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Food and Agriculture Organization of the United Nations

The International Treaty ON PLANT GENETIC RESOURCES FOR FOOD AND AGRICULTURE

Item 10 of the Provisional Agenda
EIGHTH SESSION OF THE GOVERNING BODY
Rome, 11 - 16 November 2019
Report on the Implementation of the Global Information System

Executive Summary

This document provides an update on the implementation of the Programme of Work on the Global Information System during the 2018-19 biennium, 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.

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 the Programme of Work on GLIS and related activities, taking into account the elements for a possible Resolution provided in the *Appendix*.

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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) since the Seventh Session of the Governing Body.

2. The Global Information System (GLIS) on Plant Genetic Resources for Food and Agriculture was established by Article 17 of the International Treaty. At its Sixth Session, the Governing Body adopted the Vision and the Programme of Work for the period 2016-22. It also set up the Scientific Advisory Committee on Article 17 (the Committee), whose terms of reference were updated at the Seventh Session.[1]

3. The Vision provides that:

> *The Global Information System for PGRFA integrates and augments existing systems to create the global entry point to information and knowledge for strengthening the capacity for PGRFA conservation, management and utilization.*
>
> *The development of a truly effective Global Information System as foreseen in the International Treaty involves,* inter alia*: strengthening existing systems and, where gaps remain, establishing new systems and initiatives; promoting inter-connectivity among systems; and providing overarching mechanisms to ensure ready access to the information and services provided*

4. The Programme of Work has seven objectives, under the following headings:

Objective 1 - The web-based platform

Objective 2 – Access to sources of PGRFA and associated information

Objective 3 – Interoperability, scientific standards and tools

Objective 4 – Transparency on the rights and obligations of users

Objective 5 – Communication and multidisciplinary collaboration

Objective 6 – Capacity development and technology transfer

Objective 7 – Draft monitoring and assessment mechanism

5. The Committee met once during the biennium 2018-19 and provided advice on GLIS operations, in particular on the Master Plan requested by the Governing Body at its Seventh Session. The report of the meeting is available as an information document.[2]

6. This report provides updates on the adoption of Digital Object Identifiers (DOIs), the current status of development of the GLIS Portal, the training activities undertaken with genebanks, national focal points and plant breeders, the mobilization of resources, the strengthening of existing partnerships and the development of new partnerships and collaborations. The document also provides information on the relationship with the DivSeek Initiative.[3]

7. The *Appendix* contains possible elements for a Resolution, for consideration by the Governing Body.

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[1] See Resolution 3/2015 available at http://www.fao.org/3/a-bl140e.pdf and Resolution 5/2017 at http://www.fao.org/3/a-mv103e.pdf

[2] See document IT/GB-8/19/10/Inf.1 for the *Report of the Scientific Advisory Committee*.

[3] See IT/GB-8/19/10/Inf.2 for the Report of the DivSeek Initiative.

II. UPDATE ON OPERATIONS OF THE PROGRAMME OF WORK ON THE GLOBAL INFORMATION SYSTEM

A. Progress with the Registration and Promotion of Digital Object Identifiers

8. DOIs help users to permanently and accurately identify plant genetic resources for food and agriculture (PGRFA) and to inform potential users about the PGRFA made available in the Multilateral System. The use of DOIs also facilitates the exchange of information obtained during the research and development of germplasm, so that GLIS can add value to existing datasets and promote their further use. As such, DOIs directly contribute to Objectives 2 and 3 of the Programme of Work.

9. At its Seventh Session, the Governing Body requested the Secretary to intensify efforts to use the DOIs as a central element of GLIS, linking existing information systems and, thereby, providing pointers from GLIS to PGRFA-related information in other systems.

