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Food and Agriculture
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The International Treaty
ON PLANT GENETIC RESOURCES
FOR FOOD AND AGRICULTURE

Item 7 of the Provisional Agenda

INTERNATIONAL TREATY ON PLANT GENETIC RESOURCES FOR FOOD AND AGRICULTURE

FIRST MEETING OF THE SCIENTIFIC ADVISORY COMMITTEE ON THE GLOBAL INFORMATION SYSTEM OF ARTICLE 17 OF THE TREATY

Rome, Italy, 24 – 25 November 2016

Partnerships, Collaborations and Capacity Development

I. INTRODUCTION

1. At its Sixth Session, the Governing Body adopted Resolution 3/2015, the Vision and the Programme of Work on the Global Information System (PoW-GLIS), and:

Request[ed] the Secretary, to conceptualize a capacity development and technology transfer opportunities for the conservation, management and use of PGRFA and associated information and knowledge. Paying special attention to the needs of developing countries on related themes to the Global Information System according to Article 17.1, subject to availability of resources, based on the recommendations of the Scientific Advisory Committee and present a draft to the next Session of the Governing Body.

2. Consequently, Objective 6 of the PoW-GLIS aims at providing capacity development and technology transfer opportunities for the conservation, management and use of PGRFA and associated information and knowledge paying special attention to the needs of developing countries and lists seven activities:

- i) *To convey and support regional meetings and scientific conferences related to new technologies and themes;*
- ii) *To provide access to training materials for capacity development;*
- iii) *To support the training of staff in areas such as taxonomy, information management and bioinformatics in collaboration with relevant partners;*
- iv) *To design mechanisms to promote training opportunities across institutions (training of trainers, match-making);*
- v) *To provide training for the genebank managers of the future;*
- vi) *To facilitate transfer of relevant technologies to developing countries;*
- vii) *To raise awareness among stakeholders in the Global Information System on traditional knowledge relevant to PGRFA in accordance with the Treaty's provisions and in harmony with the Convention on Biological Diversity*

3. This document has been prepared in conformance to this request. It provides information and identifies some potential partnerships and joint opportunities to further develop capacity development activities with a focus on developing countries. The document also presents or introduces some issues for the consideration and advice of the Committee.

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II. THEMES, TOOLS AND TARGET BENEFICIARIES

A) Themes

4. The adopted PoW-GLIS requires the Secretariat to focus mainly on themes that are relevant to developing countries. These are some of the initial themes identified through the PoW-GLIS:

- Registration in the GLIS of material available in the Multilateral System;
- Reporting obligations under Multilateral System of the Treaty;
- Connection of national inventory (NI) with GLIS;
- Development and adoption of data analysis and quality tools;
- Improvement of environmental and geospatial data;
- Review of data sharing and use policies and protocols;
- Development and adoption of data standards for *ex situ*, *in situ* and on-farm material;
- Linking genomics, phenomics and other omics datasets;
- Management of PGRFA data in genebanks and within breeding pools, including legal rights;
- Promotion of taxonomic tools, including PGRFA ontologies and controlled vocabularies; and
- Documentation and sharing of traditional knowledge.

5. The Committee is invited to recommend further themes to be included in the above list.

B) Promotion of tools, standards and applications

6. In recent years, national and regional organizations have developed and made available to others an increasing number of tools and applications in the area of information management and scientific analysis. Nevertheless, many of these tools continue to be unknown by a majority of potential users despite their usefulness and even when the tools are known, the rate of adoption continues to be rather low. Various objectives encourage the promotion of such tools and standards and, in particular, Objective 6 refers to them from the training perspective.

