



The International Treaty

ON PLANT GENETIC RESOURCES FOR FOOD AND AGRICULTURE



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INTERNATIONAL TREATY ON PLANT GENETIC RESOURCES FOR FOOD AND AGRICULTURE

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Institutional and Policy Designs for the Global Information System

EXECUTIVE SUMMARY

1. *This document has been prepared to provide information on the relevant policy and institutional settings within which the Global Information System is likely to operate. It presents the System as a common pool of resources which requires the broad participation and contribution of multiple stakeholders with different roles and provides an overview of potential principles for the consideration of the experts.*
2. *The document indicates the need for a set of rules and legal agreements and mechanisms to facilitate the sharing of information, including aspects as attribution and ownership claims, access and usage.*
3. *It also refers to experiences accumulated by other projects involving large provision of data and information by multiple stakeholders with public and private interests, diverse agendas and yet common goals, which could be relevant for the discussion and for the elaboration of the Programme of Work.*

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I. INTRODUCTION

1. Article 17 of the Treaty refers to the exchange of information, and the availability of such information as a contribution to benefit-sharing. It also refers to the Global Information System (GLIS) as based on existing systems, hence calling for a level of interoperability among those systems.

2. As presented in other parts of the documentation elaborated by the Secretariat, data exchange, integration and interoperability are technical specifications of the broad concepts that Article 17 harbours. In this section, we explore the institutional and policy dimensions of those concepts. The development of institutional mechanisms and policy principles that encourage the use and sharing of information among a wide range of actors in all sectors (ie, government, industry, university and other non-profit), would be aligned with the logic of Article 17 and may indeed become a desirable objective of the GLIS, with a view to encouraging research collaboration, sharing of data, and innovation within various scientific communities and disciplines and across stakeholder groups.

II. INSTITUTIONAL DESIGNS TO ENSURE AVAILABILITY AND ACCESS

3. Crop diversity as a fundamental resource for developing improved plant varieties is formed of two equally essential components: the physical plant material containing such diversity and information generated on and with such materials. As detailed in other documents¹ and in the Vision Paper², the multiple information systems, data sets and services currently in place covering technical, scientific, environmental aspects related to crop diversity seem to be difficult to find (that is, are not always available) and difficult to use (that is, are not always or readily accessible).

4. The GLIS as set forth in the Treaty aims to develop a truly global system of information covering all these aspects, ensuring its availability and accessibility by the world community. GLIS does not limit the range of information on plant genetic resources for food and agriculture (PGRFA) that may be included.³ It will be built upon the multiplicity of existing information systems on PGRFA, which may vary according to crops, types of information, and geographical and/or stakeholder reach, to develop a network interconnecting data and information among such diverse systems, through the adoption of common data standards, analytical tools, terms of engagement, and a governance structure, that allow and ensure access and availability of information and services related to PGRFA at a global level.

a) A networked common pool resource

5. Building a **common pool resource** such as GLIS requires the **broad participation and contribution** of multiple stakeholders such as providers and recipients of PGRFA under the multilateral system (MLS), producers of data and information on PGRFA, producers of analytical and information technology tools, users of these resources, funding agencies, the Secretariat and the Contracting Parties to the Treaty. The participation of such heterogeneous community may pose challenges for the acceptance of and adherence to common terms of engagement that enable an effective and efficient sharing and integration of data and information.

¹ IT/COGIS-1/15/4, *Improving Interoperability of PGRFA DATA within the Global Information System*.

² IT/COGIS-1/15/5, *The vision Paper for the Global Information System on Plant Genetic Resources for Food and Agriculture*

³ As per Article 17 of the Treaty GLIS aims at “*facilitat[ing] the exchange of information, based on existing information systems*”. These may range from “*available passport data*” (Art. 12.3b of the Treaty and Article 5b of the SMTA) to information resulting from “*technical, scientific and socio-economic research, including characterization, evaluation and utilization*” (Article 13.2a of the Treaty) and also from “*environmental matters*” (Article 17.1 of the Treaty).

6. The challenges could be overcome if the participants and partners perceive and make use of the **substantial benefits** that access and availability of data and information on PGRFA can have over advances in research and development of crops. GLIS is conceived on the premise that the “**network effect**” of contribution, use and re-contribution of data and information on PGRFA is positive as it (i) makes possible the simultaneous access, interoperability and use of varied and complementary sources of information otherwise scattered and sometimes inaccessible; (ii) combines and analyses diverse types of data and information in ways that not a single entity or group on its own may do it; and (iii) potentiates connections and synergies among stakeholder groups with diverse areas of expertise, services and resources otherwise disconnected and unknown to each other.

