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United Nations**



The International Treaty
ON PLANT GENETIC RESOURCES
FOR FOOD AND AGRICULTURE

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SEVENTH SESSION OF THE GOVERNING BODY

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Implementation of the Global Information System

Executive Summary

This document provides an update on implementation of the Programme of Work on the Global Information System (Programme of Work on GLIS), including the development and adoption of Digital Object Identifiers (DOIs), the GLIS Portal, training activities at regional and national levels, mobilization of resources and the strengthening of partnerships and collaborations. The document also reflects the advice provided by the Scientific Advisory Committee on the implementation of Global Information System during the 2018-19 biennium.

Guidance Sought

The Governing Body is invited to take note of this progress report and provide any guidance it considers appropriate for the further implementation of Programme of Work on GLIS and related activities, taking into account the elements for a possible Resolution provided in the *Appendix* to this document for its consideration.



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I. Introduction

1. This document summarizes the major activities undertaken under the Programme of Work on the Global Information System (Programme of Work on GLIS), as well as related developments since the Sixth Session of the Governing Body.

2. The Global Information System (GLIS) on Plant Genetic Resources for Food and Agriculture (PGRFA) was established by Article 17 of the International Treaty, which stipulates that:

The Contracting Parties shall cooperate to develop and strengthen a global information system to facilitate the exchange of information [...] on scientific, technical and environmental matters related to plant genetic resources for food and agriculture.

3. At its Sixth Session, the Governing Body adopted Resolution 3/2015 containing a Vision and a Programme of Work for 2016-2022, structured into seven objectives. It also decided to establish the Scientific Advisory Committee (the Committee) on Article 17, with the terms of reference contained in Annex 3 to the Resolution. The Committee met twice during the biennium, and the reports of both meetings have been made available for this Session.¹

4. This document contains the report and updates on the development and adoption of Digital Object Identifiers (DOIs), the current status of development of the GLIS Portal, the training activities undertaken with gene banks, national focal points and plant breeders, efforts devoted to the mobilization of resources, and the strengthening of key partnerships and development of new collaborations. The document also provides information on the relationship with the DivSeek Initiative.

5. The *Appendix* contains a elements of a possible Resolution for consideration by the Governing Body on implementation of GLIS for the 2018-2019 biennium.

II. Update on operations of the Programme of Work on the Global Information System (Programme of Work on GLIS)

A. Update on the Digital Object Identifiers for PGRFA

6. The permanent and accurate identification of PGRFA available in the Multilateral System of the Treaty was a key consideration when the Governing Body adopted the Programme of Work at its Sixth Session, requesting the promotion of Digital Object Identifiers (DOIs) for PGRFA. The use of DOIs to facilitate the exchange of information obtained during research and development of material becomes valuable and reusable when there is no doubt as to the identity of the material being studied. In the past, this critical requirement had been addressed at local level by the community of users for many years, but no general consensus had been reached on which of the many Permanent Unique Identifier (PUID) schemes available should be adopted.

7. Objective 3 of the Programme of Work on GLIS calls for the promotion and facilitation of interoperability among existing information systems by providing clear guidelines, technical standards and appropriate tools to support their operations in accordance with the principles and rules of the International Treaty. In particular, the Governing Body requested the Secretariat to develop a common standard for PUIDs applied to PGRFA, and an operational mechanism to promote the adoption of DOIs.

¹ See documents IT/GB-7/17/Inf. 6, available at <http://www.fao.org/3/a-BT104e.pdf>, and IT/GB-7/17/Inf. 7, available at <http://www.fao.org/3/a-BT104e.pdf>