7. It is well acknowledged that developing country Contracting Parties and others can take advantage of standards, tools and applications developed by other stakeholders. Links between regional and international organizations, the private seed sector, and non-governmental organizations will facilitate the indexing and cataloguing of such tools, but also the promotion and support for the adoption of existing tools and applications, for example:

- i) Genebank and breeding management tools – GRIN-Global management system¹, the Breeding Management System (BMS) of the Integrated Breeding Platform (IBP)²; Rice4Breeding (Rice for Breeding)³;
- ii) Data analysis – CAPFITOGEN tools⁴, FIGS⁵, etc.;
Taxonomy tools – GRIN-Tax⁶;

¹ See <http://www.grin-global.org/>

² See <https://www.integratedbreeding.net/15/breeding-management-system>

³ Available at: <https://breeding4rice.irri.org/>

⁴ Available at: <http://www.fao.org/plant-treaty/initiatives/capfitogen/tools-capfitogen/en/>

⁵ 'FIGS' tool – the Focused Identification of Germplasm Strategy, available at: <https://www.icarda.org/tools/figs>

⁶ See <http://www.ars-grin.gov/~sbmljw/johnindex.html>

C) Key stakeholders

8. The surveys undertaken so far in the context of the Global Information System have also helped to identify several stakeholders willing to participate and contribute to and/or benefit from the full implementation of the PoW-GLIS such as bioinformaticians, breeders, civil society practitioners, data curators, extension workers, farmers, indigenous and local communities, lawyers, policy makers, researchers, Treaty's National Focal Points and other stakeholders, including entrepreneurs and small-scale enterprises.

III. IDENTIFICATION OF CAPACITY DEVELOPMENT OPPORTUNITIES

9. Significant imbalances exist among regions and even among countries within the same regions concerning their ability to access, manage and disseminate information. Many countries still lack or do not have fully implemented digitalized and online national inventories, strategies and action plans including information management activities related to PGRFA. Thus, they lack integrated and functional national information systems on PGRFA. This situation is exacerbated by the fact that, at the national and institutional levels, data management and documentation activities are often given a low priority in the allocation of staff and funding.

10. Human resource capacity is still far from adequate at virtually all levels and disciplines related to PGRFA conservation and use. In many countries, genebank staff lack adequate training to collect, classify, conserve, regenerate, characterize, document and distribute PGRFA. According to the Second Global Plan of Action on PGRFA, this lack of capacity poses a serious threat to valuable PGRFA collections. Limited capacity in most developing countries on several themes, i.e. plant taxonomy and pre-breeding, severely limits the efficient sustainable use of PGRFA. Going further, on-farm extension services, and non-governmental organizations, seed production and technology activities often lack the qualified staff to interact and deliver appropriate training to farmers⁷.

11. In implementing the PoW-GLIS, the Secretariat will explore a number of key partnerships and collaborations, particularly taking into account the lack of resources and the need to identify regional and global synergies.

12. In addition to the interactions with other Treaty programmes and systems, the Treaty Secretariat will take into account existing capacity and offers for collaboration in Contracting Parties, in International Organizations, with Initiatives and Projects.

A) Synergies with other Treaty Programs and Systems

13. Since 2012, the Treaty Secretariat has provided capacity building through the Programme for the "Strengthening of Capabilities in National Plant Genetic Resources Programmes (CAPFITOGEN)⁸", thanks to the generous financial support of the Spanish Government and the collaboration with the National Plant Genetic Resources Centre of the Spanish National Institute for Agriculture and Food Research and Technology (CRF-INIA), the Polytechnic University of Madrid, the King Juan Carlos University, the National University of Colombia and the University of Santa Catarina in Brazil.

14. The Programme produced a set of 15 PGRFA data management tools adapted to the needs of the national programmes in Latin America and organized regional and national training workshops and other support activities. The Programme has contributed to improving analytical skills and capacity of 300 technical staff from 33 countries working in the area of conservation and sustainable use of PGRFA. Despite the first phase of the Programme having been completed,

⁷ See the documentation and the Report of the Third meeting of the Ad hoc Technical Committee on Sustainable Use (ACSU-3) at <http://www.fao.org/plant-treaty/meetings/meetings-detail/en/c/414990/>

⁸ Available at: <http://www.fao.org/plant-treaty/initiatives/capfitogen/en/>

the tools are available and the Secretariat continues to receive requests for training workshops in other regions, particularly from Near East, Africa and Asia.