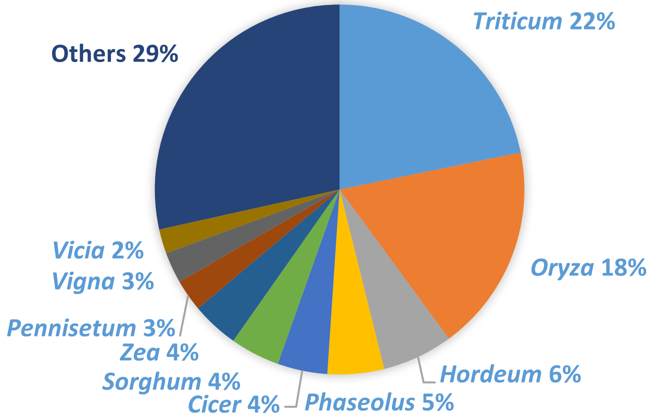
10. During the intersessional period, the Secretariat approached stakeholders in order to promote DOIs under GLIS. As a result, PGRFA holders from the following countries have begun registering DOIs:[4]

Bangladesh	Belgium	Bhutan	Burundi
Cambodia	China	Colombia	Costa Rica
Côte d'Ivoire	Ethiopia	Ghana	India
Indonesia	Italy	Jordan	Kenya
Lao People's Democratic Republic	Lebanon	Malaysia	Myanmar
Mexico	Nigeria	Pakistan	Portugal
Sri Lanka	Tunisia	Turkey	United Kingdom
Zambia			

11. The Secretary has also received requests for information from genebanks and other PGRFA holders in non-Contracting Parties who are interested in the application of the DOI standard in their workflow and systems.

12. As of 1 June 2019, a total of 834 252 PGRFA have been identified and linked with the related datasets in other systems through the registration of DOIs on the GLIS Portal. The pie chart below illustrates the percentage of crops for which DOIs have been registered.

[4] As of 1 June 2019.



13. Regarding the promotion of DOIs, the Secretariat attended the 15th meeting of the Steering Committee of the European Cooperative Programme for Plant Genetic Resources (ECPGR) and delivered a presentation on DOIs. The Steering Committee welcomed the operationalization of DOIs and recommended ECPGR members to use DOIs to permanently identify PGRFA. It further advised the EURISCO Advisory Group to send a statement encouraging all the National Focal Points of ECPGR to assign DOIs to the genebank accessions they report about.[5] The Secretariat collaborated on technical developments enabling the registration and the connection of EURISCO with GLIS.

14. Through DOIs, GLIS offers a standard and stable mechanism for the identification of PGRFA available in the Multilateral System. During the inter-sessional period, public and private PGRFA holders have continued to send communications to the Secretary notifying the availability of collections or subsets of materials within a collection. In parallel with these developments, GLIS has become a preferred notification mechanism through the use of DOIs, which enables identification of PGRFA at the accession level, in a format that is searchable and allows the querying of the holdings by passport descriptors.

15. As of 1 June 2019, the GLIS Portal provided information on 772 196 accessions available in the Multilateral System, including associated information and links and pointers to various data repositories. This represents 92 percent of all the PGRFA reported through GLIS.

16. In response to user needs, the Secretariat has begun facilitating the registration of DOIs for germplasm in the Multilateral System through a Toolkit. The Toolkit consists of a simple software application that can be deployed at a stakeholder's site to register PGRFA and, as required, update the descriptors associated with the DOIs assigned at a later stage.

17. The Toolkit was initially developed in the framework of a project of the Benefit-sharing Fund focusing on rice materials.[6] During the biennium, a first version of the Toolkit has been deployed in Bhutan, India, Indonesia, Malaysia, the Philippines and Zambia, thus constituting a practical instrument for capacity development (i.e. Objective 6 of the Programme of Work). The feedback received by the initial users has been incorporated in a new version, released in early 2019. Following a training workshop held in Indonesia in early May 2019, the new Toolkit has been deployed in Bangladesh, Burundi, Cambodia, Indonesia, Lao People's Democratic Republic, Myanmar, Pakistan and Sri Lanka. The institutions that participated in the training, have indicated that they will use the

[5] http://www.ecpgr.cgiar.org/fileadmin/bioversity/publications/pdfs/SC15_report_final_web_28_06_2018_corr.pdf
[6] Benefit-sharing Fund project W3B-PR-29-Indonesia.

Toolkit to register accessions for other crops, as well as act as disseminators to other institutions in their respective countries.

18. At the time of the preparation of this document, approximately 130 000 DOIs have been registered by national genebanks and other collections through the Toolkit.

