August 2015

Food and Agriculture Organization of the United Nations

The International Treaty ON PLANT GENETIC RESOURCES FOR FOOD AND AGRICULTURE

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Item 14 of the Provisional Agenda
SIXTH SESSION OF THE GOVERNING BODY
Rome, Italy, 5 – 9 October 2015
Report from Institutions that have signed Article 15 Agreements

Executive summary

The Governing Body regularly receives a report from institutions that have agreements in force under Article 15 of the International Treaty, in relation to the distribution of germplasm under the terms and conditions of the Multilateral System. At the time of this Session, EasySMTA is fully deployed and applied for the purpose of reporting on concluded Standard Material Transfer Agreements, by CGIAR Centres and other Article 15 international institutions, such as the Secretariat of the Pacific Community (SPC).

For this Session, the Secretariat received two reports, one collectively developed by the CGIAR Centres, and another from the SPC. The two reports are contained in *Appendices* 1–2, respectively, to this document, in the form and language received from the Institutions, for the information of the Governing Body.

The two reports inform about transfer of germplasm under the Multilateral System and technical cooperation, as well as various activities of capacity building, information exchange and technology transfer, for instance in the context of new plant breeding tecniques and 'omics'related research work. The activities are conducted in partnerships with research partners and beneficiaries in national, regional and international institutions.

Guidance sought

The Governing Body may whish to:

a) ***Thank*** the Article 15 insitutions which have submitted the reports and invite them to continue such a practice at the next Session;

b) ***Invite*** Article 15 institutions to continue engaging in non-monetary benefit-sharing activities, in furtherance of the objectives of the International Treaty.

Appendix 1

CGIAR submission to the Sixth Session of the Governing Body of the ITPGRFA
20 August 2015

CGIAR Report to Sixth Session of the Governing Body: CGIAR Centers Activities Implementing their Article 15 Agreements

Executive Summary

The CGIAR Consortium, including the 11 Centers hosting 'in-trust' collections ("CGIAR Centers" or "Centers"), are submitting this report to inform the Sixth Session of the Governing Body about their activities under the framework of their 'Article 15 agreements'. This report highlights the contributions that the CGIAR Centers are making to the implementation of the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) and its multilateral system of access and benefit sharing (MLS).

The CGIAR Centers are substantially up to date with reporting their transfers to the Governing Body. Up to ninety-four percent of all reported transfers of Plant Genetic Resources for Food and Agriculture (PGRFA) around the world using the Standard Material Transfer Agreement (SMTA) have been transferred by CGIAR Centers. The Centers continue to distribute hundreds of thousands of samples of PGRFA each year using the SMTA. Approximately one quarter of the material transferred by CGIAR Centers is germplasm from Center-hosted 'in trust' collections and approximately three-quarters is Center-improved materials. The vast majority of Center transfers are to public sector organizations in developing countries and countries with economies in transition.

In recent years, in some ITPGRFA-related fora, CGIAR Centers have been asked for information about the means by which they distribute Center-improved materials. This submission provides an overview of the Centers' practices and policies in this regard. Some Centers always identify all Center-improved materials that incorporate material from the MLS and that are not ready for commercialization as PGRFA under Development, and include pedigree information about their MLS ancestors in Annex 1 of the SMTA. Other Centers do not identify Center-improved materials as PGRFA under Development on the basis that, since they do not want to add additional terms or conditions to those already in the SMTA, it is easier to simply distribute those materials as PGRFA (as opposed to PGRFA under Development). There are many different means by which Centers distribute their improved germplasm, including through international evaluation and performance nurseries; specialized networks created for sharing, evaluating and characterizing improved materials;

consortia developed to support breeding and dissemination of hybrids, and direct transfers from genebanks and breeding programs. CGIAR Centers that host hybrid consortia report that these consortia are the means by which they distribute most germplasm for hybrid variety breeding to private sector recipients. This report includes details about the quantity and geographic destination of materials transferred through some of these consortia, as well as their structure, membership conditions and *modus operandi*.
The report also provides information about the Centers' contributions to non-monetary benefit sharing as specified in Article 13.2 of the ITPGRFA, i.e., technology transfer, information exchange and capacity building. In this context, the report underscores Centers' efforts to take advantage of technological advances in molecular level characterization of plant genetic resources to support crop improvement programs. It also highlights findings from studies evaluating the Centers' contributions to technology transfer and information exchange, primarily in the areas of crop improvement, diffusion and adoption.

During the last biennium, the CGIAR Centers have participated actively in ITPGRFA working groups and processes related to enhancing the function of the MLS, the program of work on sustainable use of PGRFA, development of the global information system under Article 17 of the ITPGRFA, and national level implementation of the MLS in a mutually supportive way with the Nagoya Protocol.

I. Background

The CGIAR Consortium and its eleven CGIAR Centers hosting international 'in-trust' crop, tree and forage genebanks submit this report to update the Governing Body regarding a number of their activities implementing their 'Article 15 agreements' with the Governing Body.[1] This report provides a high level overview concerning the CGIAR Centers':

(i) distributions of PGRFA using the SMTA;
(ii) transfer modalities and practices concerning Center-improved materials in particular;
(iii) contributions to non-monetary benefit-sharing; and
(iv) participation in specialized working groups and other activities under the ITPGRFA framework.

In the past, CGIAR reports to the Governing Body have also highlighted Center perspectives related to challenges faced in terms of acquiring or distributing materials or information using the SMTA. This report does not explicitly address those issues, as they have been captured in a number of documents that have been developed by the Secretariat of the ITPGRFA

1 Eleven CGIAR Centers hosting international collections of PGRFA signed agreements with the Governing Body of the ITPGRFA in 2006, to place their collections within the purview of the ITPGRFA. Those agreements took effect in January 2007. These eleven Centers comprise: Africa Rice Center (WARDA); Bioversity International (IPGRI); Centro Internacional de Agricultura Tropical (CIAT); Centro Internacional de Mejoramiento de Maiz y Trigo (CIMMYT); Centro Internacional de la Papa (CIP); International Center for Agricultural Research in the Dry Areas (ICARDA); International Crops Research Institute for the Semi-Arid Tropics (ICRISAT); International Institute of Tropical Agriculture (IITA); International Livestock Research Institute (ILRI); International Rice Research Institute (IRRI); and World Agroforestry Center (ICRAF).

