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COMMISSION ON GENETIC RESOURCES FOR FOOD AND AGRICULTURE

Item 9 of the Provisional Agenda

INTERGOVERNMENTAL TECHNICAL WORKING GROUP ON PLANT GENETIC RESOURCES FOR FOOD AND AGRICULTURE

Ninth Session

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REPORT FROM THE GLOBAL CROP DIVERSITY TRUST

I. INTRODUCTION

1. Established in 2004 under international law as an independent international organization, the Global Crop Diversity Trust (Crop Trust) operates from Bonn, Germany within the framework of the International Treaty on Plant Genetic Resources for Food and Agriculture (the Treaty) in accordance with the overall policy guidance provided by its Governing Body. The Crop Trust's objective as stated in its Constitution is "to ensure the long-term conservation and availability of plant genetic resources for food and agriculture with a view to achieving global food security and sustainable agriculture".

2. The Relationship Agreement between the Crop Trust and the Governing Body of the Treaty recognizes the Crop Trust "as an essential element of the Funding Strategy of the International Treaty in relation to *ex situ* conservation and availability of plant genetic resources for food and agriculture." It notes that the Crop Trust has established an endowment with the objective of "providing a permanent source of funds to support the long-term conservation of the ex situ germplasm collections on which the world depends for food security." The Agreement refers to the call in the First Global Plan of Action for Plant Genetic Resources for Food and Agriculture (GPA) for the "development and support of a rational, efficient and sustainable system of genetic resources collections around the world".

3. The Crop Trust addresses major portions of the Treaty and the First and Second Global Plans of Action. At its 6th Session in September 2015, the Governing Body approved Resolution 8/2015, Policy Guidance to the Global Crop Diversity Trust. The key areas that the Governing Body selected for policy guidance were: scientific and technical matters; the Global Information System; resource mobilization; communication and outreach. The Crop Trust submitted a report on both institutional and programmatic developments that occurred in the biennium 2016-2017 to the 7th Session of the Governing Body of the Treaty (some activities from 2015 were included for context), addressing the above key areas. The present report to the Ninth Session of the Intergovernmental Technical Working Group on Plant Genetic Resources for Food and Agriculture (ITWG PGRFA) is a thoroughly updated version to the GB7 report.

II. SCIENTIFIC AND TECHNICAL MATTERS

A. GLOBAL CROP CONSERVATION STRATEGIES

4. In the first years of its existence, between 2004-2010, the Crop Trust gathered together groups of experts to develop a series of global crop conservation strategies, to help guide its support[1]. Following the recommendation by GB6 to continue supporting this process, the Crop Trust facilitated the development of a number of new strategies during 2016-2017:

1) Surveys were done in collaboration with United States Department of Agriculture (USDA) on the status of apple genetic resources globally, and experts held a number of workshops to discuss the results and the way forward. The strategy is now being finalized.
2) A survey was also undertaken of, and consultations held with, experts on tropical and subtropical forages, with support from the Genebanks CRP (see below). A work plan has been put in place for prioritizing forage and potential forage species for conservation and use on a global basis.
3) A strategy for coffee has been prepared in collaboration with World Coffee Research, involving a survey of collections and a number of field visits to genebanks in Africa and Latin America (including the Article 15 collection at the Centro Agronómico Tropical de Investigación y Enseñanza, CATIE). The document was finalized in mid-2017.
4) The process of developing a global conservation strategy for tea genetic resources has begun, with funding from Unilever.

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5. The global strategy for coconut, first drafted in 2008, among other things reflected the crop community's concerns about the vulnerability of the crucial Article 15 South Pacific genebank in Papua New Guinea (PNG). This large and unique field collection continues to be threatened by the spread of Bogia Coconut Syndrome from surrounding areas. With financial and technical support from the Australian Centre for International Agricultural Research (ACIAR), the Crop Trust convened a meeting at the site of the genebank in April 2015, during which 27 experts were able to assess the problem at first hand and develop a rescue plan. This plan, which involves moving the collection to a safe site in PNG, is now starting to be implemented by the Kokonas Industri Koporisin (KIK) of PNG in collaboration with the Pacific Community (SPC) and the International Coconut Genetic Resources Network (COGENT), with funding from the Government of PNG and the United Kingdom (UK) Darwin Initiative. A follow-up proposal for funding has been prepared by the Crop Trust.

6. In addition, various activities under the new Genebanks Platform build on, and update, the relevant global crop conservation strategies (e.g. gap analysis, see below). As the Governing Body recognized that the crop strategies are key guiding documents to rationalize *ex situ* conservation and to build collaboration, the Crop Trust is exploring with the Treaty Secretariat opportunities for joint fund-raising on this topic, as part of a comprehensive programme of collaboration agreed at a meeting in early 2018.

B. LONG-TERM CONSERVATION AND AVAILABILITY OF CROP DIVERSITY

At the core of the Crop Trust is the endowment fund (see below), created to provide financial security to globally important collections of crop diversity in perpetuity. To date, the Crop Trust has approved long-term grants from the endowment to nine of the CGIAR genebanks and the genebank of SPC. The funding is partially supporting the conservation and availability of 20 international collections of 17 major crops[2]. These collections serve an international role as crucial parts of a rational, efficient and effective global system, recognized under Article 15 of the Treaty. In addition, the Crop Trust funds the annual operating costs of the Svalbard Global Seed Vault (see below), another key component of the global system. Long-term grants now amount to more than USD 6 750 000 annually, for a total of USD 27 700 000 since 2006.