19. For the further promotion of DOIs, the Secretariat has collaborated with partners to deliver presentations, in person or remotely, at a number of conferences, workshops and other meetings, including:[7]

a) DivSeek's annual assemblies at PAG XXVII and XXVIII
b) SADC, Cape Town, South Africa[8]
c) National Genebank of Tunisia, Tunis (April and November, 2018)[9]
d) ICABIOGRAD, Indonesia (August 2018 in person and May 2019 remotely)[10]
e) International Biodiversity Conference, Bogor, Indonesia
f) International Seed Testing Association, Hyderabad, India
g) CGIAR Platforms meeting in Heidelberg, Germany
h) BEAN_ADAPT and BRESOV projects
i) International Rice Congress, Singapore
j) Genebank Operations and Advanced Learning Workshop (GOAL) at the Malaysian Agricultural Research and Development Institute (MARDI)
k) Meeting with Italian genebanks and PGRFA holders
l) Meeting with European NGO/CSOs
m) Genebank Operations and Advanced Learning Workshop (GOAL) at the Inter-American Institute for Cooperation on Agriculture (IICA), San José, Costa Rica

20. As a first initiative for communication (i.e. Objective 5 of the Programme of Work), the Secretary has published a booklet with two documents in 2018, "Guidelines for the optimal use of Digital Object Identifiers as permanent unique identifiers for Plant Genetic Resources for Food and Agriculture – v.2" and "Data required for the assignation of Digital Object Identifiers in the Global Information System – v.2.1". The booklet is available in Arabic, English, French and Spanish.

21. The Secretary has also provided updates to the national focal points and several stakeholders groups through news items and at dedicated meetings in Rome about the progress in the implementation of the GLIS Programme of Work.

B. Progress with the Development of the GLIS Portal

22. The GLIS Portal constitutes the web-based portal referred to in Objective 1 of the Programme of Work. The first module of the GLIS Portal was published online in 2017 to allow users to share information about their PGRFA holdings and to point to information and knowledge available in referenced databases and systems.[11]

23. In collaboration with FAO's Information Technology Division (CIO), the Secretary has developed a proposal for the further development of the GLIS Portal, describing requirements and specifications. The new architecture reflects the advice provided by the Scientific Advisory Committee on the Master Plan (see paragraphs below) and lists the technical functions required for a distributed

[7] An updated list is available online at http://www.fao.org/plant-treaty/areas-of-work/global-information-system/externalmeetings/en /

[8] In the framework of the project funded by Germany.

[9] Also in the framework of the project funded by Germany.

[10] In the framework of the BSF project W3B-PR-29-Indonesia.

[11] https://ssl.fao.org/glis/ for the GLIS Portal

search protocol. This PGRFA discovery mechanism will make the query of external information resources and will support it in multiple languages possible, including external systems.

24. The current proposal foresees the translation of the Portal in all the FAO official languages and the implementation of an interactive graph browser. In this context, it is to be noted that, as of 1 June 2019, GLIS maintains more than 16 000 relationships between PGRFA. Examples of such relationships are "Derived from" or "Acquired from", which describe how a PGRFA has been obtained from its ancestor(s). The number of relationships will grow steadily as more institutions assign DOIs to PGRFAs and reference ancestor(s). The interactive graphical display of these relationships will respond to one of the top requests from users.

Connection with other systems and tools

25. The integration of external systems is performed in compliance with Article 17 of the International Treaty and to promote the implementation of interoperability (i.e. Objective 3 of the Programme of Work). The integration aims at improving the services offered by GLIS. During the biennium several connections have been carried out or improved in order to improve data quality and reduce the workload for stakeholders.

26. When a genebank uploads or updates records in Genesys declaring the DOI, the two systems establish a communication and GLIS can point to the record in Genesys and to the information associated with that record.

27. The technical procedure for the exchange of data with EURISCO is similar, but it is customised to existing ECPGR activities as a network and the data sharing processes already established to facilitate the registration of material and avoid duplications.

28. In early 2019, the collaboration with CIMMYT has led to a new version of GRIN-Global using the XML protocol to report SMTA contracts to Easy-SMTA. A similar integration for the registration and update of DOIs is being explored, taking into account the many similarities between the two XML protocols.

29. Following the advice provided by the Committee at its third meeting, the Secretary is exploring connections with agencies specialised on the registration of research publications and scientific datasets to facilitate linkages with the PGRFA records available in GLIS.

