



The International Treaty

ON PLANT GENETIC RESOURCES FOR FOOD AND AGRICULTURE



Background Study 4

AN IN-DEPTH ANALYSIS OF THE FACTORS THAT INFLUENCE THE WILLINGNESS OF STAKEHOLDER GROUPS TO MAKE CONTRIBUTIONS TO THE BENEFIT-SHARING FUND AND TO ACCESS PLANT GENETIC RESOURCES FOR FOOD AND AGRICULTURE FROM THE MULTILATERAL SYSTEM

Maryline Guiramand

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Author:
Maryline Guiramand

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1. INTRODUCTION

1. At its Fifth Session, the Governing Body established through Resolution 2/2013 the *Ad Hoc* Open-ended Working Group to Enhance the Functioning of the Multilateral System of Access and Benefit-sharing (“the Working Group”). Six innovative approaches to enhancing the Multilateral System had been identified and the Working Group was tasked with assessing the potential of each innovative approach, estimating the value of the various components, and identifying the supporting actions required to make them work. The Resolution emphasized that these innovative approaches are interlinked and interdependent, and need to be addressed together, as a range of approaches that could provide a part of an adequate and sustainable flow of income to the Benefit-sharing Fund.
2. Moreover, the Resolution specified that task (c) of the Working Group is “to consult with relevant Stakeholder Groups” with a view to achieving enhanced access and increased fair and equitable sharing of benefits. For this purpose, the Governing Body requested the Secretariat to prepare several short, strategic preliminary studies, including an “analysis of the factors that influence the willingness of stakeholder groups to make contributions to the Benefit-sharing Fund and to access plant genetic resources for food and agriculture from the Multilateral System” (Study 4).¹ At its first meeting the Working Group “noted that Study 4 would involve a questionnaire to be provided to the stakeholders and followed up with interviews where possible.” Accordingly, Study 4 has as objective to investigate these factors by means of a stakeholder consultation.
3. The consultation took the form of an internet-based questionnaire and follow-up interviews based on the Delphi method. The Secretariat facilitated the process by inviting stakeholders to respond to the surveys.
4. The Working Group had already identified a number of factors to be taken into account in developing measures to enhance the functioning of the Multilateral System.² In particular, the reasons for the shortfall of income to the Benefit-sharing Fund would need to be addressed. Technical advances in plant breeding, especially the role of DNA information, would also have to be taken into consideration. Moreover, the particular role of the Treaty vis-a-vis other regulatory frameworks for Access and Benefit-sharing, notably the Nagoya Protocol to the Convention on Biological Diversity, would have to be refined and stressed.
5. The respondents to the questionnaire and the interviews concurred with the Working Group on many of the factors to be addressed. Furthermore, they have provided insights on their willingness to support the Multilateral System, as well as assessments of the potential implications of measures under consideration for different stakeholder groups. Their views are presented in this document. Interviews with seed industry stakeholders were also held as part of Study 1, as part of a simulation exercise to better understand decision-making within the seed sector. Results of Study 1 consultations are published separately³ but corroborate the stakeholder views presented here.
6. This document is entirely based on responses to the questionnaire and interviews. After describing the *methodology* of Study 4 in the next section, its *results* are presented by way of a consideration of the factors influencing the willingness of stakeholders to include and to access plant genetic resources for food and agriculture (PGRFA) in the Multilateral System, as well as of the factors influencing the willingness to contribute to the Benefit-sharing Fund.

¹ Resolution 2/2013, para. 23

² IT/OWG-EFMLS-1/14/Report, paras.7-9.

³ Results of interviews conducted for Study 1 are summarized in two stand-alone technical papers: *Investigation of the preferences and behaviour of users of the SMTA, when making decisions to use the alternative payment options of Articles 6.7 and 6.11 of the SMTA*, and *Summary of user opinions, following interviews with members of the seed industry*. They are available on line at: <http://www.planttreaty.org/content/background-study-paper-1>

Respondents' perspectives are then synthesized with a view to developing a renewed, multi/component strategy of mobilizing resources for the Benefit-sharing Fund which would have wide support amongst stakeholders. Summaries of discussions on non-monetary benefit sharing, and on the implications of technological and policy-related advances on stakeholder-Treaty relations are included in Appendixes 1 and 2 to this document, respectively.

2. METHODOLOGY

Participants

7. Resolution 2/2013 of the Treaty's Governing Body identifies four stakeholder groups to be consulted:
 - The seed industry
 - Farmers
 - CGIAR institutes
 - Civil Society Organizations
8. Two representatives were nominated by each stakeholder group to participate in the first meeting of the Working Group; these representatives have been the main contacts for identifying experts within each group willing and able to participate in the consultations that form part of this study.

Questionnaire

9. A questionnaire was designed as the key consultative tool of this study.⁴ The questions covered the current impact of the Treaty on respondents, the factors that influence participation in and use of the Multilateral System, the Standard Material Transfer Agreement, proposed measures to increase funding in the Benefit-sharing Fund, the use of funds from the Benefit-sharing Fund, and any wider technical and policy trends requiring consideration.
10. The questionnaire included 18 questions to be answered by all stakeholders in order to gather views from different perspectives on a single issue. In addition, an Annex for each stakeholder group was designed to allow each group to provide group-specific information, with six to nine additional questions depending on group.
11. The general outline, main topics and content of the questionnaire were circulated and discussed with each stakeholder group via their representatives. Subsequently, the Secretary of the Treaty discussed and reviewed the draft questionnaire with the Co-Chairs of the Working Group. Finally, the Secretariat published a notification on the Treaty website inviting stakeholders, including representatives from government agencies, to complete and circulate the questionnaire. The questionnaire was available in English, French, Spanish, and Portuguese. In addition, each stakeholder group representative was requested to circulate the questionnaire within their own constituencies and make the questionnaire available at relevant occasions to reach a maximum of potential respondents.
12. Stakeholders demonstrated a strong willingness to participate in the study, despite the very narrow time frame available. The questionnaire was open from July 25 to August 22, 2014, and later extended to September 4 to allow for additional responses. 115 answers to the questionnaire were received.
13. Among the 115 completed questionnaires, 10 were only completed partially due to technical problems with the internet version. In order to minimize this problem, a Word version of the questionnaire was also circulated. Occasionally, respondents did not answer questions which they felt were not relevant to them or when they did not have the necessary knowledge of the topic.
14. The number of questions answered varied depending on the type of stakeholder, his/her knowledge of the Treaty, and the relevance of the questions for the organization and the

⁴ The questionnaire is available on <https://www.surveymonkey.com/s/QX7VNP9> (English). It can be also obtained upon request to the Secretariat of the International Treaty.

respondent him/herself. A technical problem with the online questionnaire unfortunately prevented many respondents from answering the Question 3 on factors influencing the willingness to contribute material to the MLS.

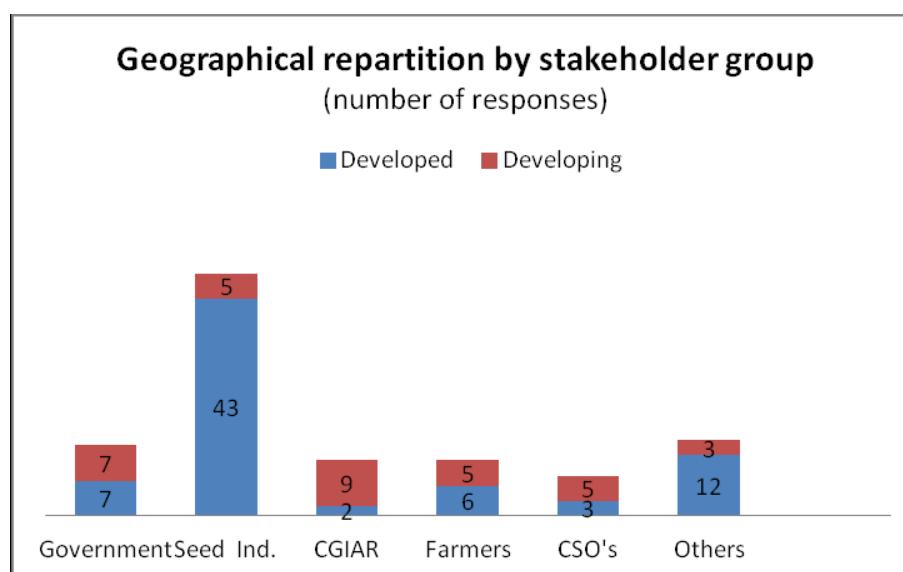
15. Questionnaires were received from respondents of 40 different countries. All the geographical zones were represented, as shown in Figure 1, with the largest representation from Europe (41%), followed by Asia (15%), and North America (14%). 9% of the responses were of unknown origin. 73 answers (68%) were from developed countries and 35 (32%) from developing countries.