CGIAR-Crop Trust Partnership on Genebanks

7. In 2017, funding for the routine activities of all 11 CGIAR genebanks, complementing the long-term grants from the endowment, was secured through the continued partnership of CGIAR and the Crop Trust in the CGIAR Genebank Platform. The six-year Genebank Platform took over from the Genebanks CGIAR Research Program (CRP), which ran from 2012-2016. The Platform, managed by the Crop Trust together with the CGIAR Genebank Managers, aims to increase efficiencies and quality management, optimize conservation protocols, develop data management systems and actively promote use of the collections.

8. The genebank figures presented below are extracted from the Online Reporting Tool that has been developed by the Crop Trust to monitor progress of the genebanks towards performance targets. They reflect the situation in early 2017. Updated figures will be available by the time of the meeting of the Intergovernmental Technical Working Group.

- The CGIAR genebanks manage 757 767 accessions, including 23 682 in vitro and 29 122 held in the field. Approximately 77 percent of these are immediately available for international distribution. This continues the steady increase in the availability of accessions since the

[2] Crops supported by the Crop Trust through long-term grants are: banana/plantain, barley, bean, cassava, chickpea, edible aroids, faba bean, forages, grass pea, lentil, maize, pearl millet, rice, sorghum, sweet potato, wheat and yam.

Genebanks CRP was launched in 2012, and is particularly significant when the ongoing distribution and acquisition of samples is taken into account.

- Of the seed accessions, 56 percent is secured in safety duplication at two levels, and 88 percent of accessions of clonal crop collections is safety duplicated in the form of in vitro or cryopreserved samples.
- About 87 percent of the accessions have passport or characterization data accessible online.
- Some 91 506 germplasm samples were provided by CGIAR genebanks to users in 2015 and 111 117 in 2016; in 2015, 32 850 distinct accessions were provided to users within CGIAR and 20 010 were distributed outside CGIAR directly to advanced research institutes and universities (43 percent), NARS (32 percent) and to farmers and the private sector (25 percent) in 114 countries. In 2016, 50 058 accessions were provided to CGIAR programs and 27 265 distributed to advanced research institutes and universities (40 percent), farmers and private sector (24 percent) and NARS (22 percent) in 102 countries. These germplasm flows represent the bulk of global distributions using the SMTA.

9. During 2015-2016, the CGIAR genebanks put in place the first phase of a quality management system (QMS). The objectives were to map all genebank processes, write key Standard Operating Procedures (SOPs), develop a risk management plan, barcode all accessions and promote capacity building of staff in genebank operations and best practices. Following the Governing Body's positive appraisal of QMS in 2015, significant progress has been made in the biennium in documenting SOPs in each CGIAR genebank, a central feature of QMS. A Crop Trust QMS specialist visited Africa Rice, Bioversity, CIAT, ICARDA, ICRAF, ICRISAT, IITA and IRRI to train and work with genebank staff, who have mapped 93 and drafted 39 SOPs to date. A one-week workshop on enhanced use of information technology in genebank operations to ensure quality (focusing on barcoding and mobile devices) was held in Germany in June 2016 for the documentation managers of all 11 CGIAR genebanks.

10. Two initiatives under the Genebanks CRP focused on ways to improve the longevity of germplasm in storage and thereby the efficiency of genebank operations:

1) CIP made major strides in cryobanking on a large scale. A team of technicians has been trained and workflows developed, allowing more than 450 potato accessions to be cryopreserved per year to stringent quality standards. This will enable much more effective and cheaper safety duplication of the collection as a whole and rationalization of the field and in vitro collections.
2) IRRI seed conservation specialists toured the CGIAR genebanks to review historical viability testing data and current practices. Initial findings suggest significant improvement can be made in both seed management practices and resulting seed longevity.

11. The CRP has supported the construction of a new Africa Rice genebank in Cote d'Ivoire, a process which the Crop Trust has actively facilitated. The original plan was for the genebank building in Cotonou to be dismantled and physically moved to Bouake but, after advice from genebank experts made available through the Crop Trust, the centre decided to construct an entirely new building. Building work by a South African contractor has been completed, and the new genebank will be officially inaugurated in 2018.

12. All 11 international genebanks of CGIAR have undergone review by external experts since the beginning of the Genebanks CRP, the last being ICRISAT, ICRAF and CIP in 2015 and ICARDA in 2016. All then implemented work plans to address priority recommendations addressing different aspects of genebank management, which were completed by the end of 2016.

13. The Genebanks CRP came to an end with 2016 and underwent an external review organized by the CGIAR Independent Evaluation Arrangement (IEA), chaired by Dr Michael Jackson. The report was made available in early 2017 and gave strong endorsement to the work of the Genebanks CRP and its continuation under the Genebank Platform. In September 2016, on the recommendation of the System Management Board, the CGIAR System Council reviewed and approved a set of 11 CGIAR Research

Programs (CRPs) and three Platforms, including the Genebank Platform, which started operating in January 2017.

14. The Genebank Platform is organized into three modules: Conservation, Use and Policy. Existing operations and activities on QMS, seed longevity, cryopreservation, and strengthened data management through GRIN-Global and Genesys (see below) continue. The Platform will have new activities on: a) compliance and engagement in international plant genetic resources policy (through the Policy Module, for which governance is provided by the Article 15 centres' Directors General and CGIAR System Management Board); and b) upgrading and strengthening quality management in Germplasm Health Units. The Platform will also contribute to developing an improved measure for the coverage of diversity in collections, and addressing gaps, in partnership with NARS, as the Governing Body requested *ex situ* conservation to be inclusive beyond CGIAR collections. This process will build on, and update, the relevant global crop conservation strategies.