8. DOIs help with the permanent and accurate identification of PGRFA available in the Multilateral System. Use of DOIs also facilitates the exchange of information obtained during research and development of the material, so that it can add value to existing datasets and be reusable.
9. At its first meeting, the Scientific Advisory Committee reviewed the documents containing the DOI Descriptors and the DOI Guidelines and recommended that users continue to be involved in testing and improving the guidelines. Following that advice, the Secretariat incorporated some of the immediate feedback received from members of the Committee and circulated the revised version of the guidelines for comments.
10. Additional feedback was also gathered from other stakeholders, including plant breeders and genebank staff. The Secretariat compiled and analysed all the comments, and subsequently published the DOI Guidelines, including the comments received, based on the advice received from the Scientific Advisory Committee at its second meeting.²
11. Furthermore, the Scientific Advisory Committee agreed that although voluntary, the use of DOI Descriptors and the DOI Guidelines is a central element of GLIS for linking existing information systems. It concluded that the development of the DOI system should continue, with a view to making it available to users by September 2017. It also agreed that the Secretariat should continue developing additional use case scenarios on the application of DOIs, in particular with plant breeders, including those from universities and the private sector. The Committee indicated that broader consultation was desirable with the on-farm and *in situ* conservation communities, and with the broader genetic resources for food and agriculture community.
12. The Committee took note of users' views that the DOI system could be adopted for all plant genetic resources, and for genetic resources for food and agriculture more generally. The Committee also acknowledged that many holders of PGRFA were not able to provide access to their PGRFA related information through any existing information system.

B. Progress in the development of the GLIS Portal

13. The web-based Platform and the Connection Toolkit are the foundation for the GLIS System to facilitate the connection of third-party systems and data stores, and to deliver online services. The Platform, which is the core deliverable of the first objective of the Programme of Work on GLIS, is conceived as a global entry point to information and knowledge, and as a connector of datasets from distributed systems.
14. During the first semester of 2017, the Secretariat collaborated with the Information Technology Division of FAO (CIO) to develop the first module of the Platform, which allows the registration of DOIs. The collaboration also included the development of the Connection Toolkit.³
15. In March 2017, a first version of the Toolkit was successfully deployed at the International Rice Research Institute (IRRI), in the framework of the Indonesia Benefit-sharing Fund Project, supporting registration of PGRFA in GLIS, and providing valuable information to improve transactions between the web-based Platform and third-party systems. In addition to the Toolkit, which offers an XML-based data integration protocol, GLIS also facilitates the registration of PGRFA

² Data required for the assignation of Digital Object Identifiers in the Global Information System (DOI Descriptors); and Guidelines for the optimal use of Digital Object Identifiers as permanent unique identifiers for Plant Genetic Resources for Food and Agriculture (DOI Guidelines). Both documents are available at: <http://www.fao.org/plant-treaty/areas-of-work/global-information-system/en/>

³ The GLIS Connection Toolkit (or GLIS Data Integration Toolkit) is a lightweight, easily deployable application facilitating the adoption of the GLIS XML Integration Protocol by participating institutions that are unable or unwilling to develop their own integration solution.

material through other methods, including Excel tables and manual data entry. Interested users are also welcomed to develop their own solution, implementing the XML-based protocol.

16. At the time of preparing this document, the DOI registration module of the Platform has been completed and tested against security vulnerabilities, according to industry standard practices applied by FAO to systems hosted within its server infrastructure. Terms of use for the DOI service have also been prepared based on guidance received from the Scientific Advisory Committee. The public release of the web-based Platform's first module is scheduled for September 2017. The Secretariat is also collaborating with the Global Crop Diversity Trust for the development of a Genesys GLIS client, a library that can be deployed in several programming languages.

17. For the second semester of 2017, the Secretariat has planned the further development of the GLIS Platform, with improvements to be made to the workflow following consultation with stakeholders. One of the most important GLIS value-added services, identified during consultations undertaken during the biennium, is the modelling of relationships among PGRFA. Most stakeholders have requested the web interface to offer filtering and visualization options for the relationships among PGRFA.⁴

18. For the 2018-2019 biennium, the Scientific Advisory Committee recommended the Secretariat to interact with a broad range of user categories, in order to define user-oriented entry points in the Portal and to facilitate the incorporation of DOIs into the workflow of existing databases and systems.

