania, Montenegro, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Sweden, Switzerland, United Kingdom)	3	6	34 (excl. European Union)
Latin America and the Caribbean	1 (Brazil)	1	14	16
Near East	3 (Lebanon, Oman, Sudan)	6	5	14 (excl. Kyrgyzstan, Syria)
North America	1 (Canada)	0	0	1
South West Pacific	1 (Australia)	2	2	5 (excl. Cook Islands)
Total	44	23	54	121

SMTA. However, most responding countries used the SMTA in one way or another. One country said it was the first time they had used the SMTA, usually they only used a simpler one designed for non-Annex I species. A few sent seeds together with the SMTA to be signed and returned. Others sent the SMTA by e-mail and the seeds once it was returned by e-mail. In a number of cases the procedures were very careful using registered mail, first in sending SMTAs and then, after signatures, the seeds. In most of the cases, the SMTA was signed in two copies, sometimes three and/or with an extra witness and all pages stamped.

In contrast, a number of European countries used the “Shrink-Wrap” option. One country (The Netherlands) had adopted the “Click-Wrap” Option SMTA to be signed by clicking an on-line button after selecting samples and used this for all requests, Annex I or not (van Hintum and Visser 2013). Towards the end of the project one country (anonymous) contacted us through the Treaty on line “EasySMTA”. We followed up this, but got no further response. In some cases—due to interest in specific accessions or species—we made a more detailed request once contact was established. Some countries allowed us to select accessions from their whole collection or data base, others offered us a sample in line with our request. Sometimes accessions were not available due

to seed quantity. In one case where seed was short (*Avena strigosa* from Ireland), we were still offered it, but asked if we could return the accession once multiplied by us, which we gladly accepted. In other cases we asked for materials were not submitted to the MLS. In a European case a public/private Network, using the “Natural or legal person” option, had submitted its wheat collection but not that of barley. In this case we got seeds of both, the first using the SMTA, the latter a simplified one page MTA referring to it. Upon request, the curator explained that the national policy was now to submit all accessions under the “Contracting Party” option and use the SMTA. A very interesting (African) case showed another real life aspect of the Treaty, explaining that many accessions were yet not accessible due to unresolved ABS negotiations with domestic resource owners under the national ABS law (Table 2). However, they worked to resolve these issues. The latter relates to the Nagoya Protocol³ adopted by the CBD in 2010. In the Preamble it “recognizes” that the protocol and “international instruments related to access and benefit sharing [such as the Multilateral System under the Treaty] should be mutually supportive”. Although

³ <http://www.cbd.int/abs/text/default.shtml>.

Table 2 Examples of “other responses”

Response type	Reasons given
Small countries with clear reasons (5 countries)	<p>“We do not grow any of the crops mentioned (nor) any wild crop species of cereals”</p> <p>“No seeds exist, is not an agricultural country”</p> <p>“Unfortunately there are no seeds derived locally on crops in (...) and in the case of wanting to get the seeds of desert plants, (we) are ready to meet the request.”</p> <p>“No more landraces grown on our (small) territory”</p>
Questions related to the functioning of the Treaty (1 country)	“(We are) in the process of consultation to include their collections in the multilateral system. This is conditional on what happens at the next meeting of the governing body of the treaty (...). Until then we cannot help you with your request.”
Extra conditions to the SMTA (2 countries)	SMTA for one crop species, own one-page MTA for an Annex-1 species not yet submitted to the multilateral system
Different MTA (1 country)	MTA with clause not to distribute the material to third party, information requirements. Replaced by the normal SMTA when asked later
Access subject to national biodiversity laws, with adapted SMTA (2 countries)	<p>SMTA adapted, additional conditions. “Plant Genetic Resources (PGR) regulation on collection, conservation and utilization of (...)” should be followed for the material distribution in (...). In according to the PGR regulation, this form of the MTA should be signed. I regret to inform you that without the signed original copy of National Bank’s MTA, it is not possible to send the material.”</p> <p>Standard material transfer agreement adapted, with strict limitations on recipients and governed by the laws of (...), but Annex 2 and Annex 3 as in the SMTA</p>
Access subject to national biodiversity laws (2 countries)	<p>“Access to (...) genetic materials should be in accordance with existing domestic legislation.” You need to present the following documents: (1) proposal of your research. (2) Official letter from the University. (3) Filled and signed MTA. (4) Letter from Competent Authority in Norway (CBD focal point).”</p> <p>Access on the terms of the National Biodiversity Authority website</p>
Domestic laws that are being resolved (1 country)	Some accessions not available due to unresolved domestic ABS issues: “...due to some binding provisions in our ABS regulations, please (...) receive the few (...) accessions that are not legally bound as we nationally work out means of availing you the other legally bound accessions.”
Time consuming domestic formalities (1 country)	Export permits or other formalities apparently outside the gene bank staff control that took up to half a year to resolve

they are legally independent and concern different genetic materials, van Hintum and Visser (2013) expect that the Protocol may indirectly impact gene bank practices due to acquisition of new Annex I germplasm, as well as non-Annex I species.