Figure 1: Respondents by Geographical Zone (%) and Country (number)

Africa	Asia	Europe	Latin America	North America	Middle East	Oceania
10 %	15 %	41 %	9 %	14 %	1 %	2 %
Angola (1) Benin (1) Ethiopia (2) Ghana (1) Kenya (1) Madagascar (1) RCA (1) Tunisia (2) Zambia (1) Zimbabwe (1)	Bhutan (1) India (2) Indonesia (1) Japan (6) Nepal (2) Philippines (5) Thailand (1)	Belgium (2) Estonia (1) France (7) Germany (17) Italy (2) Netherlands (4) Norway (3) Spain (1) Sweden (3) Switzerland (5) UK (4)	Bahamas (1) Brazil (1) Colombia (1) Ecuador (1) Guatemala (1) Mexico (1) Paraguay (1) Peru (2)	Canada (5) USA (9)	Jordan (1)	Australia (2)

16. The questionnaire was answered by 91 actors from all stakeholder groups, as well as by 14 from Contracting Parties. There was a strong participation from the seed industry (48 answers or 42%), especially from Europe and North America, followed by farmers (12), the CGIAR centres (11), national gene banks and research centres (11), civil society organisations (8), and international organisations (1).
17. Respondents' geographical distribution between developed and developing countries is provided in Figure 2. There was a balanced representation amongst respondents from Contracting Parties and farmers. CGIAR centres are based mainly in developing countries, and hence the greater number of responses received from stakeholders in developing countries was to be expected. Responses from seed companies in developed countries were disproportionately high. Despite the support received from the International Seed Federation and some seed companies in disseminating the questionnaire internationally, only five companies from developing countries participated in the study. Low levels of awareness and understanding of the Treaty, a topic which will be treated in more detail below, are likely to have prevented the participation of seed companies in developing countries. CSOs from developed countries tended to play an advocacy role while those in developing countries were generally involved in field activities to directly support farmer communities.

Figure 2: Geographical representation by stakeholder group



18. Industry respondents have been classified in three categories: 1. representative of a large multinational (even if the respondent was from a small subsidiary company); 2. representative of a small to medium-sized, independent company and 3. representative from a seed industry association. Of the 48 answers, 22 (45 %) were received from large companies, 16 (33 %) from smaller, independent companies and 10 (20%) from national seed associations.
19. 10 out of 12 responses from farmers were received from national farmers' associations. The small number of answers is probably above all due to the low level of awareness of the Treaty amongst the farming community, as well as language barriers. The "others stakeholder" category includes the responses from following institutions: 2 universities, 12 national genebanks and research institutes, and one international organisation.

Delphi interviews

20. Questionnaires were followed by in depth interviews based on the Delphi method⁵ with a selection of 25 experts who answered questions in two rounds. The group of experts was selected by the researcher with the support of the Stakeholder's group representative based on the following criteria: geographic representation, balance between large and small companies for the seed industry, balance between large and small farm representation and availability of the expert in the study time frame⁶.
21. Two rounds of interviews were performed, using semi-structured interviews. The first round was based on the expert's responses to the questionnaire. After the initial interviews, the various opinions were summarized by stakeholder group and presented in an anonymous way to all the participants. During the second round of interviews, each expert was asked for their reactions to the views expressed by her/his stakeholder group, and asked to identify key factors to report to the Working Group. They were asked to prioritise preliminary key factors and recommendations. Respondents were encouraged to revise their earlier answers in light of the replies of others, in order to facilitate convergence of views.

⁵ The Delphi technique is a structured communication method for generating ideas and facilitating consensus among individuals who have special knowledge to share, but who are not always in contact with each other. It was originally developed as a systematic, interactive forecasting method and relies on a panel of experts who answer questionnaires in two or more rounds. It is very useful in reaching an expert consensus on contentious or uncertain matters.

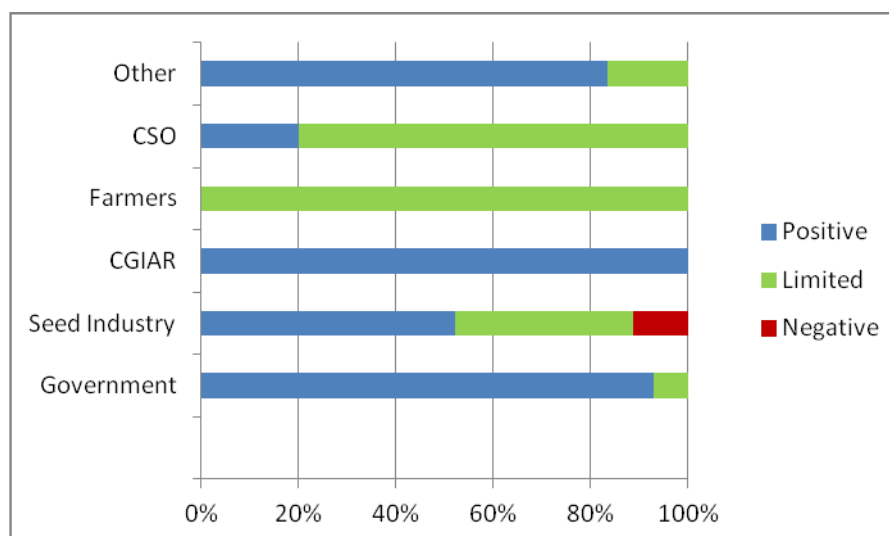
⁶ The list of experts is available upon request from the Secretariat of the International Treaty.

3. RESULTS: Stakeholder Views

Summary of views by Stakeholder group

22. The views reported here by stakeholder group correspond to the views expressed during the interviews, as confirmed by the questionnaire responses. Given that different stakeholder groups have different priorities and perspectives on the Multilateral System, the present summary intends to support a differentiated understanding of the issues at stake.
23. The majority of respondents (60%) stated that the Treaty had a distinct positive impact on them, 35% felt there was limited impact or no impact, and 5% indicated that impact so far was negative. While the latter were seed companies, which do not have their headquarters in Contracting Parties, it must be acknowledged that the majority of respondents from seed companies believed that the Treaty has had a positive impact for industry. 100% of interviewed seed companies with headquarters in Contracting Parties felt that the Treaty has had positive impact or no significant impact for them. The distribution by stakeholder group is shown in Figure 3. Respondents from the CGIAR felt extremely positive about the Treaty as it has provided the necessary legal framework for their gene banks to operate. Respondents from Contracting Parties felt that the most positive impact so far has been improved flow of material provided through the Multilateral System. NARS researchers were also positive, although they expressed concerns with regards to the management of SMTAs. Farmer organizations thought that the Treaty had a limited impact on farmers so far, as there is still too much disconnect between the farming community and other actors, including breeders and gene banks.

Figure 3: Perceived impact of the Treaty, by stakeholder group (Percentage)



24. Only 13 respondents (five from governments and seven from industry) indicated that the implementation of the Treaty was insufficient.

Seed industry

25. The seed industry indicated a strong support of the Treaty and a willingness to contribute to the Benefit-Sharing Fund, as long as funding expectations remained reasonable.
26. Industry stakeholders pointed out that they have not been sufficiently recognized for all the non-monetary benefits which they provide to the Multilateral System, such as facilitated access through the breeders exemption, improved commercial varieties, and material and support

given to some national gene banks, as well as in kind capacity building done by local companies in certain developing countries.