15. The Platform also commenced the following new activities:

1) The Policy Module represents CGIAR in meetings of the ITPGRFA and the Commission on Genetic Resources for Food and Agriculture, and holds workshops and develops papers to facilitate and promote compliance with international plant genetic resources policy.
2) CGIAR Germplasm Health Units (GHU) receives support to upgrade facilities, strengthen QMS and develop diagnostics. Together, GHU leaders are mobilizing support internationally for a "greenpass" system to facilitate the movement of germplasm through CGIAR Centres.
3) A new initiative on gap analysis is looking at ways of representing the diversity in collections and identifying gaps through expert knowledge, geographical analysis and trait assessments. Methods of identifying gaps through spatial and trait analysis were developed and tested in 2017 for beans and wheat and will be extended in 2018 for a further ten crops.
4) The Use Module is mobilizing all genebanks to develop accession datasets and germplasm sets to respond to users' expressed needs. In 2018, a major new effort is underway to incorporate accession characterization data and accession subsets with important metadata into Genesys.
5) Digital Object Identifiers (DOIs) have been applied to more than 480 000 accessions, exceeding the 50 percent target for 2017. In 2018, genebanks will support and encourage the adoption of DOIs in the use of germplasm in breeding and research. To start off, an informational video on DOIs was released to enhance awareness and adoption of DOIs as a way to standardize identification of germplasm across genebanks[3].
6) In December 2017, the Crop Trust initiated a new costing review, which will assess and benchmark the costs of routine operations in each of the 11 CGIAR genebanks.
7) The first Genebank Platform Newsletter will be sent out by end of March 2018. The Platform newsletters are scheduled to be released twice a year and will highlight feature stories from the Platform website and other interesting developments in the world of plant genetic resources and genebanks. An informational video highlighting the work of the Genebank Platform was produced to strengthen the communication and outreach efforts of the international genebanks[4].
8) The Platform also supports a joint work plan on genebank impact assessment in collaboration with Dr Melinda Smale of Michigan State University. Five early career professionals will be recruited in 2018 to help deliver a set of impact products within a six-month fellowship programme.
9) As part of the 10th anniversary of the Svalbard Global Seed Vault in February 2018, the Crop Trust formally recognized with Legacy Awards the achievements of the six CGIAR genebank managers who will be retiring imminently: Daniel Debouck (CIAT), Jean Hanson (ILRI), Ahmed Amri (ICARDA), Hari D. Upadhyaya (ICRISAT), Dave Ellis (CIP), and Ruaraidh Sackville Hamilton (IRRI).

[3] https://vimeo.com/258264024
[4] https://vimeo.com/259296364

10) In collaboration with FAO, an expert consultation workshop with experts from national, regional and international genebanks was carried out in April 2018 to facilitate the adoption and application of the FAO Genebank Standards. This meeting responds to the call from the Treaty to collaborate on scientific and technical matters, including the development of concepts for quality management regarding the conservation of, and access to, collections of PGRFA.

Crop Trust's support to regional and national genebanks

16. In 2011, the Crop Trust launched a ten-year project to support countries to collect high-priority diversity of the wild species related to 29 Annex 1 crops, to secure that diversity for the long-term, and to use it to prepare materials useful to breeding programmes around the world in adapting these crops to climate change. The project, "Adapting Agriculture to Climate Change", is funded by the Government of Norway and guided by an Advisory Group comprising subject-matter experts and representatives of CGIAR Centres, and of the Treaty Secretariat as an observer. It is being implemented in partnership with the Millennium Seed Bank (MSB) of the Royal Botanic Gardens, Kew, UK and with specialist institutes and national and international conservation and pre-breeding programmes around the world.

17. The crop wild relative (CWR) species in a total of 92 genera, including the project's target crops, have been catalogued and the database is searchable on the project's web portal as "The Harlan and de Wet Crop Wild Relative Inventory"[5]. An ecogeographic dataset has been assembled from numerous sources, representing the largest and most comprehensive resource on the spatial occurrence of the wild relatives of the world's major crops. This dataset has been analysed to identify high priority species and regions for collecting[6].

18. Following the prioritization exercise, collecting and conservation of CWRs are now being supported in national programmes in 24 countries: Armenia, Azerbaijan, Brazil, Chile, Costa Rica, Cyprus, Ecuador, Ethiopia, Georgia, Ghana, Guatemala, Italy, Kenya, Lebanon, Malaysia, Nepal, Nigeria, Pakistan, Peru, Portugal, Spain, Sudan, Uganda and Viet Nam. These partnerships include technical backstopping; as part of this, country-specific field guides have been developed by MSB to support national partners in their collecting activities, and will represent a long-term resource and an important contribution to capacity building. Some 3 500 samples have been collected and are being conserved by partners, with safety duplication at the MSB. Passport data on this material is being made available on a dedicated Genesys page[7]. Nine hundred and thirty accessions have already been distributed with SMTAs. This includes 748 accessions sent to ICARDA in 2017 to multiply and make available for pre-breeding.