30. The Secretariat has also discussed with the Plant Production and Protection Division possible options to connection WIEWS and GLIS, including the linkages to on-farm data datasets.

Improving user support

31. At its third meeting, the Committee advised the Secretary to document the experiences on the application of DOIs by early adopters and gather information on expectations from other potential users, as well as other cases identified. Additionally, the Committee also advised the Secretary to develop model cases illustrating the effectiveness of connecting existing information system through GLIS.

32. Accordingly, the Secretary requested inputs from users who have adopted DOIs and from other potential users and stakeholders, and prepared a synthesis report for the Committee, including model cases for the provision of support.[12]

Crop lists descriptors

33. At its meeting, the Committee highlighted the importance of crop descriptor lists and invited the Secretary to circulate to the Committee a broader and more detailed document listing existing crop

[12] The document is available online at: http://www.fao.org/plant-treaty/areas-of-work/global-information-system/en/

descriptors' useful information that may help in the assignation of priority for their development or review.

34. The Committee noted the usefulness of controlled vocabularies and crop ontologies, and their use by the bioinformatics community in developing new systems and tools for plant breeders and genebank curators. In this context, the Committee advised the Secretary to support the conversion of existing crop descriptors into ontologies and to further explore the use of stable ontologies through the Global Information System.

35. In June 2019, the Secretary sent a notification to national focal points regarding the approval of the project '*Development of a globally agreed list of descriptors for* in situ *Crop Wild Relatives documentation*'.[13] The main objective of the one-year project is to improve global food security through effective conservation and increased use of *in situ* Crop Wild Relatives (CWR) material, and enhanced capacity to use information to support their conservation and sustainable utilization.[14] The new project, funded by the Government of Germany through the Federal Ministry of Food and Agriculture (BMEL), contributes to the implementation of Articles 17 and 5 of the International Treaty.

C. Advocacy, Training and Capacity Strengthening

36. The Secretariat has continued updating the web page with all the relevant GLIS documentation, including findings of expert consultations, surveys and meeting reports, and explanatory videos about DOIs.[15]

37. During the biennium, the Secretariat has updated the Frequently Asked Questions (FAQs) with inputs from the Help-Desk function on issues related to information on PGRFA available in the Multilateral System, the registration of PGRFA through DOIs.[16] The web section also contains the illustrated versions of both the DOI Descriptors and the DOI Guidelines in English, French, Spanish and Arabic, which are also available in printed form.[17]

Increasing regional capacity on PGRFA documentation

38. In addition to the activities described in Section A of this document, direct collaborations and training have been implemented in support of the Multilateral System through the establishment of two regional training hubs for GLIS.

39. The first regional hub was set up for the South African Region through the organization of a workshop in Cape Town, South Africa, from 12 to 14 December 2017. The workshop resulted in enhanced capacity of both individuals and institutions to document and exchange PGRFA in GLIS. The Secretariat Plant Genetic Resources Centre (SPGRC) of the South African Development Community (SADC) and the FAO Office in South Africa collaborated in the organization of the workshop, which gathered 37 PGRFA experts, genebank curators, and other staff working on crop documentation and PGRFA conservation and use in the region, including seven national focal points plus Uganda and Ethiopia. The participation of the national focal points and a second technical expert was possible thanks to the financial contribution made by Bioversity International.

40. Additionally, the Secretariat organized two workshops in Tunisia, in partnership with the Tunisian National Genebank and with the support of the FAO Regional Office for Near East and North

[13] http://www.fao.org/plant-treaty/notifications/detail-events/en/c/1200112/

[14] http://www.fao.org/plant-treaty/areas-of-work/global-information-system/development-of-a-globally-agreed-list-of-descriptors/en/

[15] Available at: http://www.fao.org/plant-treaty/areas-of-work/global-information-system/en/

[16] http://www.fao.org/plant-treaty/areas-of-work/global-information-system/faq/en/

[17] http://www.fao.org/plant-treaty/areas-of-work/global-information-system/descriptors/en/

Africa. The first workshop took place from 17 to 19 April 2018 and gathered 18 experts - genebank curators, plant breeders and researchers - to deliver hands-on training on DOIs. The workshop helped to validate the training materials in French and to further understand the needs of scientists, in particular in relation to formal publication and citation mechanisms.