27. The main factors for access of the material under the Multilateral System are the characteristics of the material, the cost to access it, the quality of the material.
28. They believed that a financial contribution from the seed industry could help build trust in the Treaty system, as Contracting Parties would see money flowing to the Benefit-sharing Fund. However, all shared the view that Contracting Parties should finance a major share of the contributions to the Benefit-sharing Fund, as set out in the Strategic Plan for the Implementation of the Benefit-sharing Fund (“Strategic Plan”).
29. Some respondents indicated that other beneficiaries “further down the value chain” (e.g. food companies, retailers) should also contribute to the Fund.
30. Companies with patent portfolios have different opinions from companies using Plant Variety Protection (PVP) on how to modify the SMTA Articles 6.7 and 6.11. Most smaller companies working with PVP do not favour mandatory payments (they feel that they already contribute non-monetary benefits through the breeders exemption), and some would prefer a mechanism to contribute a lump sum through their association or potentially a subscription fee system.
31. Large companies consider a mandatory payment to be fair, provided it is scaled to the size of the business. For smaller companies, reducing the currently high rates in Article 6.11 would make this option more attractive.
32. The “evergreen clause”, which establishes an unlimited duration (SMTA Article 9.2) of the contract and of its benefit-sharing provisions, creates uncertainties and should be removed.
33. Industry respondents also indicated that the current distinction between germplasm available for further research and breeding, and germplasm with restrictions on further research and breeding, is essential and should be maintained in the SMTA.
34. Companies that are not using patents indicated that a clarification is necessary from the Governing Body with regard to the use of patents for native traits of materials accessed from the Multilateral System.
35. The Treaty should be enhanced in such a way as to provide a mechanism by which compliance with the Nagoya Protocol to the Convention on Biological Diversity could be automatically established.

CGIAR centers

36. The Treaty has provided the necessary legal status of the “*in trust*” collections of the CGIAR centres. The SMTA has facilitated breeding research internationally by improving access to PGRFA. A number of countries are now more comfortable sending germplasm to CGIAR centres for conservation and safety back-up.
37. The non-monetary benefits which have arisen from the flow of materials under the Multilateral System to, in particular, developing countries should be understood as an achievement of the objectives of the Treaty. Nevertheless, a better implementation of the Treaty in all Contracting Parties, including an improved awareness of the Treaty within National Agricultural Research Systems (NARS) would help increase the contribution of material to the Multilateral System.
38. There is consensus that improving some SMTA Articles (e.g. a time-limit on payment obligations, changing Articles 6.7 and 6.11 to enable some form of upfront payment) could increase monetary contributions. But should an SMTA be required in the future for products under development, current practices of the CGIAR centers would be negatively affected.
39. Contracting Parties' contributions, based on a percentage of national seed sales to be paid to the Benefit-sharing Fund, were considered the easiest way of enhancing funding.. Upfront payments from the industry through a mechanism like a subscription fee were thought to help create trust in the System. Income for the Benefit-sharing Fund should ideally originate from different sources, as laid out in the Strategic Plan, with contributions from Contracting Parties and the seed industry, as well as from other actors in the food and agriculture value chain.

40. Priority should be given to exploring how to scientifically add value to the materials under the Multilateral System. Together with strengthened project management and large-scale projects in support of the Treaty's mission, this could attract funders and stimulate exchange of material.
41. Reliable information on the genetic make-up of materials increases the attractiveness to breeders – and while advanced techniques offer one route, using the mini-core collection methodology could help generate information for large gene banks in developing countries.
42. The potential expansion of patenting on native traits was recognized as a factor that may prevent Contracting Parties from contributing material. Furthermore, the fact that those Contracting Parties who include materials in the Multilateral System are not rewarded (e.g. through directing funds of the Benefit-sharing Fund) does not incentivize contribution.

Farmers

43. Farmers' groups stressed the very low level of awareness, as well as understanding of Treaty benefits amongst farmers worldwide, preventing them from participating meaningfully in the Multilateral System.
44. Farmers in developing countries usually source their seeds for breeding from local seed banks or local markets, as they do not know about the Multilateral System. Even when they do, they might not be granted access to gene banks.
45. Farmers would like to be involved in participatory breeding not only for evaluating material but in order to breed varieties useful to them. Farmers' organizations could play a crucial capacity building role, yet often require capacity building themselves. Access to independent technical assistance which is not linked to those public or private entities that are manufacturing, selling or distributing seeds, is important to help adopting better seeds.
46. The implementation of farmers' rights, as well as the establishment of a mechanism to ensure the availability of germplasm for further research and for agricultural use, even when protected by a patent on native traits, would enable farmers to better contribute to the Multilateral System.
47. While some respondents believed that Contracting Parties should be the main contributors of funds to the Benefit-sharing Fund, others were of the view that a user-payment system would work better to ensure the conservation of PGRFA. In this latter case, the payments should be scaled to the size of the user.

Civil Society Organizations

48. CSOs can provide support for a better implementation of farmers' rights, as well as assisting *in situ* conservation and improving understanding of the Treaty.
49. Their general perception is that lack of understanding and funding are the main factors preventing NARS from accessing and/or contributing material, while availability of other sources of material, and uncertainties regarding implementation of obligations under the Multilateral System are the key factors preventing access to materials by companies, especially the large ones. CSOs perceive the current lack of trust between government and companies representatives as the main factor preventing both a predictable income to the Benefit-sharing Fund and contributions of material to the Multilateral System. Furthermore, not all countries understand how contributing material to the Multilateral System is of benefit to them.
50. Several respondents were of the view that it would be easiest to enhance income to the Benefit-sharing Fund through a national seed sales-based contribution by Contracting Parties. In addition, Articles 6.7 and 6.11 should be changed to provide for mandatory payments by all users, with rates depending on seed sales or turnover and exemption for NARS.
51. Some respondents have pointed out that the SMTA is too restrictive as it does not capture social and traditional values.
52. The Benefit-sharing Fund should be used to support *in situ* conservation, build capacity among farmers' organizations, and support farmers' rights implementation. Setting-up community seed

banks was viewed by some CSOs respondents as a cost-effective way of supporting *in situ* conservation. Others stressed that there should be more transparency regarding payments made by companies.

53. Some respondents believed that advances in genomics could constitute a major risk to the Treaty by reducing dependence on physical germplasm, and enabling the patenting of native genes. At the same time, techniques that help better evaluate germplasm are important if the results can be evaluated together with farmers, in order to address their needs *and as long as* farmers can continue to access the germplasm in the future.
54. With the Nagoya Protocol entering into force, the explicit harmony of Treaty and CBD ought to be clearly defined. The expansion of UPOV and the implementation of national seed laws should be monitored closely as they may restrict germplasm exchange, and hence threaten the Multilateral System.

Factors that influence the willingness of stakeholders to include PGRFA in the Multilateral System, and to access PGRFA from the Multilateral System

55. This section summarizes the factors identified by stakeholder groups regarding their willingness to access PGRFA from the Multilateral System. The stakeholders also indicated which factors may influence the willingness, of those managing germplasm collections under the management and control of the Contracting Parties and in the public domain, as well as of those natural and legal persons within Contracting Party jurisdictions that hold PGRFA, to include materials in the Multilateral System. Stakeholder groups also made a number of remarks regarding a potential expansion of coverage of Annex 1.

Ease of Access

56. Many respondents emphasized that the Multilateral System with its Standard Material Transfer Agreement (SMTA) provides a clear, commercially viable contract that facilitates access to PGRFA. Having a standardized contract simplifies the procedures for access to PGRFA and reduces the cost of access. SMTAs are widely used by the CGIAR, but also by many NARS and smaller seed companies using PVP.
57. Several respondents indicated that the SMTA procedure has been further enhanced through the Easy-SMTA system, the on-line system developed by the Secretariat to generate and report on SMTAs concluded in accordance with Governing Body instructions.
58. Most industry respondents indicated that they preferred using alternative PGRFA sources, which provide material that is also available under the Multilateral System, but without or with more acceptable obligations on the users.

PGRFA available within the Multilateral System

59. The diversity of material is the primary factor cited by stakeholders to explain the willingness of breeders in general, and the NARS in particular, to access PGRFA through the Multilateral System. Several experts specifically indicated that many Contracting Parties have still not included their national collections in the System. So far, the material under the Multilateral System includes the collections of 37 Contracting Parties (out of 131), of 17 CGIAR centres and of 6 natural and legal persons.
60. Many respondents stressed the need to make the Multilateral System more attractive by including PGRFA that are characterized, evaluated and have gone through some degree of pre-breeding and other forms of value-addition. Breeders and breeding companies are much more interested in routinely accessing materials under development and commercial varieties that they can integrate easily within their breeding programmes, rather than accessing traditional gene bank materials (landraces, wild relatives) which require “long term investment” and effort to breed out undesired traits. The relevance and quality of the material is therefore a major factor in the breeders’ decision to access PGRFA.