19. In preparation for the pre-breeding phase of the project, crop-specific consultations were held with a wide range of breeders and other researchers. Pre-breeding projects are now underway, or have been concluded, on 19 crops, with all materials developed being made available under the Treaty. They involve a total of some 53 national and international partners in 32 countries, and all include a strong emphasis on capacity building:

[5] http://www.cwrdiversity.org/checklist/
[6] http://www.cwrdiversity.org/conservation-gaps/
[7] https://www.genesys-pgr.org/project/CWR/overview

CROP	PARTNERS	TRAITS	PERIOD
Alfalfa	Australia, Chile, China, Kazakhstan	Drought tolerance	2015 - 2018
Banana	Belgium, IITA, partner in Southeast Asia (TBD)	Drought tolerance	2016 - 2019
Barley	ICARDA, Germany, Morocco	Drought, heat and salinity tolerance, enhanced nutritional value, disease and pest resistance	2016 - 2018
Bean	Colombia, CIAT, Honduras	Heat, drought, waterlogging and root rot resistance	2016 - 2018
Carrot	Bangladesh, Pakistan, USA	Heat, salt and drought tolerance	2014 - 2017
Chickpea	ICARDA, Turkey, USA	Drought tolerance	2014 - 2017
Cowpea	Burkina Faso, Niger, Nigeria	Drought, heat	2016 - 2018
Eggplant	Cote d'Ivoire, Spain, Sri Lanka	Drought resistance, waterlogging, cold and heat tolerance, root system development	2013 - 2016
Finger millet	ICRISAT, Kenya	Drought tolerance, resistance to blast and striga, agronomic traits	2015 - 2018
Grass pea	ICARDA, India	Heat tolerance, low toxicity, broomrape (Orobanche), powdery mildew and aphid resistance	2016 - 2018
Lentil	Bangladesh, Canada, ICARDA, Nepal, Spain, Turkey	Drought tolerance, Orobanche and Stemphyllium-blight resistance	2013 - 2017
Pearl Millet	ICRISAT (India, Niger), India	Heat and terminal drought tolerance	2015 - 2018
Pigeon pea	ICRISAT, India	Salinity tolerance, Phytophthora blight and pod borer resistance, yield-related traits	2015 - 2018
Potato	Brazil, CIP, Uruguay	Heat and drought tolerance, late blight and bacterial wilt resistance	2013 - 2017
Rice	IRRI, USA	Yield-related traits under drought	2011 - 2016
Sorghum	Australia, Ethiopia, partner in West Africa (TBD)	Heat tolerance, cool soil conditions tolerance, water-use efficiency, rust, anthracnose, grain mould and downy mildew resistance	2015 - 2018
Sunflower	Canada, Uganda	Drought tolerance, early flowering, yield-related traits	2011 - 2016
Sweet potato	CIP, USA, Mozambique	Heat resistance	2014 - 2019
Wheat (durum)	India, CIMMYT, ICARDA, UK	Yield potential, heat tolerance, drought tolerance, disease resistance	2014 - 2019

20. Negotiations with the Government of Kingdom of Norway have recently been positively concluded with the signature of a new funding agreement for Phase 3 (2017-2020) of the project. With the collecting activities under Phase 2 about to be completed, Phase 3 will focus on expanding pre-breeding work and evaluating germplasm derived from CWRs. Promising pre-breeding materials incorporating desired traits are already being made available proactively to national and international breeding programs. Data from pre-breeding projects will be made available through "Germinate 3" databases, developed by our partners at the James Hutton Institute, UK. Germinate 3 offers a customizable common interface, containing information on lines, phenotypic traits and genetic markers, through a wide range of integrated visualization and analysis tools. From 2017 to 2020, the project is focusing on expanding the pre-breeding work and evaluating materials derived from CWRs. Evaluation projects are planned for up to 13 crops and will contain a significant participatory evaluation component involving smallholder farmers.

21. By the end of its final phase, the project aims to have made available under the Treaty a range of new and exciting adaptive options for agriculture that might otherwise have been lost, whilst helping protect biodiversity from irrevocable loss. The project will also have helped build capacity in developing countries and will have produced valuable information to assist complementary on-farm and *in situ* efforts.

22. A high priority has also been given during the past biennium to strengthening the documentation systems of national and regional genebanks around the world. Progress in this area is described in a separate section below, but, in summary, detailed expert assessments of documentation systems and IT infrastructure have been carried out in 29 genebanks, and funds for upgrading provided to 20 of these.

23. In addition, through the Genebanks CRP's QMS initiative, the Crop Trust organized six Genebank Operations and Advance Learning (GOAL) workshops in 2015-2016, at:

1) CIAT, Colombia (2015)
2) NBPGR, India with support from the Crawford Fund (2015)
3) IITA (2016)
4) NBPGR, India with support from the Crawford Fund (2016)
5) ICRAF, Kenya (2016)
6) MARDI, Malaysia (2017)

24. The first GOAL workshop for Latin American genebanks (Costa Rica) and the follow-up workshop for the Asia/Pacific region are planned for mid-late 2018. In addition to staff from CGIAR genebanks, a total of 50 staff from national genebanks and research institutes attended the GOAL workshops and benefitted from the learning opportunities afforded. The five GOAL workshops organized thus far offer an excellent medium for raising and aligning standards not just across the CGIAR genebanks, but also beyond, to national partners.

25. Finally, the Crop Trust is also implementing a number of emergency grants to national/regional genebanks, with:

1) the national genebank of Nepal for the collection, conservation, and restoration of native crop seeds in earthquake-affected areas (signed February 2016).
2) the Kenya Agricultural and Livestock Research Organization (KALRO) for the refurbishment and upgrading of the conservation facilities at the Genetic Resources Research Institute (GeRRI), with support from Irish Aid (signed July 2016)
3) SPC for post-cyclone recovery of the genebank, with support from AusAID, Australia (signed March 2017).

26. The Treaty Secretariat and the Crop Trust are exploring the possibility of the creation of an Emergency Fund, to be funded through voluntary contributions, to support (non-CGIAR) Article 15 collections in situations of crisis. The Fund would complement, and not duplicate, existing mechanisms

and focus primarily on the preliminary assessment of the conditions of these collections and undertaking initial steps to mobilize necessary technical and financial support.