(Secretariat), the CGIAR and other organizations for consideration by the Ad Hoc Open-ended Working Group to Enhance the Functioning of the Multilateral System of Access and Benefit-sharing (WG-EFMLS).[2] Past reports to the Governing Body from the CGIAR concerning the implementation of the 'Article 15 agreements' are included on the ITPGRFA website.[3]

II. Overview of PGRFA distributions by Centers

Past reports from the CGIAR to the Governing Body included considerable data, assembled by CGIAR Centers, concerning the PGRFA they had acquired and distributed using the SMTA during the previous years. Throughout 2014 and 2015 the Secretariat has worked closely with CGIAR Centers to facilitate and streamline their reporting practices concerning SMTA transfers as required pursuant to the ITPGRFA. There are still some backlogs, but most Centers' reporting is now substantially up-to-date, with CGIAR Centers having institutionalized systems to submit data on transfers either in real time, every six months or annually. As a result, we are able to rely upon aggregate data provided by the Secretariat, based on the collective reports of transfers by CGIAR Centers to the Governing Body.

The CGIAR Centers are responsible for approximately 94% of all materials transferred globally using the SMTA.[4] Details about transfers reported by CGIAR Centers are included in Annex 1 to this report which breakdowns SMTA transfers by Center and region. This data confirms that, since January 2007, CGIAR Centers have transferred 2,682,300 samples under 25,395 SMTAs to recipients in 158 countries. Table 1, immediately below, provides a breakdown of the regions to which those materials have been sent.

Table 1

Breakdown of regions to which CGIAR Centers have sent materials, January 2007 – July 2015	**SMTA**	**Samples**
Africa	18%	20.1%
Asia	39%	37.2%
Europe	11%	10.5%
Latin America and the Caribbean	19%	14.8%
Near East	9%	11.1%
North America	4%	4.8%
Southwest Pacific	<1%	1.5%

Approximately seventy three percent of the SMTAs were used for transfers to recipients in ITPGRFA Contracting Parties. The vast majority of these transfers – approximately 94 per cent – were to public research organizations, universities, regional organizations, germplasm

[2] See http://www.planttreaty.org/content/third-meeting-ad-hoc-open-ended-working-group-enhance-functioning-multilateral-system-access

[3] The CGIAR reports to the Second, Third and Fourth Sessions of the Governing body are available at http://www.planttreaty.org/sites/default/files/gb2i11e.pdf, http://www.planttreaty.org/sites/default/files/gb3i15e.pdf, and http://www.planttreaty.org/sites/default/files/gb4i05e.pdf, respectively

[4] IT/OWG-EFMLS-3/15/Inf.9, p7

networks and other gene banks[5]. One percent of transferred materials were non-Annex 1 crops.[6]

Additional information concerning CGIAR Centers' distributions of PGRFA using the SMTA is included in Information Document 8 prepared by the Secretariat for the Sixth Session of the Governing Body. Still more information concerning international movement of PGRFA as facilitated by the CGIAR genebanks over the course of almost 25 years is available in a report submitted to the Third Session of the WG-EFMLS.[7]

III. Transfer practices and modalities concerning Center-improved materials

The CGIAR Centers transfer Center-improved materials for breeding, research and training for food and agriculture through a number of modalities. These modalities include:

i. direct transfer from genebanks, when the Center concerned has decided to make a long term conservation commitment to their improved materials, whether included or not in the genebank collection;
ii. international evaluation and performance nurseries;[8]
iii. specialized networks created for sharing, evaluating and characterizing improved materials (e.g. INGER-Asia, INGER-Africa);
iv. consortia developed to support breeding and dissemination of hybrids (e.g. IRRI's Hybrid Rice Development Consortium (HRDC) and ICRISAT's pigeon pea, pearl millet and sorghum Hybrid Parents Research Consortium (HPRC));
v. decentralized or collaborative breeding programs, primarily with national programs in developing countries; and
vi. in response to specific requests from individuals and organizations.

CGIAR Centers distribute different proportions of their improved materials through different combinations of these modalities. Details about the geographic distributions of improved materials by AfricaRice through INGER-Africa are included in Annex 2. Details concerning the geographic distribution of improved musa germplasm by Bioversity is included in Annex 3. The characterization networks facilitate the transfer of Center-improved materials at scale and account for a significant proportion of the transfers of PGRFA under Development which are summarized in Annex 1. The hybrid consortia include both private and public sector members and Centers; Centers hosting hybrid consortia report that these are the main vehicles through which they transfer materials to private sector recipients. Details about the geographical

[5] This figure is based on previous reports from the CGIAR Centers, see note 3 above, as transferor reports to the Governing Body do not include information about recipient types (e.g. genebank, public research, regional organization, private company, etc).
[6] IT/OWG-EFMLS-3/15/Inf.9, Annex 4
[7] See Galuzzi et al. 2015. 'Twenty five years of international exchanges of plant genetic resources facilitated by the CGIAR genebanks: a case study on international interdependence' submitted to the WG-EFMLS at its third meeting held Brasilia, Brazil, available at http://www.planttreaty.org/sites/default/files/Research%20Paper%209_20150528.pdf
[8] This includes including special nurseries such as key location diseases and pests nurseries, differentials, mapping populations, tilling populations, genetic stocks, cytogenetic stocks, etc.

distribution of materials through the HRDC and HPRC are included in Annexes 4 and 5. Additional information about the structure, membership and modus operandi of these consortia are included in Annex 6.

When the improved materials incorporate PGRFA from the MLS, transfers for breeding, research and training for food and agriculture are always effected using an SMTA. Some Centers (e.g., IRRI, AfricaRice) have adopted the policy of always identifying such materials, if not ready for commercialization, as PGRFA under Development and listing the incorporated materials from the MLS in annex 1 of the SMTA, whether they include additional terms and conditions or not. Other Centers (e.g. CIMMYT) have opted not to identify such materials as PGRFA under Development, because they do not want to add additional terms and conditions, and simply make the material available as PGRFA using the SMTA (without additional conditions). Some Centers have also adopted the policy of distributing CGIAR Center-improved materials that do not incorporate materials from the MLS using the SMTA. In this way they increase the volume of materials circulating subject to the benefit-sharing conditions of the SMTA.