7. As a common resource fostering research and development on the conservation and use of PGRFA, the network of GLIS will not be **suffering depletion through use**, but quite the opposite; through information sharing, it will provide benefits that can be adopted and adapted by local, national and global communities working on crop improvement with a vision to attain food security.

b) Principles

8. A key factor for a harmonious operation of a broad and diverse range of partners and participants harboured in Contracting Parties’ territories and/or being part of the MLS of PGRFA is a shared and common understanding and acceptance of the **principles and terms** that underpin the GLIS.

9. It is suggested that some **principles** underpinning the GLIS be: (i) increased accessibility, availability and transparency of PGRFA-related information systems; (ii) creation of synergy through broad collaboration, sharing and engagement of a wide spectrum of stakeholders; and (iii) enabling the advancement and innovation of crop research and development (R&D) at multiple levels –local, regional, national and international- through the ample sharing of the benefits derived from the first two principles. These principles reflect some of the results of the landscape survey that the Treaty Secretariat launched.⁴

c) Partners: contributions and roles

10. **Partners and their contributions** are *all* valuable to the construction and sustainability of the GLIS. Partners contributing data, information and analytical/IT tools are needed regardless of the extent of their operations –local, regional, national, international-, the type of data and information shared –passport, phenotypic, genotypic, environmental, socio-economic, policy, etc.- and the crop or PGRFA worked on. Partners whose contribution is funding, policy guidance, technical advice, management, communication are equally important to the success of the system. In turn, GLIS will foster partnerships among its partners, advancing in this way R&D in crops and food for sustainable food production and food security amidst an insecure climate.

11. **Shared and divided roles and responsibilities** among partners and participants of the GLIS network will be critical for its functioning as a common resource. Provided that the individual organizations may have different roles and responsibilities simultaneously, such roles and responsibilities may include:

(i) For the **Secretariat**: serving as a central facilitation node for the network and other GLIS facilities, and for the entire network. It may serve as an intermediary before the Governing Body for decisions/plans taken by the network members. It may serve as the focal point for initial source of terms of engagement/guidelines/best practices/standards and for seeking participation in their discussion and decision-making; dissemination and sharing of data and information; convening and coordination of network activities (meetings, forums, working groups, etc.); liaising with potential partners for their contribution in diverse areas; facilitating collaboration

⁴ Analysis of the Landscape and Genomics Surveys in the Context of the Global Information System, IT/COGIS-1/15/Inf.1, paras. 12-16.

among partners; communications among the network members; developing supporting activities to foster collaborations and use of data and information, among others.

(ii) For the **funding agencies**: supporting activities and projects aiming at devising common standards for data integration and interoperability of databases; requesting prompt release of data and information in searchable databases; and working in determining quality and breadth of the resource through peer-review evaluation. Also, they can provide sufficient support to the generators of datasets and to GLIS for curation, maintenance, initial analyses and distribution of data to the community. They could also foster synergies among potential partners through a centralized view of supported resource projects. Finally, funding agencies could support the development of a central database (if considered necessary) for housing and distribution of data.

(iii) For the **data producers**: inform the community about the information system (type of data, analyses carried out, etc.) and provide a citation to reference source of data; consistently produce and share high quality and as complete as possible data and metadata; make non-confidential data and information freely available and without restrictions; and work towards the devise and use of common agreed standards for inter-operability and integration of data.

(iv) For the **data and information analysers and users**: they can also provide services, identify needs and/or devise new ways of treating, combining or analysing data and could share these new ways with other members of the network. In addition, analysers and users should abide by the terms of data use for the system to works for them and for all.

12. Apart from the mentioned groups and roles, the **Governing Body** of the Treaty could be playing a role on policy guidance for non-confidential information associated with *ex situ* collections covered under Article 15 of the Treaty. In addition, GLIS may consider having an independent **advisory body**, of consultative and counselling nature, composed of experts not appointed by the Contacting Parties, which could guide the activities contemplated by the global system.

d) Availability of information: some limitations

13. For the institutional design of GLIS to be effective and realistic, it is necessary to take into account the **limits on availability of information**. According to the Treaty, such limits may derive from the confidentiality status of the information, the applicability of laws, and the national capabilities.⁵

Confidentiality status of the information

14. With regard to confidentiality status of the information, international standards are in place. According to those standards⁶ all country members of the World Trade Organization (WTO) must protect undisclosed information of natural and legal persons when information is secret and has been maintained so, that is, confidential, and has commercial value (derived of its secrecy). Likewise, WTO members must protect undisclosed regulatory test data required, for example, for marketing approval of agrochemical products.