The Svalbard Global Seed Vault

27. The Treaty cites the need "to take appropriate steps to minimize or, if possible, eliminate threats to PGRFA" (Article 5.2) and the Second Global Plan of Action has as an objective "to provide for the planned replication and safe storage of materials not currently safety duplicated". Safety duplication is recognized by the *Genebank Standards for Plant Genetic Resources for Food and Agriculture* as an essential element of good genebank management practice aimed at minimizing risk to *ex situ* collections. The Crop Trust supports the duplication under black-box conditions of the world's most important crop collections at the Svalbard Global Seed Vault, in Norway, as an ultimate safety net. A new ten-year agreement was signed in 2017 between the Crop Trust, the Government of Norway and NordGen for the management of the Svalbard Global Seed Vault.

28. Since its inception in 2008, the Vault has accepted deposits on 38 occasions, and now holds a total of 968 557 accessions from 73 institutes[8]. This includes about 579 878 accessions from the international collections managed by CGIAR centres. There have been 12 openings during the period 2015-2017, during which the following 31 institutes deposited a total of 131 576 accessions: Africa Rice Center, Agricultural Research Institute of Burundi (Burundi), Barley and Wild Plant Resources Center of the National University Corporation Okayama University (Japan), Centre for Genetic Resources (Netherlands), CIAT, CIP, CIMMYT, Crop Research Institute (Czech Republic), Genetic Resources Institute, University of Banjaluka (Bosnia and Herzegovina), ICARDA, ICRISAT, IITA, IRRI, Leibniz Institute of Plant Genetics and Crop Plant Research (Germany), Margot Forde Forage Germplasm Centre of AgResearch Ltd (New Zealand), National Bureau of Plant Genetic Resources India (India), National Institute for Agricultural Research (France), National Plant Germplasm System (USA), Natural Resources Institute Finland (Finland), Nordic Genetic Resource Center (Sweden), Parque de la Papa (Peru), Plant Gene Resources of Canada (Canada), Plant Genetic Resources Institute of the National Agricultural Research Centre (Pakistan), Scientific Practical Centre of the National Academy of Sciences of Belarus for Arable Farming (Belarus), Seed Savers Exchange (USA), Temasek Life Sciences Laboratory Limited (Singapore), Chaipattana Foundation (Thailand), James Hutton Institute (UK), The Norwegian Forest Seed Centre (Norway), World Vegetable Center, Universidad de Costa Rica (Costa Rica).

29. As part of the 10th Anniversary celebrations of the Seed Vault in February 2018, 23 genebanks made deposits, including three for the first time (Estonian Crop Research Institute, Estonia; Portuguese Bank of Plant Germplasm, Portugal; Unidad de Recursos Genéticos, INIA La Platina, Chile; Australian Pastures Genebank, Australia), bringing the total number of accessions sent to Svalbard for safety duplication under black box conditions to over one million.

30. The discrepancy between total sent to Svalbard and total currently conserved is due to the fact that ICARDA, previously located in Aleppo, Syria, became the first depositor to ask for deposited seeds to be returned. In September 2015, 38 073 accessions of wheat, barley, forage crops and other species were returned to ICARDA units in Morocco and Lebanon to help re-establish the active collections. These accessions are currently being multiplied. Over 15 000 samples have already been harvested and sub-samples returned to the Vault in February 2017. In late September 2016, ICARDA inaugurated its new genebank in Terbol, Lebanon.

C. STRENGTHENING INFORMATION SYSTEMS FOR GENEBANKS

31. Article 17.1 of the Treaty requires that Contracting Parties "cooperate to develop and strengthen a global information system to facilitate the exchange of information, based on existing information

[8] Full details of holdings may be found at: http://www.nordgen.org/sgsv/

systems, on scientific, technical and environmental matters related to plant genetic resources for food and agriculture, with the expectation that such exchange of information will contribute to the sharing of benefits by making information on plant genetic resources for food and agriculture available to all Contracting Parties." Articles 13.2(a) and 12.3(c) address requirements to make information available. Priority Activity 15 of the Second Global Plan of Action calls for "Constructing and strengthening comprehensive information system for plant genetic resources for food and agriculture."

32. CGIAR and Crop Trust are continuing to support the implementation of two initiatives to enhance the management and availability of information about PGRFA: GRIN-Global[9] and Genesys[10]. Close collaboration with the Treaty's Global Information System (GLIS) in the biennium has focussed to building synergies and complementarities within the Governing Body-approved Programme of Work. As DOIs have been established as a priority area for GLIS on the advice of the Scientific Advisory Committee (the Crop Trust has participated in all Committee meetings), the Crop Trust has facilitated the planning by both the CGIAR genebanks and Genesys to start supporting DOIs by the end of 2017. Along the same lines, the GRIN-Global community is also planning to include DOI support to the software.

GRIN GLOBAL

33. The Crop Trust partnered with the US Department of Agriculture (USDA) and Bioversity International to develop and deploy an advanced genebank data management software package, GRIN-Global. Version 1.0 was released at the end of 2011, and an improved version 1.9 replaced the original USDA's own GRIN system in November 2015. In 2016, the USDA GRIN-Global team won the Secretary of Agriculture's Award for personal and professional excellence for this accomplishment.