61. While there is material of interest for farmers in gene banks, farmers do not rely on gene banks to access PGRFA, but rather depend on local sources or networks. Many gene banks still do not grant access to PGRFA to farmers or their organizations. Support by NGOs, local research institutions or other experts, who can act as intermediaries between gene bank staff and farmers is necessary to improve the willingness and capacity of farmers to access PGRFA from the Multilateral System.

Availability of information on the material within the Multilateral System

62. The availability of reliable information on germplasm for traits of agronomic and economic interest is necessary for breeders to be able to search for material of interest for their program. Stakeholders indicated that if more information on the germplasm available in the Multilateral System was made public, it would make the System more attractive to users.
63. Most respondents were of the view that the availability of passport data and information on characteristics of the material is an essential precondition for access. Some gene bank managers from the CGIAR indicated that the characterization of genes for traits such as resistance to drought, diseases, insect pests, nutritional and yield traits is desirable but that such research is beyond the scope of many gene banks, as it is time and capital intensive. This is one area where seed companies based in developed countries provide some support to their national gene bank with a view to characterizing material (see also Appendix 1 on non-monetary benefits). Methodologies such as mini-core collection have been suggested by some respondents as support in characterizing materials in large gene banks at a low cost.
64. Farmers' organizations indicated that information is crucial but that they often cannot access it as it remains at government, research or university level. Since farmers access PGRFA through their own networks only, and do not have access to gene banks, farmers communities remain disconnected from other users from the Multilateral System.
65. Many stakeholders indicated the need for the Treaty to rapidly develop its Global Information System as a way to enhance the functioning of the Multilateral System. This would provide information on the material available as well as on the material already exchanged, and help enhance the value of the material under the Multilateral System.

Provisions of the SMTA

66. Industry views on the SMTA differed by company location. Respondents based in the U.S.A. indicated that the SMTA created a clear disincentive for commercial use. Companies based in Europe (which made up the majority of respondents) valued the fact that the SMTA differentiates between material available for further breeding with or without restrictions.
67. The provisions of the SMTA which most stakeholders believe to be negatively influencing user willingness to access PGRFA from the Multilateral System, are:
- Article 6.7, which provides for mandatory payments from seed companies using patents to protect innovations which may incorporate material under SMTA conditions in their parentage.
 - Article 9.2, referred to by some users as the "evergreen clause", which provides for unlimited duration of the agreement (as long as the Treaty is in force).
 - The provisions related to the reporting obligations under Article 5 ("tracking and tracing of the material"), as users believe they are cumbersome and lead to administrative costs.
68. The amendments to the provisions of the SMTA which stakeholders, especially the users, believe will hold the biggest potential to enhance the use of the Multilateral System and increase user-based payments and contributions to the Benefit-sharing Fund in a sustainable and predictable long-term manner, include:
- Reducing payment rates: the rates of Articles 6.7 and 6.11 are set too high and the parity between them is not favourable to Article 6.11. Some suggested to reduce

rates of Article 6.7 from 0.77% to 0.5% or even less. Others suggested rates of Article 6.11 to be reduced from 0.5% to 0.01%.

- Limiting duration and changing trigger for benefit-sharing payments: some respondents suggested formulating Article 6.7 and related provisions as a standard licensing agreement that includes a defined time frame for benefit-sharing if material from the Multilateral System has been incorporated in the final plant variety product at a certain percentage on pedigree.
 - If a company set different intellectual property protection depending on the country of use, the payment obligation should apply only to the country where the further use is restricted.
 - While many stakeholders supported making all payments mandatory and therefore deleting Article 6.8, seed companies who commercialize varieties under PVP disagree with such suggestions.
 - Reducing transaction costs for seed companies: reduce tracking and tracing.
69. Stakeholders also suggested that a number of concepts included in the SMTA should be clarified:
- Definition of “available without restriction” (Art. 2 SMTA); for example, does PVP mean that the Product is available without restriction?
 - Definition of “PGRFA under development” (Art. 2 SMTA); it is restricted to “material to be developed in the future by the Recipient from Material currently being transferred under the SMTA in question.” There is hence lack of clarity with regard to material being transferred as PGRFA under development.
 - Articles 6.2 and 6.10 on intellectual property provisions, as they imply that IP rights may be obtained on a product or improvements without a proper explanation.
 - Article 6.8 on voluntary payments refers to *Annex 2* of the SMTA which provides rates of payment, this is confusing as, if payments are voluntary, the amount ought to be discretionary.
70. Any revisions to the SMTA should maintain the distinction of products with or without restriction on further use. Several respondents from seed companies cautioned against changes to SMTAs that would make the material under the Multilateral System less attractive compared to material from other sources.
71. More detailed user opinions on the current provisions of the SMTA, as well as the revisions under discussion, can be found in the *Study 1 Technical Papers*.⁷

Inclusion of PGRFA in the Multilateral System

72. Factors believed by stakeholders to be influencing the willingness to include PGRFA in the Multilateral System of those managing germplasm collections under the management and control of the Contracting Parties and in the public domain, included the following:
- Low awareness and capacity of government and NARS staff with regard to the implementation of Treaty obligations is a limiting factor as highlighted by respondents who indicated that a number of those developing countries that have contributed materials were initially supported through capacity building projects.
 - Lack of or poor national legislation to support implementation of the Multilateral System and to provide for regular funding of the germplasm banks;
 - Continued lack of trust between some users and providers, especially with regard to perceived risks related to “patenting” of material provided and fears that materials will “leak out of the System”;

⁷ See also footnote 3 above. Technical Papers are available at <http://www.planttreaty.org/content/background-study-paper-1>.

- The willingness to include PGRFA in the Multilateral System increases at national level, when breeders and other local users in the research and development chain show support for the Multilateral System.
 - The implementation of compliance procedures will facilitate further contributions of materials to the Multilateral System.
73. Factors believed by stakeholders to be influencing the willingness to include PGRFA in the Multilateral System of those natural and legal persons within Contracting Party jurisdictions that hold PGRFA, included the following:
- There is lack of clarity on the formal process of contributing PGRFA from natural and legal persons. There are also technical aspects that potential providers and curators of germplasm would like to clarify, such as how to manage hybrids or prioritize materials that are costly to conserve (i.e. in vitro conservation).
 - There is no formal recognition, by the Governing Body, of those natural and legal persons that include PGRFA in the Multilateral System. There is also no communication effort explaining the importance and value of inclusion for natural and legal persons. Some seed companies already contribute material to their national gene banks, and others may follow as part of philanthropy efforts.
 - The contribution by private holders of intermediate or final research products may compromise their comparative advantage *vis a vis* other market competitors.
 - Seed companies using plant variety protection do not see the need to contribute to the Multilateral System as the Breeder's Exemption of the UPOV system already allows free access to elite commercial germplasm. Patented material is unlikely to be shared until the patent expires, when it becomes freely available.
 - Seed companies want to see more Contracting Parties including material in the public domain before including their own material.
 - Farmers are reluctant to contribute material in the absence of implementation of Farmers' Rights.

Coverage of the Multilateral System: expansion of *Annex I*

74. A majority of respondents to the questionnaire were strongly supportive of expanding *Annex I* to all crops, including their wild relatives, and many of them indicated specifically that an increased use of the Multilateral System could be expected from the expansion of *Annex I*.
75. While supporting such expansion, some stakeholders are of the view that the expansion of *Annex I* should be undertaken simultaneously with attracting more Contracting Parties to join the Treaty and to contribute to the Multilateral System and to the Benefit-sharing Fund. Others felt that focusing on changes to the SMTA would already be a valuable exercise.
76. The majority of respondents referred to the entry into force of the Nagoya Protocol to the Convention on Biological Diversity, on 12 October 2014, which they feared could lead to a significant reduction in the use of non-*Annex I* material. The Nagoya Protocol requires Prior Informed Consent (PIC) by the holder of the material, as well as by possible holders of associated traditional knowledge, before access to genetic material can be granted, and Mutually Agreed Terms (MAT), negotiated bilaterally, for benefit-sharing. Several industry respondents have found access and benefit-sharing as regulated by the Nagoya Protocol to be very difficult and costly to implement in practice, due to the administrative burden and the difficulties for negotiating MAT. During the interviews, it was indicated how even identification of the national focus person had been difficult in several cases. Additional payment obligations, as well as reporting and tracking requirements, translate into a high cost of access, and a process that could take several years without certainty of outcome. Many respondents from the seed industry felt that, in this context, it is urgent to expand *Annex I* to all crops.
77. The crops that attract the most interest by stakeholders include those with the biggest commercial value such as soy bean, vegetables (especially tomato), and ornamental plants.