When CGIAR Centers do transfer PGRFA under Development with additional conditions to those included in the SMTA, they may require recipients to do one or some combination of the following:

i. share characterization, evaluation, research data;
ii. acknowledge the sources of materials if/when research findings and data are published;
iii. obtain approval before passing the material to subsequent recipients;
iv. either notify, or obtain approval before seeking to register or commercialize new varieties incorporating the PGRFA under Development;
v. provide a sample of any released varieties to the MLS via the genebank;
vi. acknowledge the provider when derived material is commercialized;
vii. not commercialize the material in the form received; and
viii. acknowledge that the PGRFA under Development is the intellectual property of the Provider.

CGIAR Centers' practices concerning improved materials are governed by the ITPGRFA, and also the CGIAR Principles on the Management of Intellectual Assets (IA Principles).[9] The IA Principles explicitly reinforce the requirement that access to PGRFA within the purview of the ITPGRFA shall be facilitated in accordance with the ITPGRFA.[10] Additionally, the IA Principles contain a default requirement that all intellectual assets (including improved germplasm) generated by the CGIAR Centers must be promptly and broadly disseminated. This requirement is subject to three types of restrictions which are permitted pursuant to the IA Principles. First, Centers can make exclusivity agreements for recipients to commercialize their materials, provided the exclusivity is limited in scope (e.g. country specific), the restrictive arrangement is necessary for

[9] The IA Principles, effective as of 7 March 2012, are available at http://library.cgiar.org/bitstream/handle/10947/3755/CGIAR%20IA%20Principles.pdf?sequence=1
[10] Article 4.2 of the IA Principles

the further development or diffusion of the materials concerned and the materials continue to be available for emergency use and to public research organizations for non-commercial research and breeding.[11] Second, the acquisition of third party materials on terms which restrict the global accessibility of CGIAR Center materials into which they are incorporated is permitted provided equivalent materials are not available from alternative sources under less restrictive conditions.[12] Third, a Center may file or authorize a third party to file a patent or plant variety protection over CGIAR Center materials provided such protection is necessary for the further development or diffusion of the materials concerned.[13] In each instance the restriction is permissible only if it furthers the CGIAR Vision.[14]

In this way, the IA Principles, set explicit outer limits on the kinds of additional terms and conditions that CGIAR Centers could potentially introduce, in addition to the SMTA, when transferring PGRFA under Development. The CGIAR Centers are required to report annually to the CGIAR Consortium concerning their implementation of the IA Principles. These reports are aggregated annually into a publically available CGIAR Intellectual Asset Report providing insight into Centers' implementation of the IA Principles including management of PGRFA pursuant to the ITPGRFA.[15]

IV. Non-monetary benefit sharing

The CGIAR Centers engage in a number of activities to develop and exchange information, transfer technologies, and strengthen the capacities of research partners and beneficiaries related to the sustainable use of PGRFA, with the particular objective of improving food security and livelihoods of the rural and urban poor. These activities are integrated across farm, landscape, national, and international scales, involving farmers, land managers, and research and development agencies in both public and private sectors. A key focus of CGIAR activities is to enhance the innovative capacity of its clients to enable them to better identify their technological needs and implement the necessary intervention to facilitate the transfer of, and benefit from, appropriate technologies (including PGRFA) which meet the specific needs of the community, taking social, cultural and economic factors into consideration.

CGIAR submitted a document – *CGIAR's Services to Enhance Capacity Building, Technology Transfer, and Information Exchange Related to Plant Genetic Resources for Food and Agriculture*[16] – to the second session of the WG-EFMLS in December 2014, highlighting the Centers' work in the areas of: assessment of local research needs, creating and supporting

[11] Article 6.2 of the IA Principles
[12] Article 6.3 of the IA Principles
[13] Article 6.4 of the IA Principles
[14] As defined in the preamble of the IA Principles, the CGIAR Vision is to reduce poverty and hunger, improve human health and nutrition, and enhance ecosystem resilience through high-quality international agricultural research, partnership and leadership
[15] The 2012, 2013 and 2014 CGIAR Intellectual Asset Reports are available at http://library.cgiar.org/bitstream/handle/10947/2887/CGIAR%20Intellectual%20Asset%20(IA)%20Report%202012.pdf?sequence=1, https://library.cgiar.org/handle/10947/3404 and https://library.cgiar.org/handle/10947/3977
[16] Available at http://www.planttreaty.org/content/cgiar-services-enhance-capacity-building-technology-transfer-and-information-exchange-relate

innovation platforms, seed selection and availability, crop management decision making tools, value change management, transfer and use of genetic resources from the 'in trust' collections, and natural resources management. Given this document is still new and up-to-date, and relevant to the agenda of this Sixth Session of the Governing Body, we encourage delegates to access and read this report through the link provided below. One issue that perhaps should have received more attention in that document – and which we highlight here – concerns the Centers' ongoing participation in developing new plant breeding techniques and 'omics' related research work.

The development of new breeding techniques (e.g. genome editing, marker assisted breeding, reverse breeding, RNA induced DNA methylation, modifications around oligo-directed mutagenesis (ODM) and site directed nuclease mutagenesis that enable sequence specific changes in plant genomes) present revolutionary potential to 'unlock' the full potential of the germplasm held in CGIAR genebanks and breeding programs. Such techniques rely on sequencing and detailed phenotyping to create digital genomes that enable intelligent population design and are therefore a major plank in deciphering and connecting heritable phenotypic differences to sequence variation. Several initiatives are underway globally, and within CGIAR (e.g. Seeds of Discovery at CIMMYT), to advance this area of science and the rich genomic and phenotypic data they contribute to the creation of digital genomes will present an important modality of non-monetary benefit sharing for the MLS. They also represent a potential step in the direction of 'dematerialization of genetic resources' as highlighted by the Secretariat during the opening address of the 5th session of the Governing Body and the 1st session of the WG-EFMLS, raising potential challenges in the context of genetic resources-related regulations.
The CGIAR also contributes to non-monetary benefit sharing through participation in projects funded by the Benefit Sharing Fund. An overview of CGIAR involvement in projects funded by the Benefit Sharing Fund is available in Annex 7.

A number of studies highlight the impact achievements of CGIAR research with regard to non-monetary benefit sharing. An overview of such studies is provided in Annex 8.

V. CGIAR participation in specialized ITPGRFA working groups and other activities under the ITPGRFA framework

Representatives from IRRI, Bioversity International, and the Consortium Office participated in the First Expert Consultation on the Global Information System on Plant Genetic Resources for Food and Agriculture (Consultation) which took place in San Diego, USA, on 7-8 January 2015. CIP, CIAT and Bioversity contributed an input paper for that meeting concerning how to approach *in situ* genetic resources in the context of the Global Information System.