34. GRIN-Global has been adopted or is being evaluated by 26 genebanks, in CGIAR centres (CIMMYT, CIP, CIAT, Bioversity, IITA, Africa Rice, ICRAF, ICRISAT) and national programmes. A GRIN-Global Frontrunner position has been established at CIMMYT to provide a helpdesk service to national and international genebanks staff who wish to explore the possibility of adopting GRIN-Global. Four GRIN-Global training workshops have been organized in the same period, with an further one planned for mid-2018 in Portugal:

1) CIAT, May 2015: ten participants from CIAT and CORPOICA (Colombia).
2) INIAF (Bolivia), September 2015: 22 participants from INIAF.
3) Czech Republic, February 2016: seven CGIAR genebanks and six national genebanks: Azerbaijan, Costa Rica, Jordan, Lebanon, Portugal and Tunisia.
4) CIAT, April 2016: seven national and regional genebanks in Latin America: Bolivia, Chile, Colombia, Costa Rica, Ecuador, Mexico and Uruguay.

Genesys

35. In furtherance of Article 17.1 of the Treaty and Priority Activity 15 of the Second Global Plan of Action, CGIAR and the Crop Trust are continuing to support through the Genebank Platform the development of Genesys as a fundamental component of an effective global conservation system. Genesys has been managed by the Crop Trust since 2014, with the Treaty Secretariat participating in the advisory committee since the beginning of the initiative. Genesys now allows searching passport data across some 3.6 million active accessions held in 436 institutes. The Crop Trust works continuously with existing data providers to help them share up-to-date information about their collections and actively promotes and encourages data publication (automated when feasible) from new genebanks. Genesys now measures and presents a Passport Data Completeness Index as part of its summary views.

[9] https://www.grin-global.org/
[10] https://www.genesys-pgr.org/welcome

The interface was redesigned in 2016. Data from Genesys can be used by countries to report on GPA implementation.

36. Since late 2015, agreements to publish passport data on Genesys have been signed with the following institutes:

1) NCARE, Jordan
2) National Genebank of Tunisia (NGBT, Tunisia)
3) National Plant Genetic Resources Laboratory (NPGRL, the Philippines)
4) Malaysian Agricultural Research and Development Institute (MARDI, Malaysia)
5) Genetic Resources Research Institute (GeRRI, Kenya)
6) CATIE, Costa Rica
7) South Australian Research and Development Institute (Australia)
8) CIAT
9) Australian Pastures Genebank (Australia)
10) SPC, Fiji
11) EMBRAPA (Brazil)
12) SADC Plant Genetic Resources Centre (SPGRC)
13) Seed Savers Exchange (USA)

37. The Genesys Catalog for Phenotypic Datasets, a project funded by the Federal Republic of Germany through the Federal Office for Agriculture and Food (BLE), started in September 2016. The project provides support to four national genebanks and two international genebanks in the preparation of phenotypic (characterization and evaluation) data for publication, and in the production of SOPs for data publication. Likewise, the project developed online site where phenotypic data and its accompanying metadata will be published and associated to passport data already visible through Genesys. The partners in this project are: National Genebank of Tunisia (Tunisia), CATIE, Genetic Resources Research Institute (Kenya), Malaysian Agriculture Research and Development (Malaysia), National Plant Genetic Resources Laboratory (Philippines) and WorldVeg. A project meeting involving all partners was held in Bonn in February 2018[11].

IT assessment and upgrading

38. The Crop Trust has assisted genebanks with the analysis of their documentation needs, and, if they so wish, with the adoption of GRIN-Global and with making information on their collections available through Genesys. To that end, genebank documentation experts visited 29 national and regional genebanks between 2014 and early 2017: Azerbaijan, Bolivia, CATIE, Chile, Colombia, Cuba, Cyprus, Ecuador, Egypt, Guatemala, Jordan, Kenya, Lebanon, Mexico, Morocco, Nigeria, Peru, Philippines, Russian Federation, Rwanda, SPGRC, Sudan, SPC, Tunisia, Turkey (x2), Uganda, Viet Nam and Zambia. Based on the results of these assessments, support to strengthen capacity for data management was provided to the national and regional genebanks in the following countries: Azerbaijan, Bolivia, CATIE, Chile, Colombia, Guatemala, Kenya, Lebanon, Morocco, Nigeria, Peru, the Philippines, SPC, SPGRC, Tunisia and Viet Nam. Work with national genebanks regarding assessments and upgrading continues in 2018, with Cuba most likely to receive new equipment in mid-2018.

III. RESOURCE MOBILIZATION

General

39. The Crop Trust mission is "a cost-effective, rational, and global system for *ex situ* conservation of crop diversity supported by long-term, sustainable funding". Hence, the Crop Trust's fundraising

[11] https://www.croptrust.org/science-blog/helping-data-leave-home/

priority continues to be the development of the endowment fund, to provide predictable and reliable long-term funding to key, globally important, national and international genebanks. As a result of costing studies initiated by the Crop Trust, our objective is to provide USD 34 000 000 a year to fund national and international genebanks, as well as the running costs of the Svalbard Global Seed Vault. Availability of USD 34 000 000 annually requires an endowment fund of USD 850 000 000 (calculation based on 4 percent rate of return plus inflation).

40. Since its inception in 2004 up to the 31st of December 2017, the Crop Trust received USD 258 400 000 in donor contributions paid into the endowment, including a EUR 50 000 000 concessional loan from the KfW (German Development Bank) in 2017. In addition, the Crop Trust received a total of USD 185 700 000 in project funding and USD 21 000 000 for operational expenses.