C. Advocacy, training and capacity-strengthening

19. The development and implementation of GLIS is a complex task that requires communication and interaction with a large number of organizations, initiatives and projects dealing with the conservation and use of plant genetic resources, but also in the field of data management and informatics, to promote the adoption of DOIs and facilitate staff training.

20. With the support of FAO's Partnerships, Advocacy and Capacity Development Division (OPC), and collaboration with the Global Open Data for Agriculture and Nutrition (GODAN) initiative,⁵ the Secretariat has promoted the adoption of DOIs among their stakeholders and networks. This collaboration included the organization of two webinars in June and July, 2017. Other outreach activities, including the participation in the GODAN annual conference in September, were scheduled at the time of preparing this document.⁶ A similar collaborative initiative, also with the support of FAO's OPC, is being established with the Research Data Alliance (RDA).⁷

21. The Secretariat promoted the Programme of Work on GLIS and the use of DOIs at a Regional Seminar of the Latin America and the Caribbean Region (GRULAC) on implementation of the International Treaty on PGRFA held in Montevideo, Uruguay, in April 2017.⁸

22. Continuous interactions with genebanks and platforms managing PGRFA data, and with the International Treaty National Focal Points, have resulted in various stakeholders confirming their interest in participating in a range of roles in the development and use of the GLIS services. At the same time, the need to continue training staff and providing support was reiterated, at least through the

⁴ Pruning consists of hiding nodes and edges of a graph to display only those matching certain search conditions. Pruning can also be conducted by limiting the graph visualization to nodes that are within a given distance (i.e. a given number of edges or 'hops') from a specific root node. This allows the user to obtain a simplified representation of the graph, and more easily identify features of interest.

⁵ See <http://www.godan.info>

⁶ <http://aims.fao.org/fr/activity/blog/guidelines-optimal-use-digital-object-identifiers-germplasm-samples-0>

⁷ See <https://www.rd-alliance.org>

⁸ See <http://www.fao.org/plant-treaty/news/detail-events/en/c/883841/>

development of training materials in various languages, the organization of regional workshops and the provision of *ad hoc* support at national level, upon request.

23. In May 2017, the Secretariat organized a training workshop in the Near East and North Africa region to promote the use of common standards and tools to facilitate the registration and identification of PGRFA material in the Global Information System.⁹ It was organized in collaboration with the National Genebank of Egypt (NGE), the Agricultural Genetic Engineering Research Institute (AGERI) of Egypt and with the support of the FAO Regional Office for the Near East and North Africa. The event brought together 31 experts on documentation and information exchange from 15 countries and partner organizations of the Near East and North Africa region, including gene bank curators, plant breeders, geneticists, in situ experts, bioinformaticians and information specialists.

24. As part of the project activities, the Secretariat undertook a regional assessment of the current status of national genebank documentation systems. Several countries indicated that their documentation systems are obsolete, and that they needed support to upgrade and connect them to the work of plant breeders and farmers. Additionally, the participants became more familiar with the tools developed by the International Treaty's Capfitogen training programme,¹⁰ monitoring of the Global Plan of Action on the conservation and sustainable use of PGRFA,¹¹ the GRIN-Global gene bank documentation system¹², the Genesys database¹³ and the International Center for Agricultural Research in the Dry Areas (ICARDA)'s gene bank management system. The EURISCO portal was also presented as an example of a coordinated product generated from regional cooperation.¹⁴

25. The participants drew up a short list of recommendations for further strengthening regional coordination and networking through the Programme of Work on GLIS on topics of mutual interest, including tools, standards, training and individual and institutional capacity-strengthening. Among recommendations is the need to revamp existing networks on plant genetic resources in collaboration with the Association of Agriculture Research Institutions in the Near East.¹⁵ The Secretariat is exploring opportunities for a similar workshop to be organized in the Southern African Development Community (SADC) region.

26. The Secretariat created a web page listing all the relevant documentation on the work of GLIS where users can watch videos of the DOIs, read the finding of the consultations and surveys with experts and stakeholders, and download reports from related meetings.¹⁶ The section includes a page with Frequently Asked Questions (FAQs) on matters related to the DOIs, concepts and the benefits of using common documentation standards and tools. The web section also contains the latest versions of both the DOI Descriptors and the DOI Guidelines.