Expanding to all crops would not only simplify access to PGRFA by freeing resources that would otherwise have to be used in obtaining PIC and negotiating MAT under the Nagoya Protocol, but also increase the potential⁸ of income to the Benefit-sharing Fund from such crops. Nonetheless, one respondent cautioned about unrealistic expectations with regard to the overall levels of income generated.

78. The focus on all crops would allow the inclusion of many minor crops of local importance for food and agriculture that may have a low commercial or industrial value but are very important for food security. Their inclusion may promote their use and conservation and prevent them from being neglected.

⁸ For an estimate of potentials, see: Moeller and Stannard, “Estimating income to be expected from possible changes in the Provisions governing the functioning of the Multilateral System”, paragraph 126-134. Available at: http://www.planttreaty.org/sites/default/files/ITPGRFA_BS001e.pdf

Factors that influence the willingness to contribute to the Benefit-Sharing Fund

Factors leading to the current short-fall of user-based income

79. Stakeholders agreed with the Working Group in its review of the factors leading to the current short-fall of user-based income to the Benefit-sharing Fund: the slow speed of plant breeding; the availability of material, and type of material; the alternative sources of materials; avoidance of SMTA material and the problem of voluntary payments; the imbalance of payment rates between options; and the transaction costs for users.
80. The lack of awareness and understanding of the Multilateral System at all levels (e.g. Governments, NARS, gene banks, breeders, farmers' organizations, farmers' communities, CSOs) was quoted as a major additional factor preventing many actors from participating in the Multilateral System, leading to poor implementation of the Treaty and a lack of contributions to the Benefit-sharing Fund.
81. The avoidance of material under SMTA conditions is above all due to its unlimited duration ("evergreen clause") and its tracking and tracing requirements. The low availability of material due to the ineffective implementation of the Treaty in many Contracting Parties and the insufficient crop coverage of *Annex I* were also recognized as factors negatively influencing participation in the Multilateral System. Moreover, material in the Multilateral System includes predominantly landraces and crop wild relatives, while private breeders seek improved material.
82. While the seed industry has indicated a strong willingness to contribute to the Benefit-sharing Fund, the recognition of their non-monetary contributions would further enhance their willingness to make monetary contributions. See Annex 1 for more details.

Mandatory contributions

83. Under Article 6.7 of the SMTA, the commercialisation of a plant variety which incorporates material received under an SMTA gives rise to mandatory benefit-sharing payments, at a rate of 0.77% of annual seed sales of that variety, if it is not freely available to others for further research and breeding, such as would be the case with patented products. This leads to avoidance of materials under SMTA conditions, especially amongst users pursuing patent protection for their plant variety innovations.
84. Article 6.11, the alternative payment option to Article 6.7, provides for payments at a rate of 0.5% of the sales of all products that belong to the same crop as the material accessed, with immediate effect, whether or not these products are available for further research and breeding. The comparatively high rate creates an imbalance between the two options, making Article 6.11 very unattractive to the user. This is unfortunate, as under Article 6.11, payments would be made immediately rather than after a lengthy period of breeding.
85. Stakeholders indicated that mandatory payments should provide the bulk of the income flows to the Benefit-sharing Fund, to enable a steady and predictable income.

Voluntary contributions

86. Users who are commercializing plant varieties incorporating SMTA materials without any restrictions on further research or breeding are encouraged to make voluntary payments (according to Article 6.8 of the SMTA). However, as making a voluntary payment may put a company at an economic disadvantage compared to its competitor, it would never make good economic sense to make such payments.
87. Many stakeholders are of the view that a concerted communication effort regarding the role of the Treaty in conservation and sustainable use of agricultural diversity, in the face of genetic erosion and for food security, would go a long way to improving attitudes towards the Treaty and encouraging voluntary payments as well as contributions from other stakeholders, including actors further down the value chain, such as in the food industry.
88. The potential of future voluntary contributions from the seed industry will depend on the type of future mandatory contributions. Some seed industry respondents believe that voluntary

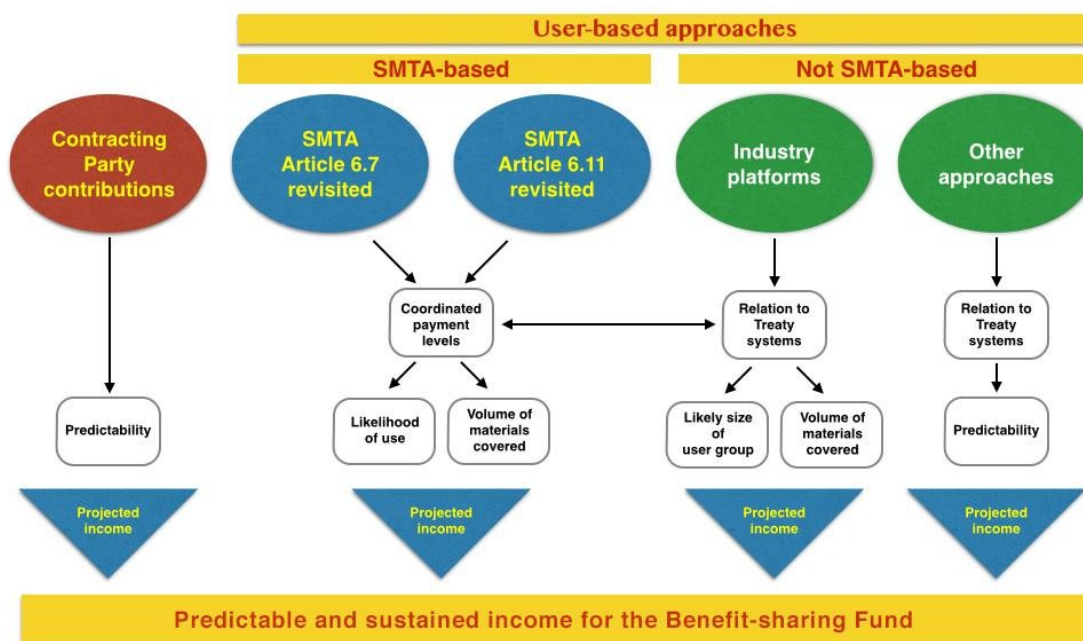
contributions are more likely if the SMTA remains unchanged. Companies may also be more inclined to contribute to the Benefit-sharing Fund if projects funded focussed on adding value to the Multilateral System (such as improving access, evaluation and pre-breeding).

89. Some experts indicated that *Annex 2* of the SMTA creates confusion, as it provides rates for voluntary contributions, which, however, should be at the discretion of the contributor.
90. Providing non-monetary benefits should be recognised as voluntary contribution.
91. Most respondents believed that institutionalizing a form of recognition for payments or contributions made to the Benefit-sharing Fund could provide an incentive to companies and donors in general. A number of industry respondents thought that publishing the name of the financial contributors and/or providing a type of quality label to recognize the contributor's Corporate Social Responsibility would provide such an incentive. The contribution could also be recognized at government level through a corporate tax exemption at national level.
92. Accessible reports on projects funded and money spent would provide more transparency to all stakeholders and increase trust in the system.
93. Some stakeholders have also pointed out that the procedure for making donations to the Treaty could still be further simplified and facilitated.

Elements for a renewed strategy to mobilize and use funds

94. As described in Document 3 of the first meeting of the Working Group⁹, there are different components that could come together to provide an adequate income stream for the Benefit-sharing Fund, including user-based and other approaches. Another component could be contributions provided by Contracting Parties, foundations or other philanthropic institutions through further work on fund-raising through the next iteration of the Strategic Plan. Figure 4, originally published as Figure 9 of Document 3, serves here as illustration.

Figure 4: Assembling a range of measures to provide an adequate and sustainable flow of income to the Benefit-sharing Fund



95. Stakeholders were supportive of an approach which would create a package of measures to increase income to the Benefit-sharing Fund through different components.

Innovative approaches

SMTA- based approaches

96. The stakeholders' views about revisiting these Articles of the SMTA have already been introduced above, and are treated in more depth in the *Study 1 Technical Reports*.¹⁰ The majority of stakeholders are of the view that making all payments mandatory would enhance funding, and help create a level playing field. Furthermore, only mandatory payments could provide a steady income, as voluntary payments tend to be cut when there are economic downturns. However, seed companies selling products under Plant Variety Protection disagree with mandatory payments as they feel that they keep access open and provide benefit-sharing through the breeders' exemption.