41. The Crop Trust's fundraising efforts are overseen by both the Executive Board and the Donors' Council. The Donors' Council is comprised of governments and private sector donors who contribute at least USD 25 000 or USD 250 000, respectively. The Donors' Council meets biannually and provides financial oversight and advice to the Executive Board. The Donors' Council has traditionally been held at the Food and Agriculture Organization of the United Nations in Rome, but the first meeting of 2018 will be in Berlin, for a high-level audience, as decided by the Donor Council in 2017, while the autumn Donor Council meeting will continue to be held in Rome.

A more diversified fundraising strategy

42. As previously reported, in order for the Crop Trust endowment fund to reach its goal of USD 850 000 000, the Crop Trust will need to develop a more diversified fundraising strategy. The October 2017 Executive Board meeting endorsed the Crop Trust's efforts in diversifying its donor base – noting that the primary focus will remain on grants from governments to increase the endowment fund, while recognizing a rapidly changing funding environment which requires a diversified and innovative fundraising strategy.

43. As done in the past, the Crop Trust will continue to seek grant funding from governments for the endowment. This is still our preferred method of funding. We will increasingly hold annual bilateral discussions with major current donors to review their budgetary priorities, so as to identify early opportunities for additional support. Effort to recruit new governments as donors will continue.

44. In addition to endowment fund giving, the Crop Trust will continue to pursue time-bound funding from specific donors to cover the annual operating expenditures of individual genebanks, or for specific projects for the upgrading of individual crop collections – prioritizing collections and crops that are included under Article 15 and Annex 1 of the Treaty, as well as genebanks identified under the National Collections Strategy of the Crop Trust.

45. As the Crop Trust builds the endowment fund it is crucial to limit avoidable withdrawals. To this effect, the Crop Trust will seek support for the operational expenditures of operating the genebanks, the Crop Trust Secretariat and the Svalbard Global Seed Vault. In 2018, the Secretariat is focused on securing operational support from the European Commission (EC), while advancing the pillar assessment with the EC. The pillar assessment would allow the Crop Trust to be recognized as an international organization with access to the "indirect EC funding mechanism," which would allow for unrestricted multi-year funding.

46. Engaging the private sector is crucial to achieving our fundraising targets. As discussed in the report to the Seventh Session of the Governing Body, the Crop Trust is pursuing crop-based fundraising to foster greater engagement and investment from private sector actors. The aim of crop-based fundraising is to tie conservationists, researchers, producers, consumers and/or other users in the commodity chain of food crops into the development and implementation of a global crop-based conservation strategy. This community would co-develop and own the strategy - and thereby would hopefully be prepared to contribute to its funding. The Crop Trust is testing this approach with the

Coffee Conservation Strategy, produced jointly with World Coffee Research. The aim is to raise USD 20 000 000 of endowment funding which would allow to invest USD 5 000 000 annually to safeguard the coffee germplasm in perpetuity. The same process is currently underway for tea, with a portion of the funding provided by Unilever.

47. In 2018, the Crop Trust will develop and pilot its first crowdfunding campaign to mobilize non-traditional funding instruments to raise money for the endowment fund. The goal of crowdfunding is to raise funds via a large number of small donations. In early 2018, Friends of Global Crop Diversity (the Crop Trust's 501C3 organization in the US) opted to earmark USD 15 000 for the implementation of a Crop Trust Crowdfunding Campaign. Our initial expectation is that the Crop Trust will not be able to raise large sums for the endowment fund in this fashion, but rather to broaden the base of existing contributors and to cultivate ownership of the Crop Trust's mission at an individual level. In essence, crowdfunding approaches constitute carefully tailored communication campaigns with the aim of raising awareness and name recognition within a general audience and increasing overall donations.

48. The Crop Trust is also moving forward with innovative financing techniques, including a Food Security Bond and an Investment Sharing Facility. The Food Security Bond (FSB) is an innovative finance mechanism that offers urgent funding to national crop collections to invest in facilities, equipment, and procedures now, with funding earmarked in the future to repay the bond. The FSB allows debt securities to be sold to impact investors globally, with proceeds to be used to fund high impact projects to protect agricultural biodiversity. Similar to the successful GAVI imitative in the health sector for vaccinations, the FSB is predicated on receiving financial guarantees from governments. The Crop Trust is currently in discussion with a handful of governments who would lead this endeavour.

49. The Investment Sharing Facility mentioned in the Crop Trust's previous report is proceeding. Deutsche Asset Management has exchanged the underlying investment fund to a Global Equity Income oriented fund with sustainability features (ESG). The Crop Trust has established its German front-end charitable vehicle, the Crop Trust Foundation gGmbH as a qualified and recognized entity to issue tax deduction certificates, subject to continuing approval by the respective local tax authorities. Deutsche Asset Management and the Crop Trust continue their collaboration on the operational set-up. The prospectus language of the underlying investment fund, and the donation share class, was approved by the Luxembourg Regulator and the prospectus language was effective as of 1 January 2018. We intend to start addressing larger institutional investors first, or those who may not require or rely on the tax deductibility feature due to their set-up or jurisdiction.

IV. COMMUNICATION AND OUTREACH

50. The Crop Trust's communication and outreach efforts focus on two overarching goals:

1) raising awareness of the important role crop diversity plays for our food, now and in the future; and
2) highlighting the technical work that our partners are doing to make sure that crop diversity is indeed conserved and available.

51. These messages have received major media attention over the past biennium and introduced new champions for the cause, highlighting that, perhaps more than ever, people are recognizing the value and urgency of conserving agrobiodiversity, and are speaking up.

52. To better address a growing audience, our new website was launched in December 2017. It includes enhancements to the homepage and menus to improve the user experience. Next will come a new Media Zone, a Svalbard Global Seed Vault page, and interactive project map. All web text has been updated. We also publicly launched the new project database, which records the Crop Trust's historical technical work. We have expanded our online news page and *Crop Topics* newsletter to include two

new sections: a Science Blog, and a "Spotlight" feature. The newsletter currently reaches over 9 000 subscribers.