15. During the present biennium, the experts involved in the implementation of the Programme of Work on Sustainable Use⁹, indicated potential synergies between the implementation of GLIS and the toolbox on sustainable use. This process could also eventually facilitate some tasks related to the publication of successful technologies and practices.

16. There are clear synergies with the operations of the Multilateral System of Access and Benefit-sharing of the Treaty. For instance, the registration of PGRFA in GLIS will serve as a notification for other users to know that the material is included in the Multilateral System, as part of the Online Notification Facility. The provider will also be able to easily identify the material in the list of Annex 1 of the Standard Material Transfer Agreement (SMTA), thus facilitating the reporting obligations. Accordingly, Easy-SMTA¹⁰ will accept DOIs during both the compilation and the reporting of transfers.

B) Collaboration with Contracting Parties

17. The Benefit-sharing Fund (BSF), under the 3rd call for proposals, is supporting training and capacity building projects on germplasm management and participatory breeding, molecular markers, germplasm management, classical molecular and bioinformatics tools for breeding, and genetic resources data management systems.

18. In this context, the Indonesian Center for Agricultural Biotechnology and Genetic Resources Research and Development (ICABIOGRAD) is coordinating a multi-country project¹¹ with the objective of testing the applications of DOIs to rice and linking with operations under the Multilateral System (MLS) and GLIS.

19. The Committee is invited to advise on any national or regional relevant activities to explore future collaboration.

C) Collaboration with International Organizations, Initiatives, and Projects

20. The collaboration with the Convention on Biological Diversity (CBD) and the Access and Benefit-sharing Clearing House (ABSCH)¹² of the Nagoya Protocol was recognised at the Expert Consultation on the Global Information System in 2015. Subsequently, the Secretariat has identified a possible mechanism to exchange online data, in particular through the publication of the list of national focal points of the Treaty in the corresponding section of the ABSCH. The Secretariat has also commissioned a background study paper for this meeting of the Committee which, in the context of transparency of rights and obligations, examines ABS developments occurring in the CBD and the Nagoya Protocol.¹³

21. The International Research Centres of the Consultative Group on International Agricultural Research (CGIAR) have made a strong commitment to Open Access and Open Data (OA-OD) in recent years and do have an Open Access and Data Management Policy since 2013¹⁴. Under the policy and its implementing guidelines, a core metadata schema (“CG Core”) to present

⁹ See footnote 7.

¹⁰ Available at: <https://mls.planttreaty.org/itt/>

¹¹ BSF-funded project W3B-PR-29-Indonesia “[Multi-country construction of a test platform for the development and allocation of globally unique identifiers for rice germplasm](#)”.

¹² Available at: <https://absch.cbd.int/>

¹³ See Background Study Paper n. 10, available at <http://www.fao.org/3/a-bq620e.pdf>

¹⁴ Available at: <http://library.cgiar.org/bitstream/handle/10947/2875/CGIAR%20OA%20Policy%20-%20October%202013%20-%20Approved%20by%20Consortium%20Board.pdf?sequence=1>

and share metadata in consistent ways across the network of CGIAR repositories is under development.¹⁵

22. The collaboration with some centres on different topics and at different levels has also evolved recently. Since 2015, the Secretariat concluded a partnership agreement with the International Rice Research Institute (IRRI) to increase the expertise of the Secretariat on PGRFA documentation and for the centre to participate in the testing phases of new applications and tools relevant to both the PoW-GLIS and the Multilateral System. IRRI already announced the inclusion of 3000 rice genomes¹⁶ in GLIS in October 2015.

23. IRRI is also developing a new breeding information management system called “Breeding4Rice”¹⁷ which is based on the principle that a properly designed information management system is a fundamental component of any breeding program. The International Treaty, through the Benefit-sharing Fund, is funding a senior specialist to link the information that it will produce with GLIS through the International Rice Information System (IRIS)¹⁸.