During the second meeting of the Ad Hoc Technical Committee on Sustainable Use of Plant Genetic Resources for Food and Agriculture on 2-3 March 2015, Bioversity participated and made a presentation concerning *in situ* conservation and on farm management of PGRFA.

Virtually all the CGIAR genebanks have participated in populating GeneSys, the global information system linking genebank accessions. GeneSys languished for many years since its inception until recently due to a combination of the genebanks obtaining secure funding through the CGIAR Research Program on Genebanks and the Global Crop Diversity Trust establishing a position to strengthen GeneSys. Today, GeneSys houses information on over 2,775,000 accessions (including and characterization/evaluation data for some accessions). This foundation is being built on by the inclusion of descriptor data. All this information, including that concerning the CGIAR hosted 'in trust' collections is publically available on the internet. This effort is still in its early stages, but should serve as a universal publically accessible warehouse for not only accessing information but also ordering accessions from one site.

Divseek is a complementary initiative, in which some of the CGIAR Centers are playing a supporting role, with Bioversity and IRRI scientists participating in the Steering Committee. Divseek was born from the need to store, collate, associate and combine in a user-friendly format all the genotypic and phenotypic information generated from genebank accessions. At present, the wealth of information from these 'omics' studies is limited by a lack of interrelationship between the data bases and users generating this data.

Under the framework of the FAO/Secretariat/Bioversity Joint Program, with support from the Government of the Netherlands, Bioversity has been supporting national level implementation of the MLS in a number of countries in Central America, East and West Africa, and South Asia. It has also co-organized, with the Secretariat of the ITPGRFA, Convention on Biological Diversity (CBD)/Nagoya Protocol, and the ABS Capacity Development Initiative, an expert workshop (2013) and multi-stakeholder workshop (2014) focusing on the mutually supportive implementation of the ITPGRFA and the Nagoya Protocol. The latter workshop brought together both the national focal point for the CBD/Nagoya Protocol and the ITPGRFA from 20 countries. A third such workshop will be co-hosted by the African Union Commission in November, bringing together national ITPGRFA and Nagoya Protocol focal points, along with national Global Environment Facility operational focal points, climate change and national planning department ministries.

ICARDA contributed to the development of the *Strategic Action Plan for the Implementation of the Benefit-Sharing Fund of the ITPGRFA in the Near East and North Africa and Beyond: 2014-2020*.[17]

As mentioned above, some Centers have been project coordinator and or project collaborators in projects supported by the Benefit-Sharing Fund. Details are provided in Annex 7.

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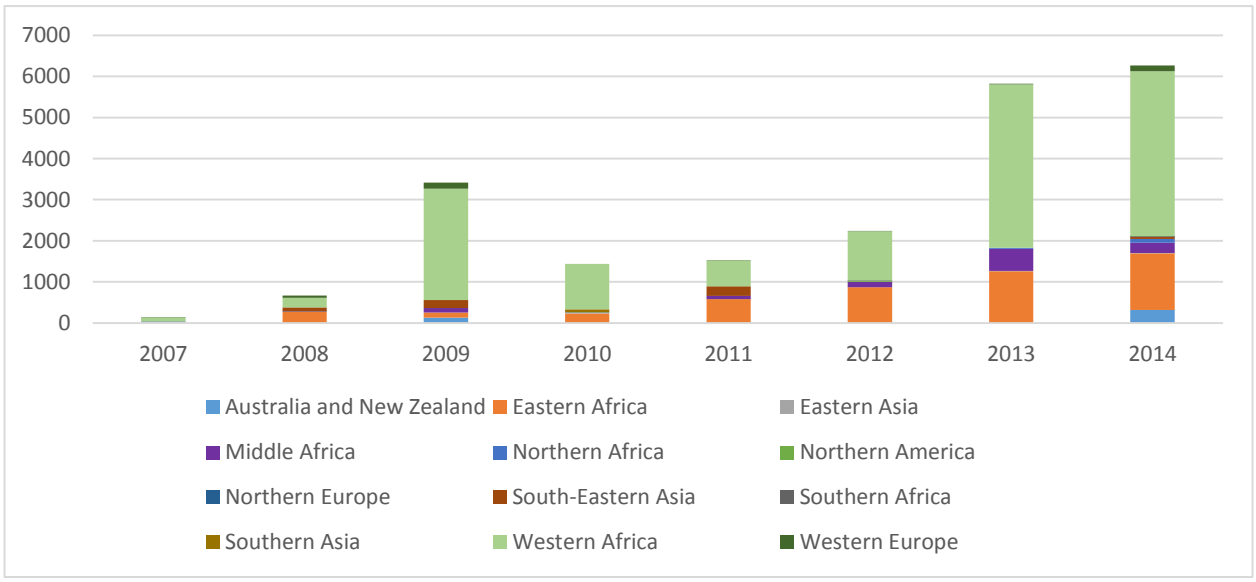
[17] Framework for an Action Plan for the Implementation of the Benefit Sharing Fund in the Near East and North Africa Region is available at http://www.planttreaty.org/sites/default/files/files/Framework%20for%20Action%20Plan-NENA%20Region-Adopted-21Sept2013.pdf

Annex 1: PGRFA distributions by CGIAR Centers (SMTA breakdowns by Center and Region)

Center	SMTAs	PGRFA	PGRFA under Development	From	To
AfricaRice	390	36,564	20,884	5 March, 2007	14 December 2014
Bioversity	323	4,692	546	24 January 2007	9 December 2014
CIAT	197	5,677	0	4 February 2013	20 December 2014
CIMMYT	14,582	1,542,618	0	January 2007	22 December 2014
CIP	476	12,695	8,006	19 January 2007	26 June 2015
ICARDA	351	67,250	0	13 February 2007	12 February 2014
ICRAF	24	104	0	14 February 2013	21 November 2014
ICRISAT	2,209	111,763	19,990	11 November 2009	31 December 2014
IITA	473	21,207	0	7 March 2007	22 December 2014
ILRI	639	7,756	0	22 February 2007	19 December 2014
IRRI	5,731	512,361	310,087	January 2007	8 June 2015
Total	25,395	2,322,687	359,513		

Annex 2: Distribution of PGRFA under Development by AfricaRice through INGER-Africa