41. The second workshop was held from 6 to 8 November 2018, with the support of the Sub-regional FAO representative in Tunisia. It gathered 27 regional experts from eight countries, including genebank and data curators, researchers, plant breeders, bioinformaticians and documentation staff. The workshop resulted in the consolidation of the national genebank as a regional documentation hub for GLIS.[18] All the participants expressed their willingness to use and promote DOIs, including making information on PGRFA in the Multilateral System publicly known, and started submitting their data to the Secretariat for testing and registration purposes during the meeting.

42. The workshops described above, have constituted activities for the implementation of capacity development and technology transfer as well as for multidisciplinary collaboration (respectively, Objectives 6 and 5 of the Programme of Work). The Secretary received requests for assistance in the form of capacity building and information technology equipment for the documentation of PGRFA from other regions, which could not be supported due to the lack of resources.

D. Other Partnerships

43. Following the guidance received from the Governing Body at its Seventh Session, the Secretary invited the DivSeek Initiative to report on the development and activities of the Initiative for the biennium 2018-19.

44. The Secretariat also attended the annual assemblies of the Initiative. At the time of preparation of this document, the Secretary is still liaising with DivSeek in order to explore possible arrangements for further engagement with the Initiative, under the guidance of the Bureau, as the Governing Body had requested at its Sixth Session.

E. Genetic Sequence Data with Respect to PGRFA

45. In the biennium 2016-17, the Committee had begun considering various issues, including the accessibility of genetic sequence data, related to the transparency of rights and obligations (i.e. Objective 4 of the Programme of Work). At its Seventh Session, the Governing Body requested the Committee to consider scientific and technical issues of relevance to genetic sequence information, as far as it is generated from the use of PGRFA and related to the implementation of GLIS.[19] It also requested the Secretary to notify the outputs of the work by the Committee to Contracting Parties and all relevant stakeholders.[20]

46. At its third meeting, the Committee was of the view that applying DOIs to PGRFA information could be a useful starting point to address uses of information, including digital sequence information (DSI) / genetic sequence data (GSD), generated from the use of germplasm in the Multilateral System.

[18] The three workshops were supported financially by the Government of Germany through project GCP/GLO/685/GER, which will end in December 2019.

[19] Resolution 5/2017, para.9. At the same Session, through Resolution 13/2017, the Governing Body clarified that the term "digital sequence information" was taken from decision CBD COP XIII/16 and was subject to further discussion. The Governing Body further recognised that there are a multiplicity of terms in this area (including, *inter alia*, “genetic sequence data”, “genetic sequence information”, “genetic information”, “dematerialized genetic resources”, “in silico utilization”, etc.) and that further consideration would be needed regarding the appropriate term or terms to be used.

[20] Resolution 13/2017, para. 3

47. The Committee was of the opinion that DOIs could be a tool to link DSI/GSD to the source germplasm. Furthermore, it considered exploring scientific and technical issues in the use of DOIs for linking material and information, such as the development of quality standards for DOI relationships.[21]

48. The Committee advised the Secretariat to gather more information from GLIS users, including CGIAR Centres and other institutions managing crop germplasm repositories, on the current application of DOIs to crop germplasm in the Multilateral System for which DSI/GSD are available in GLIS compatible information systems.[22]

49. The European Cooperative Programme for Plant Genetic Resources (ECPGR) indicated that only passport and phenotypic data are available in most of the genebank information systems and that the use of DOI for plant germplasm accessions is increasingly accepted by genebanks. In the view of the ECPGR community, the connection of passport and phenotypic data with DSI/GSD via DOIs appears very promising and a task for the GLIS could be to promote the use of accession DOIs as metadata for sequencing/genotyping consortia, thus improving the later integration with these data.

50. CGIAR Centres made it a priority in 2018 to 'mint' DOIs for materials in the international collections that they host, including landraces, wild relatives, as well as breeding and elite lines resulting from the Centres' breeding programmes, when they are to be conserved long term and made them available through the Multilateral System. Most Centres already include, or are in the process of putting systems in place to include, together with the accession number, the DOI code when transferring PGRFA.