24. The evolution of the classic Germplasm Resource Information Network (GRIN) software into a new scalable and flexible system called GRIN-Global has been supported by the Global Crop Diversity Trust, the United States Department of Agriculture (USDA) and Bioversity International. The International Maize and Wheat Improvement Center (CIMMYT) pioneered the adoption of GRIN-Global¹⁹ as the germplasm resource information management system. It has accumulated extensive experience in the adoption of the system and provides the GRIN-Global Help Desk support.

25. A number of organizations have also adopted it,²⁰ while some others are evaluating it. The GRIN-Global system is still evolving as developers review the source code and make modifications to share with the global community, thus appropriate synergies and links with GLIS will also evolve. In this context, the Documentation and Information Working Group of the European Cooperative Programme for Plant Genetic Resources (ECPGR) is planning to hold a workshop in 2017 to help genebanks to get familiar with GRIN-Global.

26. The project BEAN_ADAPT²¹ is a three-year project funded through the 2nd “Europe-USA Call strengthening transnational research in the Molecular Plant Sciences (ERA-CAPS)”. The main aim of this project is to dissect out the genetic basis and phenotypic consequences of the adaptation to new environments of the common bean (*Phaseolus vulgaris* L.) and its sister species, the runner bean (*Phaseolus coccineus* L.). The project taps into a large collection (11,500 accessions of both species) from three major genebanks and it benefits from the collaboration of an international consortium of partners based in Italy, Germany, Ethiopia, USA and Colombia. It will study the introduction of those PGRFA, from their respective centers of domestication in the Americas, and their expansion throughout Europe. The main deliverables will be computed haplotypes; signature of selection for adaptation; genome annotations; candidate for validation and final list of validated candidates. The Treaty has collaborated with it through two PoWs – the Sustainable Use of PGRFA and GLIS. This is a key project to implement information interoperability with GLIS.

¹⁵ See Background Study Paper n.10, footnote n. 64.

¹⁶ See <http://iric.irri.org/resources/3000-genomes-project>

¹⁷ Available at: <https://breeding4rice.irri.org/>

¹⁸ See <http://irri.org/tools-and-databases/international-rice-information-system>

¹⁹ See <http://www.grin-global.org/>

²⁰ As of February 2016: Bolivia (INIAF), Chile (INIA), CIMMYT (CGIAR), Czech Republic, (VURV), Portugal (INIAV) and USDA-NPGS had adopted it. See <http://www.grin-global.org/>