D. Strategic partnerships and collaborations

27. Following the advice of the Scientific Advisory Committee, the Secretariat has explored synergies with the CGIAR's Excellence in Breeding Platform, the Plant Production and Protection Division of FAO, the Global Crop Diversity Trust in relation to Genesys, DataCite, the European Cooperative Programme for Plant Genetic Resources (ECPGR), the Convention on Biological

⁹ See the programme at <http://www.fao.org/plant-treaty/meetings/meetings-detail/en/c/853576/>

¹⁰ See <http://www.fao.org/plant-treaty/initiatives/capfitogen/en/>

¹¹ See <http://www.fao.org/agriculture/crops/thematic-sitemap/theme/seeds-pgr/gpa/monitoring0/en/>

¹² See <http://www.grin-global.org/>

¹³ See <https://www.genesys-pgr.org/>

¹⁴ See <http://eurisco.ipk-gatersleben.de>

¹⁵ The National Focal Points who participated expressed their willingness to collaborate in formulating a joint regional project, should the priorities of the Fourth Call of the Benefit-sharing Fund allow for this.

¹⁶ Available at: <http://www.fao.org/plant-treaty/areas-of-work/global-information-system/en/>

Diversity (CBD) Secretariat, the Association of Agricultural Research Institutions in the Near East and North Africa (AARINENA) and ICARDA, among others.

28. The Secretariat invited a number of potential partners to the second meeting of the Scientific Advisory Committee in June, and the Committee provided the following advice:

- With regards to the World Information and Early Warning System on Plant Genetic Resources for Food and Agriculture (WIEWS) and the reporting system for the Second Global Plan of Action on Plant Genetic Resources for Food and Agriculture (GPA), it noted the unique value of the GPA reporting format for *ex situ*, on-farm and *in situ* materials.¹⁷
- With regards to the Global Open Data for Agriculture and Nutrition initiative (GODAN) and the Research Data Alliance (RDA), it flagged interoperability and encouraged participation in ongoing working groups on areas of interest for GLIS.
- With regards to the Genesys database, it noted the role of Genesys as an entry point for information on *ex situ* collections.
- With regards to the Access and Benefit-Sharing Clearing-House (ABS-CH) of the CBD, it highlighted the opportunity of collaboration.
- With regards to the CGIAR Genebank Platform, it noted that the correct application of DOIs would be a valuable method of identifying and linking the material in genebanks, and those in breeding programmes across transactions.
- With regards to the CGIAR Excellence in Breeding Platform, it noted the planned development of an application for breeders, which could benefit from the use of DOIs to track, on a voluntary basis, the exchange of germplasm and provide links to information.

29. The Committee advised the Secretariat to follow a step-wise approach in the further development of partnerships and to prioritize GRIN-Global, Genesys, WIEWS and the GPA. In the area of on-farm and *in situ* material, the Committee highlighted a number of other potential partners, such as FAO Globally Important Agricultural Heritage Systems (GIAHS), UNESCO World Heritage Sites and the Man and Biosphere Programme, the CBD Programme of Work on Protected Areas, IUCN Key Biodiversity Areas and the Crop Wild Relatives Specialist Group, and the European Natura 2000 Network.

The DivSeek Initiative

30. Through Resolution 3/2015, the Governing Body requested the Secretariat to continue participating in the Joint Facilitation Unit of the DivSeek Initiative. It further requested the Secretariat to invite DivSeek stakeholders to report on implications for the objectives of the International Treaty of the technologies underlying the DivSeek Initiative, and to compile a synthesis report on this for consideration by the Governing Body at this Session.

31. The evolution of the relationship with the DivSeek Initiative and the report are contained in the Synthesis Report of the DivSeek Initiative for the consideration of the Governing Body.¹⁸

32. At the time of preparing this document, the Secretariat was an observer of the DivSeek Initiative and, following the guidance received from the Bureau of the Sixth Session, was exploring options for future cooperation with the DivSeek Initiative.