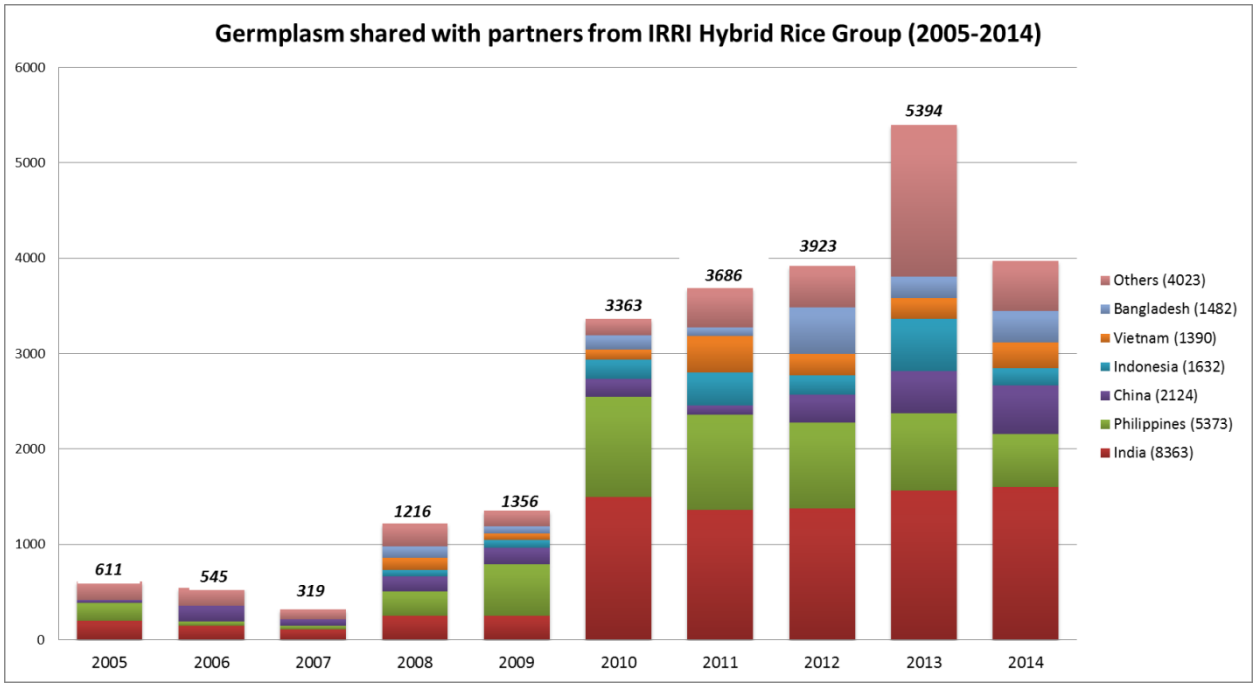


Annex 3: Distribution of PGRFA under Development by Bioversity

Countries that received PGRFA under Development from the International Musa Germplasm Transit Centre (2007-2014)	# of samples
AUS	6
AUT	17
BDI	82
BEL	10
CHN	69
CMR	14
COL	7
COM	7
CZK	16
DEU	5
DMA	22
DRC	21
ETH	3
FJI	32
FRA	31
GBR	10
GHA	3
GTM	3
HND	8
JAM	20

Countries that received PGRFA under Development from the International Musa Germplasm Transit Centre (2007-2014)	# of samples
JOR	2
JPN	2
MEX	14
MUS	19
MWI	4
NDL	15
NGA	2
NOR	1
NPL	7
PAK	4
PHL	5
PRI	13
RWA	1
SDN	4
TZA	11
USA	14
VCT	8
ZAF	34
Grand Total	**546**

Annex 4: Distribution of PGRFA under Development by IRRI through the Hybrid Rice Development Consortium (HRDC)



Annex 5: Distribution of PGRFA under Development by ICRISAT through the Hybrid Parents Research Consortium (HPRC)

Material shared with partners from ICRISAT Hybrid Parents Research Consortium (2000-2015)

Pearl millet

S.No.	Country	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total
1	**Brazil**										120	67						**187**
2	**India**	171	20	97	315	758	487	1500	403	7028	133	5024	706	6245	364	435	5500	**29186**
		171	20	97	315	758	487	1500	403	7028	253	5091	706	6245	364	435	5500	**29373**

Pigeonpea

S.No.	Country	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total
1	**Brazil**	-	-	-	-	-	-	-	-	-	74	36	106	100	-	-	-	**316**
2	**India**	-	-	-	-	-	773	106	1262	1613	136	132	211	370	182	221	81	**5087**
							773	106	1262	1613	210	168	317	470	182	221	81	**5403**

Sorghum

S.No.	Country	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total
1	Argentina			85														**85**
2	Brazil									6		100						**106**
3	Egypt			1260			67											**1327**
4	Germany					5								97				**102**
5	Haiti								4									**4**
6	India	4403	3391	8359	1185	1426	1044	1012	1570	1256	790	1061	321	351	565	131		**26865**
7	Indonesia					41												**41**
8	Israel										16	107						**123**
9	Italy	3																**3**
10	Mexico							6		18	49	42	46		14	14		**189**
11	Sudan															36		**36**
12	Turkey													3				**3**
13	UK					10												**10**
14	Uruguay								6									**6**
15	Venezuela												106					**106**
		4406	**3391**	**9704**	**1185**	**1482**	**1111**	**1018**	**1580**	**1280**	**855**	**1310**	**473**	**451**	**579**	**181**	**0**	**29006**

Annex 6: Overview of the Hybrid Rice Development Consortium (HRDC) and the Hybrid Parents Research Consortium (HPRC)