²¹ Available at: <https://pag.confex.com/pag/xxiv/webprogram/Paper18833.html>

27. The European research alliance project, G2P-SOL – “Linking genetic resources, genomes, and phenotypes of Solanaceous crops” funded by the European Union, set the goal to bring together the major European and International repositories of germplasm with public and private institutions active in genomics, phenotyping and breeding in potato, tomato, pepper and eggplant. This will be done using common ontology terms and allowing easy interfacing with existing platforms for germplasm cataloguing including GLIS. The collaboration with G2P-SOL could further facilitate the on-line availability of germplasm information, including sequencing data, through the assignment of Digital Object Identifiers.
28. The Secretariat of the International Treaty has continued supporting the development of Genesys, an online portal to accession-level passport information, through its participation in the Advisory Committee. Genesys has been managed directly by the Global Crop Diversity Trust since 2014. It allows searching across some 3.6 million active accessions held in 481 collections. Genesys has on average 200 visits per day. With the adoption of DOIs, Genesys will benefit from a robust permanent and standardised linking system and the GLIs will also benefit from an *ex situ* database with millions of records.
29. In the area of training relevant to GLIS, the Crop Trust has also supported the organization of several workshops to support Genebank Operations and Advanced Learning (GOAL) and it has been invited by the Secretariat of the International Treaty to participate in the first meeting of the Scientific Advisory Committee.
30. Regarding DivSeek initiative,²² the Governing Body, at its Sixth Session, requested the Secretariat to continue its participation in its Joint Facilitation Unit (JFU).²³ It also invited DivSeek stakeholders to report on the implications of the technologies underlying the DivSeek initiative for the objectives of the Treaty, and to compile a synthesis report for its Seventh Session in 2017.
31. At its annual Assembly in June 2016, DivSeek discontinued the JFU, and identified “potential synergies with the Programme of Work on the Global Information System of the International Treaty on Plant Genetic Resources for Food and Agriculture”. Consequently, and following the guidance and advice received from the Bureau of the Treaty, the Secretariat is exploring the scope of a new partnership with DivSeek.
32. In this context, the Secretariat will receive the report from a conference being organized in Bellagio, Italy, at the end of November (28 November -2 December). The Conference aims to advance the global conversation about the role of PGR in agri-food systems and the policies governing their use. The Secretariat is also exploring additional methods of consultation with DivSeek stakeholders, based on those initial findings and interactions.
33. The Global Information Facility (GBIF)²⁴ operates through a network of nodes, coordinating the biodiversity information facilities of participant countries and organizations, collaborating with each other and the Secretariat to share skills, experiences and technical capacity. GBIF has developed a range of activities and programmes to enhance the capacity training and knowledge-sharing among peers to make the most of the existing resources. It also supports different classes of datasets and ensures that each metadata dataset is associated with a unique Digital Object Identifier (DOI) to streamline data users’ citation of these resources. It includes checklists, and occurrence-only data; sampling event data.
34. The Treaty Secretariat is going through the formalization of the collaboration with Bioversity International acting on behalf of ECPGR²⁵ through a Memorandum of Understanding

²² Available at: <http://www.divseek.org/mission-and-goals/>

²³ Resolution 3/2015, available at: <http://www.fao.org/3/a-bl140e.pdf>

²⁴ Available at: <http://www.gbif.org/publishing-data/summary>

²⁵ Available at: <http://www.ecpgr.cgiar.org/>

mainly supporting the implementation of the PoW-GLIS. ECPGR is a collaborative programme among 33 European countries aiming at ensuring the long-term conservation and facilitating the access to and utilization of *ex situ* and *in situ* PGRFA in Europe. The main role of ECPGR is helping data providers to provide accurate and reliable high-quality data. In particular, ECPGR can support its members by passing information and exchanging experiences on how to notify the availability of material in the Multilateral System and on how to register material in GLIS through the adoption of DOIs. The use of these identifiers will allow precise linkages between genotypic data and specific accessions stored in genebanks.

35. The French Agricultural Research Centre for International Development (CIRAD)²⁶ has put in place a new strategy that highlights the importance to upgrade the current practices related to the management of PGR and related information within the international access and benefit-sharing context to facilitate compliance with both the Nagoya Protocol and the International Treaty. CIRAD and the Secretariat of the International Treaty already successfully collaborated in 2008 for the development of Gene-IT.²⁷ In the area of information management related to the Treaty, CIRAD is planning to develop a legal tool to generate material transfer agreements, including the SMTAs, which would benefit from interface with both Easy-SMTA and the GLIS.

36. The Integrated Breeding Platform (IBP),²⁸ hosted by CYVERSE, is a software and service provider developed to help plant breeders accelerate the creation and delivery of new crop varieties in today's context. Besides the Breeding Management System (BMS) dedicated to breeding programmes, it also maintains a network of breeding service providers, links to products and information for over ten crops, training materials, and activities for integrating sound breeding practices.

37. Collaborations with academic institutions in developed and developing countries could further support the implementation of GLIS. In this regard, the Secretariat has initiated some preliminary discussions for the promotion of existing eLearning resources on breeding and PGRFA documentation.