¹⁷ See T/GB-7/17/Inf. 17, Study on the relevance of information submitted to the International Treaty and the CGRFA for ongoing reporting processes.

¹⁸ IT/GB-7/17/15, available at <http://www.fao.org/3/a-mt955e.pdf>

E. Transparency of rights and obligations

33. During the biennium, the Secretariat informed the Scientific Advisory Committee of developments related to Objective 4 of the Programme of Work, which deals with promoting transparency of the rights and obligations of users for accessing, sharing and using PGRFA associated information, as well as with establishing ways to exercise those rights and obligations within the GLIS.

34. The Secretariat followed and reported on the developments that occurred within the Working Group on the Enhancement of the Functioning of the Multilateral System and within the CBD in relation to genomic information, and provided the Scientific Advisory Committee with an analysis of the emerging issues of direct relevance to the Vision and Programme of Work on GLIS. The Committee discussed the issue of genetic sequence information, but was unable to reach consensus on how to deal with this issue, and would welcome further guidance from the Governing Body.¹⁹

35. In recognition of the importance of access to genomic information to the GLIS vision and functions, the Scientific Advisory Committee suggested that the Governing Body invite Contracting Parties and relevant stakeholders to provide views and information to ongoing processes, including processes under the CBD and the CGRFA. This was to ensure that the multilateral nature of the International Treaty and its approaches to information exchange for PGRFA would be taken into account in the consideration of relevant issues under those processes.

36. On the occasion of the Governing Body, the Secretariat has planned a special event on genomic information on Saturday 28 October. The event will present the findings of an initial scoping study about how current technologies and practices related to the generation, exchange and use of genomic information are relevant for the International Treaty.

F. Monitoring mechanism

37. Through Resolution 3/2015, the Governing Body requested the Secretary to design a monitoring and assessment mechanism of the usefulness and effectiveness of the GLIS according to Article 17.1, subject to availability of resources, based on the recommendations of the Scientific Advisory Committee, and to present a draft to the next Session of the Governing Body.

38. At its first meeting, the Scientific Advisory Committee considered a document containing options and elements for the development of a monitoring and assessment mechanism for GLIS, including a feedback system and statistics.²⁰ The options included use of a questionnaire, the analysis of web generated statistics, and consideration of interviews and email communications from experts.

39. The Committee advised implementing all three options, and to make the questionnaire available online, once the system was released. The Scientific Advisory Committee further advised the inclusion of more questions related to the relevance of the information and, subject to the availability of resources, the collection of feedback through the organization of one-on-one interviews.

40. Regarding the frequency of the reports, the Scientific Advisory Committee advised the Secretariat to produce these every two years, on the occasion of the Governing Body sessions.

¹⁹ This would be without prejudice to ongoing and future discussion in all relevant fora, of issues related to the technical scope, and the legal and scientific implications of existing terminology.

²⁰ See document IT/GB7/SAC-1/16/6, *Draft monitoring and assessment mechanism*, available at <http://www.fao.org/3/a-bq616e.pdf>

III. Resource mobilization

41. In adopting the Programme of Work on GLIS at the Sixth Session, the Governing Body did not make financial provision for its implementation within the Core Administrative Budget for the current biennium. Consequently, the Secretariat adopted a two-pronged approach in carrying out this programme. On the one hand, it prioritized the continuation of activities started in the previous biennium, whose delay would have caused a significant negative impact on early implementation of the Programme of Work on GLIS. On the other, it explored potential donor options for the funding of selected activities of the Programme of Work.²¹

42. In January 2017, the government of made a financial contribution to support the Programme of Work on GLIS. The activities covered by the project included the review and publication of the Guidelines and the development of the web-based Platform. They also included a range of activities for training and capacity-strengthening in the Near East and North Africa region, which were initiated in May, and in the Southern African Development Community, which are being planned at the time of preparation of this document.

43. The lack of predictable and sustainable resources for the Programme of Work on GLIS has a direct impact on the pace and impact of its implementation.