The *other responses* (Table 2) gave a variety of reasons. Five countries (all small) stated their good will, but responded that they had no agriculture, no cereals or no landraces “originating in the country”, as we had asked for. One country (in Latin America) responded also very clearly, that they needed to wait for some clarifications about the multilateral system in

a forthcoming meeting in the Governing Body of the Treaty. Equally clear were four countries where access was subject to national biodiversity legislation. Two of them (one European, one African) used the SMTA as a template, but rewritten, referring to national law, not the Governing Body of the Treaty. These countries (and a few others) also asked for details about our research project. In one case (Asian) the SMTA had added a page to the SMTA, where we should commit ourselves to restrict distribution of the materials to third parties. When we asked about this extra clause, it was waived. One country (European) had its own one-

page MTA, with a similar clause. When asked, they said it was used prior to the SMTA and was a mistake, the latter is now used.

The remaining “other responses” showed an array of different reasons for failing access to their germplasm. These included trivial loss of communications between the address supplied by the NFP and others down the line, or that the respondent curator wrote that the accessions would be provided, but then e-mail communications sooner or later ceased. In a few cases SMTAs were even signed, but the downstream work could take time, e.g. like in the country where the gene bank staff had to wait for an export permit. In another case the SMTA was handled (friendly and expeditiously) by intellectual property staff, before final approval at a higher administrative level.

Discussion

The main finding from our small inquiry is the alarming number of non-respondents (about half of the contracting parties), which supports the views of Moeller and Stannard (op. cit.). We have not identified them in Table 1, since we will not speculate about the reasons for not responding, many of which presumably are trivial [e.g. the (few) cases where the physical letters and/or e-mails were returned due to deficient addresses].

The other major finding is the uneven geographical distribution of countries that provided seeds. Among the 44 gene banks sending seeds, 25 were in Europe, 9 in Africa, 3 in the Near East, 4 in Asia, 1 in Latin America, 1 in South West Pacific, and Canada. It may be argued that European responses are biased, since 7 countries got requests directly to their gene banks. Still the paucity of countries elsewhere is striking.

A third major finding is the quite variable SMTA practices as described, from none at all to major distortions, as seen in Table 2. Although they have a great potential of simplifying the system, but it was striking that most countries preferred the “Signed SMTA” over the “Click-Wrap” or “Shrink Wrap” options. Our impression is that this is largely out of unfamiliarity. Indeed, in the European survey given by van Hintum and Visser (2013), only 7 of the 19 gene banks have (data on the numbers of) distributed accessions under the SMTA, The numbers of SMTAs in the different institutions were highly uneven, ranging from 7

to 3,635 of the 5,782 reported. The number of accessions is a surprisingly small, in total 94,930 accessions, of which 50 % is Annex I material. For comparison, from 2007 to 2012 CIMMYT alone distributed 10822482 accessions using 10395 SMTAs, using “Shrink-wrap” (Dr. T.S. Payne, CIMMYT, personal communication). In other words, of the ca. 500000 accessions now electronically registered according to the Treaty website, it is highly likely that a large share come from the International Research Centers of the CGIAR.

It is therefore probable that many recipients in other parts of the world did not experience our request as routine. We could clearly see this from the care they undertook to fulfill the requests. This may not mean that requests are so rare. One very forthcoming gene bank (Africa) said it was the first time it used the SMTA, they were more accustomed to a simpler MTA. To help ameliorate unfamiliarity, for many requests the “Easy SMTA” option may be very helpful in the future. We also noted that one (European) gene bank had adapted the SMTA to three different users. Since the purposes defined by the IT are “research, breeding and training for food and agriculture”, one version of the SMTA was adapted to basic research, pharmaceutical, environmental uses and as old landraces, without intention of breeding, and a third version for hobby purposes. This rather narrow interpretation may be unnecessary, since Article 12.3a states that “In the case of multiple-use crops (food and non-food), their importance for food security should be the determinant”.

A fourth finding is that in many cases access to germplasm was quite time consuming, if one considers the requirement in the Treaty article 12.3b and the SMTA Article 5a that “[a]ccess shall be accorded expeditiously”. We acknowledge the expeditious action on part of a number of providers, especially early in the process, but others took considerable time. In a few cases we were not expeditious enough ourselves. In handling correspondence with a fair number of providers all at the same time, we sometimes caused undue delays with regard to cooperative countries. However, this was of course not independent of other countries where communication took more time.

Last, as noted in the Methods, we did not consider the Prior Informed Consent as relevant. However, because the reasons for not complying with our request were so diverse and apparently trivial, we

choose only to publish the names of the countries actually sending seeds. There are very few cases of apparent violations of the SMTA. Most cases seem due to unfamiliarity with practical procedures of handling requests, and an apparent lack of harmonization of different domestic laws or bureaucratic requirements with their obligations under the Treaty. Although we at this point are forced to conclude that “facilitated access” is not straightforward, by ratifying the Treaty countries have already made the major step towards building a MLS based on mutual trust and interdependence and are models for the countries that have not yet ratified. The next steps will be much easier and will enable the full realization of the intended ABS.

Acknowledgments We wish to thank the many respondents for cordial contacts and substantial efforts, greatly contributing to our stated purposes, “research, breeding and training in our institution”. As to our obligations in the SMTAs, our research, beyond this paper, is plant breeding research on cereals. Our seed collections have become greatly upgraded and some accessions (at this point oats) have already entered research projects. If they become relevant in our research collaboration with third parties, we will observe our duties in the SMTA. Since we are not breeding varieties, we do not expect economic benefits from our access. The accessions will also be very

helpful in our plant breeding teaching about crop plant diversity, and about the international germplasm exchange system so important to international plant improvement and agricultural development.

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