	IRRI's Hybrid Rice Development Consortium (HRDC)	ICRISAT's Hybrid Parents Research Consortium (HPRC)
Overview	• HRDC was established in 2008 to strengthen the collaboration between the public and private sectors and to enhance the dissemination of hybrid rice technology • membership has experienced steady growth with 39 initial members expanding to 76 members in 2015 • Over 24,000 germplasm samples have been transferred to partners in various geographic locations as at the end of 2014	• HPRC was established in 2000, as a partnership model for sorghum and pearl millet hybrid parents' research. Pigeonpea was included in the consortium in 2004 • Membership includes 31 seed companies (25 pearl millet, 4 sorghum and 2 pigeonpea) in the current phase (2014-2018) • Over 63,000 germplasm samples have been transferred to partners to date, principally within India
Members-hip structure	• Membership is open to any interested entity willing to accept the membership terms • Private sector members pay annual fees according to their category of membership and public sector members are encouraged to make voluntary contributions • Access to HRDC materials can occur at different stages of development for further breeding and research, final development and commercialization with each purpose is subject to different licensing conditions	• Membership is open to registered private and commercial public sector seed companies/ corporations or agencies dealing with crop improvement, hybrid seed production and marketing • The companies contribute small grants annually (for a crop consortium under a 5-year timeframe) to support core crop improvement research at ICRISAT • Membership includes access to early generation at field days
Legal and policy framework	• There are distinct membership agreements for private sector and public sector partners • Governance and operational guidance is included in publically accessible guidelines which are incorporated by reference in the membership agreements (available at http://hrdc.irri.org/images/HRDC_Guidelines/2013%20hrdc%20guidelines.pdf)	• ICRISAT-bred materials remain in the public domain and no seed company is given exclusive rights • Public research institutions have free access to the improved breeding materials developed by the consortia at all stages • There is an Advisory Committee which comprises representatives from the private sector and ICRISAT
MLS germplasm transfer and commerci-alization framework	• All germplasm transfer and commercialization activities involving IRRI germplasm or IRRI derived germplasm is explicitly acknowledged to be subject to the SMTA • Tailored agreement is used for the purpose of evaluation • Project specific MTA used for transfers of IRRI materials for research and breeding (i.e. as additional terms to the SMTA) and IRRI reserves the right to distribute IRRI PGRFA under Development to other parties • Use of IRRI PGRFA under Development in the form received for a commercial purpose requires a separate commercial license and use of material derived from IRRI PGRFA under Development for a commercial purpose requires prior notification to IRRI to allow it to determine if a commercial license is required • IRRI to be notified as to results from the use of any IRRI PGRFA under Development in research and breeding	• Transfer of materials is carried out under the SMTA and ICRISAT's Material Transfer Agreement (MTA) (i.e. as additional terms to the SMTA) • Breeding materials under development are initially available only to HPRC members in the private sector. Non-members (in the private sector) have access to parents of released hybrids (on payment of designated fees) three years after these have been provided to Consortium members • Private sector seed companies that are members of the Consortium and all public sector institutions are invited to participate in field days at ICRISAT to select the materials of their choice at any stage of their development from early generation segregating materials to near-finished hybrid parental lines

Annex 7: Overview of CGIAR involvement in projects funded by the Benefit Sharing Fund

Funding Round / Window	Center / Role / Countries involved	Project title	Countries / crops involved
Round 2 (2010) W1: Strategic Action Plans	Bioversity International (Collaborator)	Community based Biodiversity Management for Climate Change Resilience (in short, CBM for Resilience Project)	Bangladesh, Benin, Brazil, Ecuador, India, Guatemala, Malawi, Nepal, Nicaragua, Zambia, Zimbabwe Various crops
	Bioversity International (Coordinator)	Participatory and science-based formulation of a Strategic Action Plan to strengthen the conservation of plant genetic resources and their enhanced use in adapting to climate change in Mesoamerica	Various countries, Various crops
Round 2 (2010) W2: Immediate Action Projects	ICARDA (Collaborator)	On farm conservation and mining of local faba bean landraces of Morocco for biotic and abiotic stresses	Morocco Faba bean
	ICARDA (Collaborator)	On-farm conservation and mining of local durum wheat and barley landraces of Tunisia for biotic and abiotic stresses, enhanced food security and adaptation to climate change	Tunisia Wheat and barley
	ICARDA (Coordinator)	Use of genetic resources to establish a multi country program of evolutionary-participatory plant breeding	Syria, Iran, Jordan Wheat, barley, rice, maize
	Bioversity International (Collaborator)	Using rice genetic diversity to support farmers' adaptation to climate change for sustainable food production and improved livelihoods in India	India Rice
	Bioversity International (Collaborator)	Seeds for life-action with farmers in Uttar Pradesh-IGP region to enhance food security in the context of climate change	India Rice and wheat
	Bioversity International (Collaborator)	Using local durum wheat and barley diversity to support the adaptation of small-scale farmer systems to a changing climate in Ethiopia	Ethiopia Barley and wheat
Round 3 (2010); W2: Immediate action projects	CIP (Coordinator)	Exchanging and developing biodiverse potato varieties in Peru, Nepal and Bhutan	Peru, Nepal, Bhutan Potato
	CIMMYT (Coordinator)	Improving food security by enhancing wheat production and its resilience to climate change through maintaining the diversity of currently grown landraces	Turkey, Afghanistan, Iran Wheat
Round 3 (2010) W3: Co-development and transfer of technologies	ICARDA (Coordinator)	An Integrated Approach to Identify and Characterize Climate Resilient Wheat for the West Asia and North Africa Region	Jordan, Egypt, Ethiopia and Sudan Wheat
	CIMMYT (Coordinator)	Addressing the challenges of climate change for sustainable food security in Turkey, Iran and Morocco, through the creation and dissemination of an international database to promote the use of wheat genetic resources and increase genetic gains	Turkey, Iran and Morocco Wheat and wild relatives
	ICARDA (Coordinator)	In vitro culture and genomics-assisted fast track improvement of local landraces of wheat and barley in Morocco, Tunisia and Algeria for enhancing food security and adaptation to climate change	Morocco, Tunisia and Algeria Wheat and barley
	IRRI (Collaborator)	Co-Development and transfer of Rice Technologies	Indonesia, Malaysia, Lao PDR and Philippines Rice

Annex 8: Impact of the GIAR Centers work on genetic resource conservation, characterization and improvement

Crop genetic improvement is at the core of CGIAR's mandate. Germplasm improved by CGIAR has been an international public good for use by national and private sector research programs from the early years of the CGIAR Centers. The impact of CGIAR work on crop improvement has been consistently recorded from 1980, in particular for major crops like maize, wheat and rice. In 2003, Evenson and Gollin[18] completed a CGIAR system-wide study on the impact of crop improvement. More recently, Renkow and Byerlee (2010)[19] published a complete review of the impact of CGIAR research in various areas, starting with crop improvement.