97. Agreement existed with regard to a differentiated payment rate, higher for products that restrict further use for research and breeding, as compared to products that do not restrict such further

⁹ http://www.planttreaty.org/sites/default/files/OEWG-EFMLS_1-14-w3_en.pdf

¹⁰ Available at: <http://www.planttreaty.org/content/background-study-paper-1>.

use. As indicated above, some respondents suggested reducing the rates of payment for Article 6.7 from 0.77% to 0.5%, and for 6.11 from 0.5% to 0.01%. No comments were received on the relative levels between Article 6.7 and 6.11.

98. Finding ways to cut transaction costs by reducing or doing away with the need for tracking and tracing was mentioned often as a key factor in enhancing the attractiveness of the Multilateral System and its SMTA.
99. **Upfront payment on access**, to be discounted against payment due on commercialization of a product: several stakeholders supported the approach and felt that in addition to the early payment, such an approach could encourage seed companies to share material and technology with providers. Others, particularly from the seed industry, disagreed as they felt that it is difficult to contribute prior to knowing whether the material is of interest to the user.

Non SMTA- based approaches

100. **Promoting regular seed sales-based contributions by Contracting Parties:** this approach was supported by several respondents from governments, CGIAR, Farmers, small seed companies and CSOs as it seems the simplest to implement and would allow a level playing field among all companies. It would be up to each country, based on a scale arising from discussions by the Governing Body, to decide how to collect and provide such contributions.
101. Some respondents suggested defining the scale of the contribution based on GDP or following the established UN scale or establishing the scale of contributions taken into account other indicators such as the number of researchers in the country, the number of PGRFA patents and released protected plant varieties, or the national seed sales. Others suggested adding the contribution to the national agricultural budget. Some indicated that the scale for the contribution from developed countries could be similar to the one used to the Global Crop Diversity Trust (GCDT) in its current resource mobilization strategy, noting that scales and funding targets should be coordinated. While some countries may want to include such contributions in their national budget, others may decide to collect it from the seed industry or through its associations. Some Stakeholders reported that they were discussing, in a specific country, the possibility of a burden-sharing mechanism agreed by industry and government, where each one would provide a certain obligation on a regular basis.
102. Several stakeholders raised the idea of creating another endowment fund such as the GCDT, to promote regular contributions by Contracting Parties to PGRFA priority areas other than *ex situ* conservation. Others stressed that the resource mobilization strategies of the Benefit-sharing Fund and the GCDT should be aligned and that new cooperation mechanisms should be established to enable the Governing Body to provide policy guidance for a balanced use of funds to the different PGRFA priorities and among the different elements of the Funding Strategy of the Treaty.
103. In this context, it was pointed out numerous times that other actors benefit from PGRFA and products deriving from them. Margins are often higher “further down the value chain” of beneficiaries of improved germplasm, such as is the case in the food and feed industry, and among large food retailers. It was suggested that contributions be sought from the entirety of actors benefiting from PGRFA, including the end consumer, and that Contracting Parties were best placed to do this.
104. **Novel ways to attract use-based voluntary funding:** The approach of an industry licensing platform was presented in Document 3 of the first meeting of the Working Group. While the concept of developing the industry licensing platform was not addressed specifically in responses to the questionnaire, or interviews, some experts expressed support for developing agreements or partnerships that work as burden-sharing mechanisms between the governments and seed companies, at either national or global level.
105. **Expanding the coverage of the Multilateral System** to all plant genetic resources for food and agriculture was largely supported by all stakeholders, and especially all industry respondents.

Contributors

106. Stakeholders reaffirmed the importance of the Treaty, which provides a global benefit to society, and helps enhance global food security, biodiversity conservation and adaptation to climate change. They therefore view it as a major responsibility of the Contracting Parties to support the Treaty in fulfilling its crucial mission. Some respondents from the seed industry highlighted that this is fully in line with the Strategic Plan, where more than 75% of the funding was expected to originate from the Contracting Parties. Many stakeholders expected contributions to be mandatory for developed countries and voluntary for developing countries.
107. While all stakeholders anticipate that a major share of the funding should originate from Contracting Parties, most stakeholders also recognize that PGRFA users should also contribute to the Benefit-sharing Fund. The seed industry is the primary PGRFA user that commercializes varieties and other products. All respondents from seed companies indicated their willingness to contribute to the Benefit-sharing Fund, but they highlighted that Contracting Parties need to be realistic with regard to potential income to be generated through the SMTA. Moreover, the seed industry would like to be recognized for the importance and value of monetary and non-monetary contributions to the International Treaty, including the availability of materials under Plant Variety Protection for further research and breeding.
108. Seed companies also indicated that future provision of non-SMTA contributions from industry will depend on how the monetary benefit-sharing is structured in the SMTA as part of the enhancement process. It cannot be expected that seed companies will support a package of measures where there is a major increase in both the provision of income through the SMTA and in non-SMTA contributions.
109. Several stakeholders stressed that a mechanism should be found, in line with Article 13.6 of the Treaty, to mobilize voluntary contributions from those actors in the food supply, such as food processing industry and retailers, which also benefit from the value generated from the use of PGRFA.
110. Some stakeholders also indicated that a wider array of sources for voluntary contributions should be explored. The Benefit-sharing Fund has a great potential to attract funding for special projects or programmes from multilateral organizations, such as GEF or IFAD, as well as from foundations and other philanthropic institutions, especially if such projects were to create value to the material under the Multilateral System or to support the implementation of the Treaty. This needs to be taken into account in future fund raising efforts through the next iteration of the Strategic Plan.
111. Civil Society Organizations indicated that they would not contribute funding directly, but they can be instrumental to promote funding contributions from certain donors, such as foundations.

Priority in the use of funds of the Benefit-sharing Fund

112. Several stakeholders (from Contracting Parties, Seed Industry, and CGIAR) believed that the Benefit-sharing Fund should invest in fewer but larger projects with a potential for greater impact. Such projects could attract voluntary contributions by seed companies and multilateral donor institutions, as well as Contracting Parties. Such large projects should be designed in close cooperation with Treaty partners, such as the CGIAR Centers and the GCDT, in order to optimize the project impact and reinforce the attractiveness for potential funders. They could involve public-private partnerships and be aimed at adding value to the material under the Multilateral System.
113. In terms of funding priorities, while stakeholders from farmer or civil society organizations support a clear focus of Benefit-sharing Fund for on-farm management of crop diversity, seed companies, CGIAR, and other stakeholders are of the view that the Fund should not only deal with on-farm management but should also focus on the addition of value to material in the Multilateral System through better evaluation, pre-breeding, improvement of information systems and technology development and transfer.

114. Stakeholders from farmer or civil society organizations indicated that the projects focusing on on-farm management of crop diversity should strengthen farmers' organizations' capacities to support seed management, with interventions centred on participatory breeding and collective conservation. Projects should aim at enhancing the sustainability of farmers' seed systems and supporting an effective implementation of farmers' rights. Some are of the view that it should be possible to attract funding from some foundations to finance these types of projects.
115. Other stakeholders indicated that this type of project should focus on PGRFA that are under threat in *in situ* and on-farm conditions and that appropriate links should be established with *ex situ* conservation facilities and institutions to make the material available under the Multilateral System. They also emphasize the need to focus on *in situ* conservation in centers of origin and diversity. The varieties under threat are often minor local crops which are essential for local nutritional needs and food security.
116. Several respondents (Contracting Parties, Seed Companies, CGIAR, and other) indicated that the Benefit-sharing Fund should play a catalytic role in increasing the value and the downstream use of the PGRFA in the Multilateral System, by supporting activities such as evaluation, pre-breeding or provision of PGRFA sample information and the transfer of relevant technologies, as well as collecting and making available PGRFA. It is therefore important to support national gene banks in their efforts to conserve crop diversity for future generations, and in capacity building for gene bank management, characterization and regeneration to allow national partners to make better use of the diversity available. Private companies indicated that they could assist in some of these activities, especially pre-breeding.
117. Most stakeholders believe that all stakeholders groups should be represented on the panel of experts which evaluates and selects projects proposals. These experts should possess a broad working experience of PGRFA conservation and management, as well as of rural development.