51. Some Centres have started to include DOIs in online platforms that focus primarily on genomic sequence information. Bioversity International has included accession DOIs in the Banana Genome Hub when sequenced genomes come from Bioversity's Musa genebank. IRRI is working towards extending the use of DOIs to the rice-specific platform SNP-Seek. AfricaRice is preparing a new website where genetic information about 3 000 rice accessions maintained in the genebank with DOIs will be made publicly available, and linked to the GLIS.

52. In the view of the CGIAR Centres, it appears that GenBank, GigaDB, EMBL-EBI and other online platforms which are widely used for uploading big data in biology and genetics are not equipped yet to handle DOIs. They would likely need to adjust their databases to include this information in the GLIS and GLIS DOIs to facilitate the linking and layering of genomic sequence data associated with materials from CGIAR genebanks as well as any other sources of sequenced germplasm.

53. The Committee further advised the Secretary to compile and analyse the information that countries would submit in response to the invitation made by the Governing Body on digital sequence information.[23] The submissions received from Contracting Parties and other stakeholders in the context of the Multi-Year Programme of Work, are available in a separate information document.[24] In two submissions, explicit references are made to the GLIS, in relation to:

a) the exchange of information contributing to the sharing of benefits under Article 17.1 of the International Treaty;[25]

[21] Paragraph 20 of IT/SAC-GLIS-3/18/Report. Following the usual practice by the Secretariat, the report was published online as soon as finalised and, as such, made available to Contracting Parties and other stakeholders.. The Report is also available for this Session as IT/GB-8/19/10/Inf.1

[22] Para. 22 of IT/SAC-GLIS-3/18/Report

[23] Para. 25 of IT/SAC-GLIS-3/18/Report

[24] IT/GB-8/19/16.1/Inf.1

[25] http://www.fao.org/3/ca4195en/ca4195en.pdf

b) the GLIS linking to the uses of DSI, in line with its role to connect all existing open data systems of genebanks worldwide.[26]

54. In relation to the current development of the GLIS Portal, the Committee considered it useful to include pointers to relevant major global DSI/GSD databases. Accordingly, the GLIS Portal started pointing to these datasets.

55. In relation to capacity development, the Committee considered that, in the future, the GLIS Portal could offer pointers to practical tools, such as GSD analysis tools. It advised the Secretary, subject to the availability of financial resources, to facilitate technology transfer and training on GLIS and genebank data management systems, e.g., GRIN-GLOBAL, as a benefit for developing countries.[27]

F. Statistics

56. A new statistics module has been developed and published online. The module provides access to key information available on the GLIS, thus contributing to communication (Objective 5 of the Programme of Work).[28]

57. The information is organized into five categories with a brief explanatory text and example queries. More indicators will be added over time. Statistics are provided once the size of the population being analysed becomes significant. For example, the number of DOIs with associated publications or datasets will be provided once the number of publications or datasets has significantly increased.

III. RESOURCE MOBILIZATION

58. At the Seventh Session, the Governing Body made a financial provision for only a limited set of activities of the GLIS within the Core Administrative Budget (CAB) for the current biennium. Consequently, the Secretariat adopted a two-pronged approach in carrying out support activities. The funds in the CAB covered the payment of the server and related core information technology services and licences, the help-desk function and the updating of information and outreach materials.

59. During the biennium, the Government of Germany has continued providing financial support to GLIS through a project that will end in the last quarter of 2019.[29] The project funded training activities in the Near East and Africa regions, in support of DOIs and the statistics module. The Government of Canada supported the organization of the third meeting of the Committee. The Secretariat received no other extra budgetary resources for the Programme of Work on GLIS. In this context, it may be noted that the lack of predictable and sustainable resources for the Programme of Work on GLIS has a direct impact on its implementation.

60. In preparing and adopting the budget for the 2020-21 biennium, the Governing Body may consider providing for the organization of at least one meeting of the Committee, should it decide to reconvene it, as well as make financial provision for the maintenance of the help-desk and the core infrastructure already developed and the services being provided to users, particularly for the identification of PGRFA.

61. Additional extra budgetary resources will be needed for the further development of the GLIS Portal in the biennium 2020-21, and any other technical, outreach, training and support activities requiring staff time and travel.