15. In case of confidential PGRFA-related data or information, GLIS would need to decide whether to accept or not to access/hold information in confidence, as this would impact on the measures adopted for accessibility of data and possibly on administrative measures and costs of running the platform.

16. The Secretariat of the International Treaty is already familiar with handling vast amount of data and information, including confidential information, provided by users of the Standard Material Transfer Agreement (SMTA) for the transfer of PGRFA under the MLS of the Treaty. **Easy-SMTA** is a group of information technology tools that facilitate the compiling and generation of SMTAs in multiple languages, and the reporting on concluded SMTAs according to the terms of the Treaty and the instructions of the Governing Body. Cognizant of the private nature of the SMTA as a contract between a provider and a recipient of PGRFA under the MLS,

⁵ Article 13.2 a of the Treaty

⁶ Article 39 of the Agreement on the Trade-Related Aspects of Intellectual Property Rights (TRIPS).

the Secretariat protects identifiable information (i.e., names, emails and contact details) collected through Easy-SMTA tools under confidence, and uses non-identifiable information of the PGRFA transfers to provide statistical and general information to the Governing Body, and also for operations and quality assurance purposes.

Applicability of laws

17. National laws that may limit disclosure of information and/or reuse, extraction, redistribution, reproduction, or adaptation of information and databases include confidentiality and trade secrets laws, copyright and related rights, database rights, test data exclusivity and privacy laws applicable to disclosure of personal information.

18. Confidentiality and trade secret laws at national level consistent with the international standards mentioned in the above section are aimed at providing protection against disclosure of information of potential commercial value. Copyright and related rights, also consistent with international standards,⁷ are applicable to the expression of an idea or information in works, including literary and artistic. Of importance for the GLIS, authors of scientific and technical information and works hold exclusive rights on reproduction and redistribution, public display of the work, and creations of derivative works. The rights holder would need to give its consent to any of the above uses through for example, a waiver, license or assignment. Database rights recognize and protect the investment made in a systematic compilation of data or arrangement of information (database), against extraction, reutilization, or copying. These *sui generis* rights apply only in certain countries, notably the European Union.⁸ However, even if they do not exist as such, the content in databases is likely to be protected by copyright. Acts such as collection, storage and use (including transfer and disclosure) of personal information, which can be linked to a person, are regulated in many countries through privacy laws.

19. The GLIS would need to take into account the applicability of any of the mentioned bodies of law when linking diverse databases or information systems, and /or performing any of the acts above mentioned.

National capabilities

20. National capabilities have been invoked in case of availability of information by the Contracting parties on the PGRFA that are under the MLS and on the reporting of the use of the SMTA for the transfer of such PGRFA. Given the differences in information gathering, processing, analysing and storage capacity of the Contracting Parties, public and private entities and organizations holding and using PGRFA, an important component of the GLIS could be to foster and enhance the capability of the Contracting parties and the MLS participants on all the mentioned areas of data and information management to be able to build an inclusive, growing, dynamic and relevant information system where its partners and participants could benefit indeed from availability and accessibility of data and information.

III. MECHANISMS FOR ACCESS AND APPROPRIATION

21. Clear and concise terms of engagement for the participation in an open and inclusive community informational resource, such as the GLIS, are critical for its establishment, its “buying” among the providers and users, sustainability and use.

22. As the existing PGRFA information systems in place demonstrate, an online terms and conditions page containing the defined terms on information access, deposit and usage is set up to be accessible to anyone wanting to join as data providers and users. The GLIS may consider formalization of some partnerships by entering into agreements with, for instance, major

⁷ Articles 9 to 14 of TRIPS.

⁸ Directive 96/9/EC of the European Parliament and of the Council of 11 March 1996 on the legal protection of databases.

providers of data/information, analytical tools, and financial donors. In any case, the agreements should reflect the upon-agreed terms and conditions available online in addition to the specific terms according to the situation at hand.

a) Publicly available information with or without registration

23. Access to the GLIS online platform could be completely unrestricted to the public and without registration, or could be public and requiring a potential user and/or provider of data registration in order to access all or parts (components) of information available through the system. As described in the following section, several informational resources contain information accessible with and without registration at the same time, depending on the nature of the information provided.

b) Contributing information and/or linking databases or datasets

24. Providers of datasets and information should provide complete metadata on the data provided, and include time of collection/generation and provision, location, links with actual PGRFA collections and follow decided-upon standards for data provision. Following article 13.2a of the Treaty, information should be non-confidential and available to the public in case of passport data and associated descriptive information on PGRFA. In this case, access to the public should be delayed due to time processing and work only. However, as before mentioned, the GLIS might consider receiving confidential information (e.g., PGRFA-related technological applications, commercially valuable evaluations of materials, including of PGRFA under development) or information submitted to limited embargo periods after which it would become publicly available.