Some salient points of this review were summarized by CGIAR commemorating its 40th anniversary[20]:

- As a result of crop improvement research within and beyond the CGIAR, 65 percent of the total area planted to the world's 10 most important food crops is sown to improved varieties;
- About 60 percent of the food crop area planted to improved varieties is occupied by many of the approximately 7,250 varieties resulting from CGIAR research;
- The overall annual economic benefits of CGIAR research on the three main cereals alone is about US$0.8 billion for maize, $2.5 billion for wheat and $10.8 billion for rice in Asia alone, far exceeding the investment in this work;
- For maize, wheat and rice, research on genetic improvement has made possible rates of yield growth that vary in recent years from 0.7 to 1 percent annually;
- Potato varieties originating from the CGIAR are now planted to more than 1 million hectares;
- The estimated rates of return on CGIAR's investment in all crop improvement research range from 39 percent in Latin America to more than 100 percent in Asia and in the Middle East and North Africa.

Some attempts to measure and document the impacts of the CGIAR Centers' work on plant genetic resource collection, characterization and pre-breeding have also been made. The work done by Robinson and Srinivasan (2013)[21] is a good example of this.

Efforts on impact assessment were institutionalized within CGIAR with the formation of the Impact Assessment and Evaluation Group in the late 1990s and increased with the creation of the CGIAR Standing Panel on Impact Assessment (SPIA). A large number of studies focusing on the impacts of the CGIAR Centers' genetic improvement work can be found on the SPIA/CGIAR impact website: http://impact.cgiar.org/.

Particularly relevant are the data collected by the CGIAR project entitled *Diffusion and Impact of Improved Varieties in Africa* (DIIVA). These data refer to the level of adoption and economic impact of CGIAR improved crop varieties in Sub-Saharan Africa. The express intent of this project was to update the data and analysis provided in the Evanson and Gollin studies referred to above. The project focused on 20 crops and 30 countries, together representing over 70 percent of the region's total agricultural production value.[22]

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[18] Evenson, R. E. and Gollin, D. (eds.) (2003). *Crop Variety Improvement and its Effect on Productivity: The Impact of International Agricultural Research*. CABI Publishing, Oxon and Cambridge. Available at: http://www.fao.org/docs/eims/upload/282053/9780851995496.pdf

[19] Renkow, M. and Byerlee, D. (2010) The impacts of CGIAR research: A review of recent evidence. Food Policy, Issue 5, Pages 391-402. Preview available at: http://impact.cgiar.org/sites/default/files/pdf/RenkowByerlee2010.pdf

[20] CGIAR Fund Office, Findings on the Impacts of CGIAR Research 1971–2011. Available at: http://www.cgiar.org/www-archive/www.cgiar.org/pdf/Forty-findings-CGIAR%20_March2011.pdf

[21] Robinson, J. and Srinivasan, CS. (2013). Case-studies on the impact of germplasm collection, conservation, characterization and evaluation in the CGIAR. Standing Panel on Impact Assessment, Rome. Available at http://impact.cgiar.org/publications/GCCCE-in-the-cgiar

[22] DIIVA data are available at http://www.asti.cgiar.org/diiva and a synthesis report based on the DIIVA project, "Measuring the Effectiveness of Crop Improvement Research in Sub-Saharan Africa from the Perspectives of Varietal Output, Adoption, and

Other recent studies include:

- an independent post hoc impact study in three Asian countries which estimated that the economies of Indonesia, Philippines and Vietnam have increased by $1.5 billion/year as a direct result of IRRI's contributions to breeding improved varieties for these countries;[23] and
- an analysis of public-private partnership and impact of ICRISAT's Hybrid Parents Research Consortium in several well-documented reports, including the IFPRI report "Millions Fed".[24]

Change: 20 Crops, 30 Countries, and 1150 Cultivars in Farmers' Fields," is available at: http://impact.cgiar.org/sites/default/files//pdf/ISPC_DIIVA_synthesis_report_FINAL.pdf

[23] Brennan JP and Malabayabas A (2011) International Rice Research Institute's contribution to rice varietal yield improvement in South-East Asia. ACIAR Impact Assessment Series Report No. 74. Australian Center for International Agricultural Research: Canberra. 111 pp available at http://aciar.gov.au/files/node/13941/international_rice_research_institute_s_contribu_39069.pdf

[24] See Chapter 12 by Pray and Nagarajan (2010) available at www.farmafrica.org/downloads/resources/Millions-Fed-2009.pdf. See also http://oar.icrisat.org/2661/1/public-private.pdf and http://www.icrisat.org/impacts/impact-stories/icrisat-is-hprc.pdf

Appendix 2

EXPERIENCE OF THE CENTRE FOR PACIFIC CROPS AND TREES OF THE SCERETARIAT OF THE PACIFIC COMMUNITY (SPC-CEPACT) REGARDING THE AGREEMENTS WITH THE GOVERNING BODY OF THE TREATY

Report submitted to the Sixth Session of the Governing Body of the International Treaty on Plant Genetic Resources for Food and Agriculture

October 2015

1. Introduction

At the Third Session of the Governing Body in June 2009, SPC-CePaCT formally placed the ex situ collections of the Annex 1 crops, that it holds in trust for the Pacific region, into the Multilateral System by concluding an agreement with the Governing Body under Article 15 of the Treaty. The following brief report informs the Governing Body of activities linked to the implementation of the agreement in the biennium 2014-2015.

2. Distribution

From January 2014 to the date of this report, 640 accessions (5,000 plants) of alocasia, banana, breadfruit, cassava, ginger, pineapple, potato, swamp taro, taro, vanilla, xanthosoma, sweet potato and yam, have been distributed to 16 countries, namely: American Samoa, Cook Islands, Dominica, Fiji Islands, Federated States of Micronesia (Yap and Pohnpei), Jamaica, Kiribati, Marshall Islands, New Caledonia, Palau Samoa, Solomon Islands, St Vincent and the Grenadines, Tonga, Tuvalu, and Wallis and Futuna.

3. Technical cooperation

New project of the Benefit-Sharing Fund

The project – *Strengthening the resilience of Pacific agricultural systems to climate change through enhancing access to and use of diversity* – was officially opened at the Vanuatu Agricultural Research and Training Centre (VARTC). SPC-CePaCT provides technical support and advice on projects dealing with climate change impacts and plant genetic resources for sustainable food and livelihood security, and works closely with VARTC as a technical partner on the crop improvement aspect of this project.

The project supports activities in countries that have ratified the Treaty. The objectives are to strengthen the resilience of farming communities to adapt to climate change; to improve

national capacity to adapt to biotic and abiotic stresses; and to enhance the utilisation of seeds, plantlets and other planting material at the national and community level.