4. CONCLUSIONS

118. Stakeholders participating in this study reaffirmed that the International Treaty is crucial in the fight against food and nutrition insecurity and in efforts to adapt agriculture to climate change and future challenges. The majority of respondents stated that the Treaty had had a distinct positive impact for their organizations. There is goodwill among stakeholders towards contributing positively to the process of enhancing the functioning of the Multilateral System and the Benefit-sharing Fund. They expect the Multilateral System to become the main global system for accessing all PGRFA.
119. At the same time, the majority of stakeholders stressed that there is still a significant lack of awareness and understanding of the Multilateral System at all levels and across the different stakeholder groups. They therefore emphasized the need for the Treaty to make additional and systematic awareness raising and capacity building efforts to improve the implementation of the Treaty and the functioning of the Multilateral System. Defining and implementing a communication strategy to enhance the Treaty's visibility to both users and potential funders was considered very important. The crucial role of the Treaty in supporting the conservation and sustainable use of plant genetic for food and agriculture, as a major contribution to world food security, should be emphasized and communicated widely. Several stakeholders highlighted the fact that the goals and services provided by the Treaty should be further defined so that different audiences can better relate to the Treaty.
120. There is general agreement about measures to increase the attractiveness of the Multilateral System such as the inclusion of value-added material and the provision of better information on the PGRFA in the system. The implementation of the Global Information System as laid out in Article 17 would enhance the value of the material available under the Multilateral System, and the expansion of the Treaty's crop coverage (*Annex 1*) would make the entire system more attractive. Farmers' organizations stressed the need for changes that will enable farmers to have better access to PGRFA in the system and to information on germplasm relevant to them.
121. Stakeholders underline that the responsibility to support the Treaty in fulfilling its crucial mission lies with Contracting Parties, which includes the provision of funding to the Benefit-sharing Fund. They recognize, however, that PGRFA users should also contribute to the Benefit-sharing Fund. All respondents from seed companies indicated their willingness to contribute to the Benefit-sharing Fund, but noted that Contracting Parties need to be realistic with regard to potential income to be generated through the SMTA. They stressed the need for a simplification of the reporting obligations and the termination clause.
122. Stakeholders have very concrete ideas on the priorities for use of funds in the Benefit-sharing Fund and would like to be involve and provide their expertise in defining priorities and selecting projects or programmes to be funded. They emphasize the need for larger projects with higher impact that could enhance the value and use of the Multilateral System and the need for mechanisms for specific donors to contribute to specific programmes or priorities (i.e. foundations to support on-farm management and seed companies to support evaluation or pre-breeding).

Stakeholder recommendations

123. The following recommendations to enhance the Treaty were formulated during the Delphi interviews
 1. Attract additional parties to join the Treaty;
 2. Improve availability of materials in the Multilateral System by ensuring that all Contracting Parties contribute their materials, and by encouraging natural and legal persons to do so, too;

3. Revise the provisions of the SMTA, especially its unlimited duration and payment rates;
 4. Raise awareness and understanding of the Treaty
 - Among staff of governments
 - Among users (NARS, breeders and seed industry, farmers and farmers organization, CSOs)
 5. Expand *Annex 1* of the International Treaty;
 6. Improve information available on material in the Multilateral System (such as characterization and evaluation data);
124. When rating their recommendations during the Delphi process, stakeholders found revisions to the SMTA to be of most importance, followed by improving the availability of material through more inclusions of materials and the expansion of *Annex 1*. Increasing awareness and improving communication was the third most important aspect in enhancing the functioning of the Multilateral System.
125. Ratings varied slightly by stakeholder group:
- For the seed industry, expanding *Annex 1* was most important, followed by revisions to the SMTA, increasing the number of Contracting Parties, as well as improving the availability of materials. The need to characterize the material, which was often mentioned during the interviews, was not given such a high priority.
 - Farmers supported these top priorities, but raising awareness was their priority. Key for farmers is to have clearly defined and well implemented farmers' rights, as well as a decision from the Governing Body to ensure that PGRFA received from the Multilateral System will not be patented, so that farmers can contribute materials to the Multilateral System.
 - While revisions to the SMTA and the improvement of material available in the Multilateral System were the most important aspects for CSO respondents, they underlined that all recommendations ought to be implemented.
 - CGIAR respondents found that all recommendations were equally important.
126. This study showed the confidence that all the stakeholders put in the Treaty as a major instrument to conserve and to use sustainably the plant genetic resources for food and agriculture, and their readiness to continue to support the process to enhance its functioning for the benefit of all.

APPENDIX 1 NON-MONETARY BENEFIT SHARING

For an in-depth treatment of non-monetary benefit-sharing, the reader is encouraged to refer to Study 3 *An Analysis On How To Enhance Mechanisms For Capacity-Building, Technology-Transfer And Information-Exchange*.¹¹

Facilitated Access

As specified in Article 13.1, 30% of respondents indicated that facilitated access within the Multilateral System is a major benefit for all, in particular developing countries. The main benefit derives from improved varieties provided to farmers resulting in improved yield and higher profits, and thereby also improving farmer livelihood. The positive impact of facilitated access should not be undervalued but further enhanced and developed. These benefits of facilitated access, although called non-monetary, may be huge in monetary terms.

Taking the example of rice, one Delphi respondent indicated that a number of studies evaluated the impact of adoption of modern rice varieties.¹² One study estimated the benefit at as much as US\$ 4,310 million annually for the Asian region. Taking a cost-benefit approach from a Contracting Party's perspective, the "cost" corresponds to how many accessions they have contributed to the Multilateral System. Taking the number of accessions contributed to the gene bank of the International Rice Research Institute (IRRI) and taking an average benefit as estimated in the studies referenced, the respondent estimated that the economy of each country may have increased by US \$ 50.000/year for each accession they have put into the gene bank. A more precise estimate could be provided by further study.

Moreover, most plant varieties are available for further research and breeding, either through the breeders' exemption under UPOV, or because they are not protected by any intellectual property right. This is already a major benefit, provided by the seed industry. The value of the breeders exemption *per se* has not been estimated, but is perceived to be important. Some companies with varieties under patent protection, may contribute their material at expiry of the patent to the Multilateral System and share benefits in this way. In addition, some companies are already providing support, sharing their knowledge and experience by helping gene banks multiply their collections and evaluating them for free. These ways of sharing benefits should be recognized, it was stressed.

Other respondents indicated that access to material is very important, but only if it is accompanied by the information, technology and capacity to make use of the material. Hence, in order to maximize their use of the Multilateral System, developing countries need to receive other non-monetary benefits as well.

Exchange of information

Most respondents are of the view that information on the availability, passport data, and characteristics of materials are essential for accessing germplasm. One important way of sharing benefits is, for the company or research institute making use of materials from the Multilateral System, to share their research results with the organization who provided access to the germplasm.

There are a number of initiatives taken that support the implementation of information exchange, as well as technology transfer, and capacity building. Some seed companies indicated during interviews that they provided support to gene banks through their national associations by collecting and characterizing materials, and by contributing some of their own material.

¹¹ IT/OWG-EFMLS-2/14/5 *Synoptic Study 3: An Analysis On How To Enhance Mechanisms For Capacity-Building, Technology-Transfer And Information-Exchange* and XXXX REF to full study. These are available at URL XXX.

¹² Three impact studies have been selected as a reference to demonstrate the importance of the benefits of modern rice adoption. The annual benefits, by region and study period, have been estimated at: 153 million US\$, Bangladesh, 1973-1993 (Hossain 1998); 286 million US\$, Latin America and the Caribbean, 1967-1995 (Sanint & Wood 1998); 4,310 million US\$, Asia, 1998 (Hossain et al 2003).

Initiatives such as DivSeek, which is jointly facilitated by the Treaty and the Global Crop Diversity Trust, and other information systems within the Global Information System of the Treaty will contribute to develop standardized data formats, associated repositories, and analysis tools that could link large-scale sequencing and phenotyping data to publicly available germplasm accessions, including those that are part of the Multilateral System.