53. The Crop Trust is awaiting approval of Phase Two of the #CropsInColor campaign – a photographic storytelling effort aimed at raising awareness of crop diversity around the world. This phase will expand the range of crops and countries covered. Genesys and the CWR project continue to produce regular newsletters and have an active web and social media presence.

54. In January 2018, the Crop Trust appointed a Head of Communications to oversee the outreach efforts of both the Crop Trust and the Food Forever Initiative. This should enable the Crop Trust and FFI to rely less on external public relations providers and brings much-needed additional capacity to the communications team.

Recent Events

55. The Crop Trust co-hosted four Agricultural Advantage side events at the UNFCCC COP23 meeting in Bonn, Germany in November 2017, in cooperation with the CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS).

56. The Crop Trust's Global Patron, Prince Charles, hosted a special lunch featuring "Forgotten Foods" at Clarence House, the Prince's official London residence (January 2018). The Prince met a Crop Trust-led delegation of 65 people, including the President of Mauritius, Ameenah Gurib-Fakim; UK Secretary of State for Environment, Food and Rural Affairs, Michael Gove; Minister of Climate Change and Environment for the United Arab Emirates, His Excellency Thani Ahmed Al Zeyoudi; Chair of the Committee on Food Security, Mario Arvelo; former Archbishop of Canterbury, Rowan Williams; and a number of celebrity chefs, food writers and conservation campaigners.

57. The Svalbard Global Seed Vault celebrated its 10th anniversary in February 2018, with deposits of around 77,000 new seed varieties, by 23 institutions – the largest number to deposit at any one time. Over the course of several days, the Crop Trust organized a series of media visits to the Vault to mark the occasion, resulting in global media coverage (BBC, Reuters, Washington Post, AFP, Radio France Internationale and others).

58. While in Svalbard for the anniversary celebrations, the Crop Trust launched its inaugural Legacy Awards – to recognize the commitment of several genebank managers as global "gatekeepers" of crop diversity. The Legacy Awards ceremony was attended by high-level guests including Jon Georg Dale, Norwegian Minister for Agriculture and Food; Dagfinn Høybråten, Secretary General of the Nordic Council of Ministers; and Christine Dawson, Chair of the Governing Body of the International Treaty for Plant Genetic Resources for Food and Agriculture, among others.

59. The Crop Trust is currently in the final phases of a communications initiative with Oculus, the Virtual Reality arm of Facebook, to upgrade the online 3D tour of the Svalbard Global Seed Vault hosted on the Crop Trust website.

60. The Crop Trust is also developing a Crop Trust-themed version of the popular board game Catan. This should help raise awareness of the importance of crop diversity and conservation with a broader audience, and includes a fundraising mechanism, with a percentage of the sales of the game contributing to the Crop Trust Endowment Fund. Crop Trust-Catan will officially launch.

61. The Crop Trust's presence on social media continues to improve. While Facebook and Twitter continue to be our core social media channels, Instagram represents the most rapidly growing platform. The following figures are correct as of 4 March 2018:

- **Twitter** currently 6 940 followers with 907 new followers gained since October 2017, representing a 15 percent increase.

- **Facebook** currently 8 087 followers with 701 new followers gained since October 2017, representing an 8.5 percent increase.
- **Instagram** currently 6 699 followers with at least 5 699 new followers gained since October 2017, representing a 570 percent increase.

Food Forever

62. The Food Forever Initiative (FFI) continues to gain momentum, with 30 "champions" coming on board since its launch in June 2017[12]. This global endeavour advocates for concrete actions and ideas in support of implementation of the United Nations Sustainable Development Goal Target 2.5. Specifically it aims to:

1) raise awareness of the important role crop diversity plays for our food, now and in the future.
2) highlight the technical work that our partners are doing to make sure that crop diversity is conserved and available.

63. The Crop Trust is strengthening its communications efforts around FFI with a series of opinion articles and multimedia pieces planned over the course of 2018 and 2019. These will involve several of the FFI Champions, as well as chefs and other advocates for crop diversity. Some articles are planned to coincide with key UN International Days. FFI will host its annual meeting in Delaware, USA, in September 2018, bring together many of FFI Champions. It will focus discussions on the ways different actors in our food system can advocate for SDG 2.5.

64. The FFI-organized Food Biodiversity for Greater Climate Resilience side event took place at Crop Trust HQ, in parallel with the UNFCCC COP23 climate change meeting in Bonn. The presentations and subsequent panel discussion conveyed the importance of crop and livestock diversity in climate change dialogues.

65. Attendees of the Crop Trust luncheon with HRH the Prince of Wales in January were afterwards invited to the event Getting Together for the Future of Food, at the UK headquarters of Deutsche Asset Management, London. They discussed the challenges facing our food system and the role crop diversity – and biodiversity more broadly – can play in a more sustainable, resilient, healthy future. The event featured presentations from UK Member of Parliament Michael Gove, Gunhild Stordalen (EAT Foundation), Marco Ferroni (CGIAR), and Manuel Pulgar Vidal (World Wildlife Fund).

66. Also in January 2018, a group delegates including Crop Trust staff and Food Forever Champions visited the Google UK offices at St Pancras, London, to learn more about how the tech giant is attempting to sustainably source food for its staff canteens and promote healthier eating habits. Discussions followed on how delegates can support SDG 2.5 in their own work.

[12] https://www.food4ever.org