Climate change is a reality and the Pacific region is very vulnerable to natural disasters. In recent years, many Pacific countries have undergone rehabilitation and recovery programmes, some of which have included SPC-CePaCT's assistance, after natural disasters: typhoons, mainly in the Northern Pacific; cyclones, like Cyclone Ian that devastated communities in the Ha'apai Island group in Tonga early this year; and floods – Solomon Islands is still trying to recover from the recent flooding that devastated agriculture and displaced a lot of communities.

Pacific Agricultural Plant Genetic Resources Network (PAPGREN)

Through PAPGREN, SPC-CePaCT is promoting several regional initiatives for information sharing, technology transfer and capacity building.

SPC-CePaCT is leveraging existing projects, funded by multiple donors to expand capacity building in areas such as crop improvement. With specific regard to CePaCT, PAPGREN countries are encouraged to share information, particularly on evaluation, and to put in place cost sharing arrangement for requests to CePaCT that fall outside the coverage of a funded project. This will help CePaCT to meet rising costs in areas such as biosecurity, shipment of PGR materials and inspections. SPC-CePaCT is also liasing with the University of the South Pacific (USP) and Samoa to establish a stand-alone laboratory for the safety duplication of SPC-CePaCT's back-up collections.

Under PAPGREN, emergency plans for the safety duplication of the Pacific coconut genebank are also being devised. Seed nuts or embryos from the current Papua New Guinea International Coconut Genebank (ICG) collection may be relocated within PNG, using accessions free of the phytoplasm that causes the Bogia complex. The collection should be re-established in Samoa and Fiji from new planting material acquired from the national collections. The members may also apply other ways of conservation and safety duplication in coconuts, such as the slow growth embryo culture procedure, bonsai plants in screen houses, on-farm conservation that is integral to regional collections, and the establishment of pollen collections for conservation and distribution.

Regarding, climate change, SPC-CePaCT is promoting a metholodogy for crop modelling, screening methods and vulnerability assessment at community level, with the opportunity for linkages to climate change programmes at national and regional levels.

Through PAPGREN, SPC-CePaCT is also active on organic agriculture, niche markets and value chain for products. It is supporting the development of best practice examples of niche organic products and traditional farming systems, which include the identification and development of resistant varieties, climate resilient varieties, open pollinated seeds, and research. This activity promotes the growing of traditional and culturally important plants, and not just those with a commercial value.

Support to breeding programs

SPC-CePaCT pooled resources from the Benefit-Sharing Fund project and from EU PAPP and IACT, to deliver regional training on breeding programs. Participants that attended the training

included focal points from the Ministries of Agriculture, non-governmental organisations, farmer groups and university representatives.

Subsistence farming and organic agriculture dominate food production in the Pacific. One aim of plant breeding is to diversify and break down the cycle of mono-cropping (normal clonal propagation); another is to broaden the genetic base. The skills required for plant breeding include a need to plan ahead, good seed storage, awareness of the constraints with money and labour, and having backups of the planting stock in different places.

Climate change and biological disasters are never ending threats, hence the need to access and produce resilient crop diversity to enable traditional farming to adapt and survive in a changing environment. To produce resilient crops more plant breeders are needed to sustain the knowledge and pass it on to future generations. The strategic approach and tools that SPC has adopted helps build local capacity in plant breeding. Involving farmers in the participatory plant breeding approaches is the new approach, whereby most widely adopted varieties are due to farmer participation in the selection and evaluation process. SPC aims to strengthen the breeding network and collaborate amongst Pacific breeders using the major staple crops such as taro, Xanthosoma, yam, cassava and sweet potato.

Two prominent plant breeders in the region, Dr Roger Malapa of Vanuatu and Moafanua Tolo Iosefa from Samoa conducted the regional training and are leaders in the network. Breeding programs have been carried out in the past. However, many plant breeders have retired and are not being replaced fast enough by a new generation, leaving a vacuum. One important aspect of the training is to train more women plant breeders. Most of the work is carried out by men, but in some countries such as Palau, women are the farmers.

The Pacific has its successful breeding program such as the SPC-led multi-donor funded taro breeding program based in Samoa and PNG together with other partners. This has resulted in taro leaf blight resistant varieties (TLB), some of which is now being exported. These varieties have been rated highly worldwide over the traditional varieties by Pacific Island countries and territories and members of the SPC-EU International Network for Edible Aroids.

The sweet potato breeding program by VARTC produced some very good hybrids that are suitable for atoll conditions and are undergoing virus indexing at SPC-CePaCT for sharing. In some countries, plant breeding guidelines have been developed for use by local farmers. For example, SPC Samoa has developed a manual for dealing with the taro leaf blight – which devastated the industry in 1993 - and shows how this staple crop recovered through 20 years of taro breeding. It also highlights the risks of taro leaf blight to other countries, and suggests ways for farmers to avoid the disease.

As follow up to the training, SPC-CePaCT is working closely with USP and national institutions to develop a curriculum for degree and post graduate courses in priority areas such as plant genetics, plant breeding and others.

Treaty membership campaign and mutual supportiveness with the Nagoya Protocol

SPC-CePaCT organized back-to-back meetings to promote Treaty membership for countries which were not yet Contracting Parties but indicated willingness to accede to the instrument, and to explore measures to promote mutual supportiveness with the ABS regime of the CBD

and its Nagoya Protocol. The multi-donor Access and Benefit Sharing Capacity Development Initiative participated in the meeting, sharing its experiences on supporting the national implementation of the Protocol. The meeting highlighted the need for coordination between agricultural focal points and ABS national focal points. SPC-CePaCT is the regional focal point for the treaty through the Ministries of Agriculture while the Secretariat of the Pacific Regional Environment Programme (SPREP) based in Samoa is the regional focal point for the Nagoya Protocol through the Ministries of Environment.

This activity resulted in three countries becoming Contracting Parties, namely Kiribati, PNG and Marshall Islands.

SPC-CePaCT continues to work closely with the FAO Treaty Secretariat in Rome and the FAO Regional Office in Samoa to facilitate consultations and meetings with non-contracting parties (Federated State of Micronesia, Niue, Nauru, Solomon Islands, Vanuatu and Tuvalu), so to promote the importance of the Treaty in harmony with the CBD-Nagoya Protocol.