44. In adopting the budget for the upcoming biennium, the Governing Body is invited to consider providing for the organization of at least one meeting of the Scientific Advisory Committee, should it decide to reconvene it, as well as make financial provision for the maintenance of the core infrastructure already developed and the services being provided to users, particularly for the assignation of DOIs. In this scenario, further development of the Platform and the delivery of training activities could be covered through the provision of extra-budgetary resources.

IV. Guidance sought

45. The Governing Body is invited to adopt a Resolution on Implementation of the Global Information System for the 2018-2019 biennium.

46. The Governing Body is invited to take into account the elements provided for its consideration in the *Appendix* to this document.

²¹ The project title is *Implementation of the pilot phase of the Global Information System on Plant Genetic Resources of Article 17 of the ITPGRFA* (GCP/GLO/685/GER).

APPENDIX

Draft Resolution XX/2017

Implementation of the Global Information System

THE GOVERNING BODY,

Recalling its previous Resolutions and decisions on the Vision and the Programme of Work on the Global Information System (Programme of Work on GLIS) and particularly Resolution 3/2015;

Further recalling the close interlinkages between the Global Information System of Article 17 of the International Treaty and the Multilateral System of Access and Benefit-sharing under Article 13.2.a;

Thanking the Government of Germany for the financial support provided for implementation of the Programme of Work during the 2016-2017 biennium;

- 1) **Takes note** of the progress made in implementation of the Programme of Work on GLIS during the 2016-17 biennium;
- 2) **Welcomes** the publication of the Digital Object Identifiers Descriptors and the Digital Object Identifiers Guidelines and, subject to the availability of resources, and **requests** the Secretariat to intensify efforts for the provision of support to Contracting Parties and other relevant stakeholders in developing countries for their adoption through the development of training materials and capacity-strengthening workshops at regional and national level;
- 3) **Further requests** the Secretariat to interact with a broad range of user categories in order to define through user cases the user-oriented entry points in the Portal, and to facilitate the incorporation of Digital Object Identifiers into the workflow of existing databases and systems;
- 4) **Requests** the Secretariat to develop a detailed implementation master plan describing the functionalities of the Global Information System, and the interactions with partner information systems;
- 5) **Takes note** of the ongoing discussions with the DivSeek Initiative for the definition of terms and conditions for future cooperation, and **requests** the Secretary to continue doing so under the guidance of the Bureau of the Eighth Session and report to the Eighth Session of the Governing Body;
- 6) **Takes note** of the methods and options identified for the monitoring of the web-based Portal at the first meeting of the Scientific Advisory Committee, and **requests** the Secretariat to implement them as soon as possible;
- 7) **Decides** to reconvene the Scientific Advisory Committee on the Global Information System of Article 17, subject to the availability of financial resources, and **requests** the Secretariat to continue updating the Committee on progress with the GLIS Vision and Programme of Work;
- 8) **Further decides** to include in the terms of reference of the Committee, for the 2018-2019 biennium, the review of the implementation master plan and the activities for collaboration with partners to be prepared by the Secretariat, and the consideration of scientific and technical issues of relevance to genetic sequence information and their implications for the implementation of the International Treaty;

9) **Invites** Contracting Parties and relevant stakeholders to provide views and information related to genetic sequence information to ongoing processes, including in the Convention on Biological Diversity and the Commission on Genetic Resources for Food and Agriculture;

10) **Requests** the Secretariat to continue following the discussions on genetic sequence information in other fora, and to coordinate with the Secretariats of the Convention on Biological Diversity and the Commission on Genetic Resources for Food and Agriculture in any related activities in order to ensure coherence and avoid duplication of efforts.

11) **Invites** Contracting Parties, other governments and stakeholders to provide the necessary resources to implement the Programme of Work, in particular capacity-strengthening activities in developing countries;

12) **Requests** the Secretary to submit to the Governing Body a progress report at the Eighth Session, and any proposal for the review of the Programme of Work when appropriate, based on the recommendations of the Scientific Advisory Committee.