IV. RESOURCE MOBILIZATION AND CAPACITY BUILDING

38. The Treaty Secretariat has also been discussing with the Federal Ministry of Food and Agriculture (BMEL) of Germany on a project proposal to support selected objectives and activities of the PoW-GLIS with three main goals:²⁹

- 1) the development of a set of core services and activities to connect existing and future PGRFA information systems and datasets (Tools and Services);
- 2) the development and promotion of standards for germplasm description and documentation (DOIs Standards);
- 3) the organization of training activities in two regions through a capacity development component to improve both individual and organizational capacities to document and exchange non-confidential information associated to the germplasm in the Multilateral System of the International Treaty and other useful information for plant breeders, farmers and researchers (Capacity development).

39. The capacity building activities under the proposed project will adopt the training of trainers modality and will be implemented in two regions (SADC and Near East) through the development of collaboration with national and regional organizations as described in *Figure 1*.

²⁶ See <http://www.cirad.fr/en>

²⁷ A stand-alone software for users to draft Standard Material Transfer Agreements (SMTAs).

²⁸ Available at: <https://www.integratedbreeding.net/2/about-us>

²⁹ The title of the project proposal is "Implementation of the pilot phase of the Global Information System on Plant Genetic Resources of Article 17 of the ITPGRFA". At the time of drafting of this document, the project is in the final consultation and approval phase.

40. The Secretariat has elaborated a draft list of criteria for the selection of those partnerships and would like to receive additional guidance from the Committee:

- i) Technical expertise on information management related to PGRFA;
- ii) Record of participation and role in crop and regional networks for the documentation and exchange of scientific information;
- iii) Number and type of PGRFA documentation projects;
- iv) Extent of experience in linking *in situ* and *ex situ* projects and initiatives;

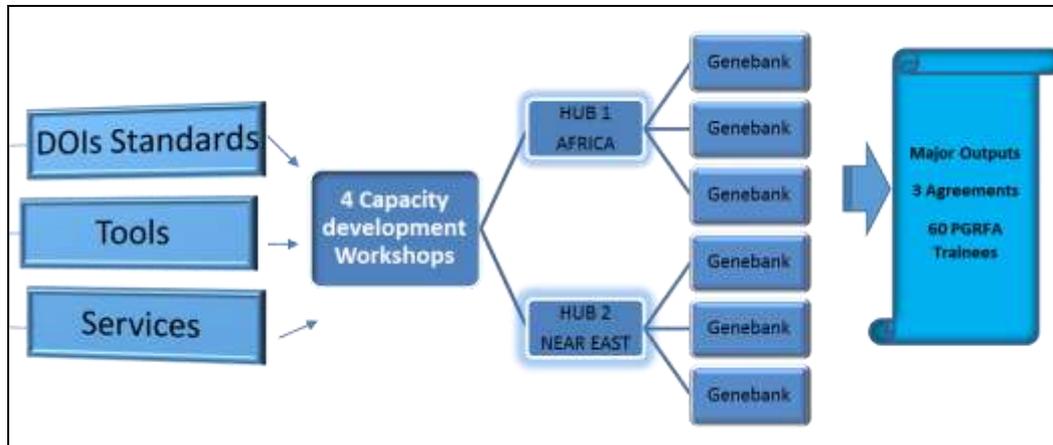


Figure 1. Main work packages and capacity building.

41. The Committee is invited to advise the Secretariat on any potential funding opportunities to develop technical collaboration and to support countries, particularly developing country Contracting Parties, in the implementation of the GLIS.

V. ADVICE SOUGHT

42. The Committee is invited to take into consideration the information presented in this document and advise on:

- a) other themes of relevance for the development of partnerships and collaborations, including for training and capacity development for developing country contracting Parties under the Programme of Work;
- b) the types of standards and tools that could be most useful for further promotion;
- c) other opportunities for collaboration with existing training programs;
- d) the selection criteria for the regional PGRFA information hubs;
- e) the identification of further funding opportunities for the implementation of GLIS;
- f) any other relevant element for the development of partnerships, collaborations for the effective implementation of the Programme of Work.