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[26] http://www.fao.org/3/ca4668en/ca4668en.pdf

[27] Para. 24 of IT/SAC-GLIS-3/18/Report

[28] https://ssl.fao.org/glis/stats/index for the GLIS statistics on PGRFA registration with DOIs.

[29] The project *Implementation of the pilot phase of the Global Information System on Plant Genetic Resources of Article 17 of the ITPGRFA* (GCP/GLO/685/GER) ends in December 2019.

IV. GUIDANCE SOUGHT

62. The Governing Body is invited to ***adopt*** a Resolution on Implementation of the Global Information System for the 2020-2021 biennium, taking into account the elements provided in the *Appendix* to this document.

APPENDIX

Draft Resolution XX/2019

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 Resolutions 3/2015 and 5/2017;

Further recalling the contribution of the Global Information System of Article 17 of the International Treaty to the Multilateral System of Access and Benefit-sharing, in particular to the provisions of Article 13.2.a;

Thanking the Governments of Germany and Canada for the financial support provided for the implementation of the Programme of Work during the 2018-19 biennium and the organization of the third meeting of the Scientific Advisory Committee on the Global Information System of Article 17 (Scientific Advisory Committee);

1. ***Takes note*** of the progress made in the implementation of the Programme of Work on GLIS during the 2018-19 biennium and requests that such implementation continue in the 2020-21 biennium;

2. ***Welcomes*** the progress made in the use of the Digital Object Identifiers (DOIs), and ***requests*** the Secretary, subject to the availability of resources, to continue its efforts to build the capacity of relevant stakeholders, especially in developing countries;

3. ***Takes note*** of the ongoing collaboration with Genesys, the World Information and Early Warning System (WIEWS), GRIN-Global, the European Search Catalogue for Plant Genetic Resources (EURISCO) and the Documentation and Information System Southern African Development Community (Web-SDIS), and ***requests*** the Secretary to continue enhancing cooperation with relevant institutions and initiatives, and facilitating the exchange of information through the Global Information System with existing information systems while avoiding duplication of efforts;

4. ***Takes note*** of the new project for the development of a globally agreed list of descriptors for *in situ* crop wild relatives documentation funded by the Government of Germany and ***encourages*** the participation of experts in the consultation process;

5. ***Further takes notes*** of the usefulness of controlled vocabularies and crop ontologies, and ***requests*** the Secretary to support the conversion of existing crop descriptors into ontologies and to further explore the use of stable ontologies through the Global Information System;

6. ***Recalls*** the opinion of the Scientific Advisory Committee on the usefulness of the application of DOIs to PGRFA information and ***thanks*** the stakeholders and users that have submitted information on the application of DOIs to genomic sequence data, including to link phenotypic and passport data with genomic sequence data;[30]

7. ***Requests*** the Secretary to place a high priority on linking scientific publications and datasets to PGRFA material and in supporting users to incorporate such information into information management systems;

[[30] Any consideration of terminology related to digital sequence information/genetic sequence data by the Governing Body may be reflected in the text of this Resolution.]

8. ***Thanks*** the Scientific Advisory Committee for the development of entry points developed in the Master Plan for the Portal and ***requests*** the Secretary to incorporate them in the GLIS Portal as soon as possible;

9. ***Takes note*** of progress made with the DivSeek Initiative, and ***requests*** the Secretary to explore possible arrangements for further engagement with the Initiative, under the guidance of the Bureau of the Ninth Session;

10. ***Decides*** to reconvene the Scientific Advisory Committee with the same composition and terms of reference of the previous biennium, 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;

11. ***Invites*** the Committee to review, as may be required, the Programme of Work of the Global Information System for the consideration of the Ninth Session of the Governing Body;

12. ***Requests*** the Scientific Advisory Committee to continue considering scientific and technical issues of relevance to genetic sequence information, as far as it is generated from the use of PGRFA and related to the implementation of the GLIS;

13. ***Invites*** Contracting Parties, other governments and stakeholders to provide the necessary resources to implement the Programme of Work, in particular for the further development of the GLIS Portal, the review of crop list standards and the support of training and capacity-strengthening activities in developing countries;

14. ***Requests*** the Secretary to follow up on the implementation of the recommendations of the Scientific Advisory Committee and to submit a progress implementation report to the Ninth Session of the Governing Body.