Most stakeholders indicated the need to develop a Global Information System (GIS) as stipulated in Article 17 of the Treaty. The GIS would help capitalize the information of the ongoing global exchange of germplasm and enable valuing the material already under Multilateral System. Some respondents from the CGIAR indicated that the main problem for setting up a system is the current lack of harmonization of the material coding. Some suggested a clearing house procedure to allocate the code as a potential solution to explore. They also recognized that current technologies of information system management offer unique opportunities to implementing Article 17. Furthermore recent advances in plant breeding to associate genetic information with phenotyping information could be made use of in this context. Such an Information System should be like a one stop shop where interested organizations could go to access on where resources are (PGRFA, technology, information).

Access to and transfer of technology

Stakeholders stressed also the importance of technology transfer as non-monetary benefit-sharing. Respondents from government and seed companies highlighted how technology transfer together with capacity building is crucial to building up a local seed and plant breeding sector in developing countries. Technology transfer and capacity building can also be useful for *in situ* and *ex situ* conservation activities, and could be achieved collaboratively.

Farmer Organizations stressed the need to support participatory plant breeding as a technology transfer activity.

Capacity building

Capacity building is usually delivered in an integrated manner with one or more of the other non monetary benefits (facilitated access, information exchange, technology transfer). Many stakeholders emphasized the importance of capacity building for gene banks, for breeding of locally adapted varieties, for farm-based seed multiplication, and for access of small holders to seed of improved varieties. Stakeholders recognized that on-line tools are helpful but they are not sufficient as capacity building requires on-the-ground implementation.

It was furthermore suggested that, while capacity building should be a crucial component of all Benefit-sharing Fund projects and for all actors (e.g. farming communities, gene banks, government institutions, breeders), a capacity building strategy should be developed, with funding from the general Treaty budget. The strategy should identify the relevant partners to be trained, and devise a train the trainer strategy to optimize the potential of the training. Champions should be identified and a network built at all levels (government, gene banks, breeders, farmers, etc.), to train them, create a sense of community, and build trust. Links should be established with local, regional, and national associations (e.g. breeders, farmers) as a way to reach a maximum number of people. The implementation of farmers rights at country level ought to be supported through capacity building at policy level.

APPENDIX 2 TECHNOLOGICAL AND POLICY TRENDS

The Working Group noted that, in the context of developing innovative approaches to generate income for the Benefit-sharing Fund, technical advances, in particular the increasing role of DNA information in plant breeding, should be taken into consideration. This Appendix presents the views put forward by respondents, during interviews and in the questionnaire, with regard to such technological, as well as policy trends.

Technological trends

The new technologies available in plant breeding are: double haploids, marker assisted selection, genomic selection, new approaches to phenotyping, biostatistics, data handling. These technologies enable large-scale phenotyping and genotyping and the use of genomic markers to assist breeding, making a speedier, more efficient and to allow cheaper screening of germplasm. These technologies also provide the means to induce variation by using approaches such as tilling and directed mutagenesis without using the variability offered through PGRFA.

Out of the 53 respondents who highlighted their views on the technological trends, 53% were positive, 19% were neutral and 28% were negative on potential impact of these developments on the Treaty.

The positive respondents are of the view that these techniques will help characterize and assess the diversity in germplasm in a major way, hence they provide opportunity to add a lot of value to the Multilateral System material and contribute to more exchange of material. There are various factors put forward by respondents:

- Finding ways to characterize wild relatives and unimproved germplasm, would allow to include more material in the Multilateral System, making it more attractive.
- Molecular characterisation would help understand what is important to preserve and what is already duplicated in the Multilateral System material. This could help better target funding for sound decisions on what needs to be preserved.
- New techniques can help screen material for high temperature tolerance and other characteristics needed to cope with climate change.
- Methods will need to be developed to incorporate the tracking and utilisation of germplasm based on this sub-level of cellular organisation.
- The development of information systems to associate genetic information with phenotyping information should be a component of Article 17 (GIS).

Those who were neutral with regard to this technological progress are of the view that traditional breeding is still the most important approach where capacity building efforts should be focused in the developing countries.

Those who were negative felt that the potential to screen genetic resources using these new technological approaches would in the longer term, reduce the dependency on these genetic resources. Some companies indicated that if the access to biodiversity remains cumbersome or becomes too expensive, there is the possibility that technical solutions will increasingly replace accessing physical material. These technologies may therefore create a real risk for the Multilateral System.

Policy trends

Apart from the Treaty, there are three further international agreements which relate to PGRFA: the Convention of Biological Diversity (CBD), the International Union for the Protection of New Varieties of Plants (UPOV)¹³ and the Patent Cooperation Treaty. Their implications for the Treaty and in particular the enhancement of the functioning of the Multilateral System were considered in the stakeholder consultation.

¹³ http://www.upov.int/about/en/upov_system.html

CBD and the Nagoya Protocol

The Nagoya Protocol to the CBD has been quoted by the majority of respondents as the most important policy trend to consider. Several seed industry respondents indicated that the implementation of the Nagoya Protocol, which has entered into force in October 2014, is likely to complicate access to PGRFA for breeders, at a time when plant research, plant breeding and agriculture are confronted with the global twin challenges of food security and climate change. The breeding industry hence insisted on the importance of the Treaty as an instrument for Access and Benefit-Sharing for PGRFA. While the Treaty and the CBD are in explicit harmony, the industry stressed the special role of the Treaty in regulating access to germplasm for the agriculture sector. It was suggested that the SMTA be recognised as a proof of compliance under the Nagoya Protocol, for all *Annex 1* crops.

Some seed industry respondents emphasized that PGRFA are not the “green gold” that they are sometimes expected to be, and that inflated expectations will inevitably result in disappointment. The seed industry operates on much lower margins and needs substantial investment to add value to germplasm, compared with the kind of profits pharmaceutical companies can achieve, and which underlie the CBD model. Given the technological trends in breeding highlighted above, a too cumbersome and expensive process for accessing germplasm may push seed companies, with the capacity and resources to do so, to rely increasingly on technological solutions rather than access to genetic variety.

Patenting laws

The possibility of patenting native traits is an issue of contention for various stakeholders. The worry is that patents might be granted on some of the material accessed via the Multilateral System, which would prevent further use without authorization of the right-holder in the country of origin, if a patent was granted in that jurisdiction. A solution to the issue of patenting of native trait needs to be found to build trust amongst all stakeholders in the Multilateral System. Some respondents insisted that the Treaty should not facilitate the creation of database of patentable traits until a solution is found to this issue, and that such a solution is fundamental in enhancing the exchange of material under the Multilateral System.

While the general value of patents to protect inventions is recognized, the specific disagreement lies in the possibility of patenting either a natural gene or natural trait of a plant. Further studies should be conducted on the issue. Some concrete suggestions which were made by respondents in the Delphi interviews towards addressing these issues included:

1. A clarification, prohibiting the acquisition or exercise of patents on natural genes or traits, could be inserted as a footnote in the SMTA. In the view of some stakeholders, this would constitute a short term solution which could help build the necessary trust.
2. A possible customized solution for patented inventions developed from PGRFA could have the following elements:
 - Allow patenting of PRGFA-derived trait innovations (not specific varieties), provided that the resulting patents are accessible through a reciprocity-based clearing house
 - Allow free use of the patented technology for breeding, research, or for humanitarian purposes
 - Commercial use of the patented technology in developed countries should result in benefit sharing (royalty payments) to the innovator. On request the amount of royalties can be reviewed by an independent expert committee.
3. Other stakeholders suggested that, since facilitated access to PGRFA is critical in securing food security, serves humanity, and since patenting could negatively impact world food security, a high level action request could be put forward between FAO and WIPO, to seek a clarification on the Patent Cooperation Treaty. Such avenue is a long term solution, but would help to resolve the issue by embedding the solution in international treaties.

UPOV

The UPOV Convention offers a *sui generis* form of intellectual property protection to the breeder of a plant variety, in the form of a "breeder's right". It has been specifically adapted for the process of plant breeding and has been developed with the aim of encouraging breeders to develop new varieties of plants. This system

allows breeders to collect royalties for new varieties developed. A fundamental aspect of the UPOV system, known as the "breeder's exemption", means that the variety is freely accessible for further research and breeding.

Breeders have extended their plant variety protection rights in significant steps through the UPOV process. Some farmers respondents indicated that farmers' rights were lost in the process and that with the most recent update, it has become illegal for farmers to save their own seed, a fundamental aspect of farming throughout the ages. With the expansion of UPOV especially in developing countries, national legislations are being set up that prohibit farm saved seeds, which also limits the potential of farmers to participate in the Multilateral System and should hence be discussed as part of the overall enhancement of its functioning.

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