25. To strengthen the links with the Benefit Sharing Fund (BSF) of the Treaty and share the benefits of funded projects within the participants of the MLS and the public in general, all projects financed through the BSF have the obligation to deposit in the GLIS platform or make accessible to it, information on materials and data and information gathered/developed on materials worked under such projects. Likewise, organizations and projects funded and/or administered by the Global Crop Diversity Trust related to PGRFA collections may be requested to make data and information available through agreed procedures and standards.

c) Attribution and ownership claims

26. All provided and/or accessed data and information should always have a very clear and simple format to cite the source. Information on the individual or corporate authors should always be present with the data/information. When information has been directly deposited in the GLIS platform, it might be possible to send automatic alerts to authors.

27. Copyright notices of deposited and/or linked to information should be present and clear. All of the data/information posted on the GLIS would be subject to the pertinent intellectual property rights owned by those who deposited and/or allowed linkages of their material. If the GLIS compiles and/or analyses and presents data, there is a need to decide *ex ante* who would own the IPRs on such compilation and/or analyses and new data. Allowed usage of copyrighted material should also be spelled out clearly.

28. Ownership on new data and information derived from accessing, combining, analysing or otherwise working with the accessed information should be defined. Terms may contemplate that such derived new data and information and any new technologies or tools developed based on the accessed data/information are the property of who develops them. A granting back clause to the GLIS of such new developments, combinations and/or inventions might also be considered in order to augment the resources provided through the GLIS, and make it relevant through time and use. The GLIS and other organizations associated could consider the use of Creative Commons licenses.⁹ Copyrighted works can be licensed providing permission for others to use the work

⁹ Information on Creative Commons licenses can be found at creativecommons.org

under certain conditions such as copy, distribution, translation, edition, build upon the work, for commercial or non-commercial purposes. The right holder selects the grade of permissiveness that wants to allow with the work by choosing from different licenses available, while reserving some rights over the works. The aim of these licenses is to facilitate and foster sharing and innovation of copyrighted works. As up to November 2014, there is an estimate of 882 million works licensed under Creative Commons terms.

d) Access and usage

29. Any provider of data/information is also a potential user of the GLIS platform. The system might consider having a different set of access rules for providers/partners of GLIS and for users only. For instance, providers/partners may get earlier access to data/information given by other providers, to new data/information generated through analyses done by the GLIS, and/or could have the right of the first offer of services provided through or by the GLIS. These measures may also serve as incentives for providers to share and allow access to their data/information.

30. Authorised uses of the data/information upon access by both partners-providers and users only should be clearly spelled out. If different sets of rules applied to different sets of information in the GLIS, these should be clearly and visibly described at the moment of access.

31. Irrespective of the authorised uses of the information, any user should appropriately cite the source of data analysed and acknowledge the data provider/author, and should recognize the legitimate interest and right of the data producer and provider in publishing what they have produced and that neither a description of the data, nor data deposit in a database or repository will be equivalent to such publications.

32. As mentioned before, informational resources growing through use require feeding back new data and information into the system after use of the accessed resource. This should be a condition to any user of the GLIS. The terms of the system should specify standards to follow for reporting/deposit back information and times to do so.

e) Other terms

33. Measures and standards for monitoring the development and the effectiveness of the system, and for assessing adherence of the members would assist in making the GLIS an adaptive and responsive system to the needs of the members of the network resource.

34. Termination conditions and dispute settlement provisions would assist on providing to the network members certainty on the conditions to join the platform, to finish such engagement, and to clarify and resolve disputes emerging among the community members.

IV. COMPARABLE EXPERIENCES IN OTHER FIELDS

35. The concepts and possible functions of GLIS are not new. Projects involving large provision of data and information by multiple stakeholders with public and private interests, diverse agendas and yet common goals can be found in the agricultural area as well as the health realm. Without any attempt to determine the practical consequences of different policy options, this last section of the paper describes some relevant initiatives, for possible future further analysis as part of GLIS future Programme of Work¹⁰.

36. Some of the older projects on large-scale data sharing and use involve genomics and sequencing information derived from the Human Genome Project, the Cancer Genome Project, the Mouse Genome Project and the sequencing of the Zebrafish, pig, and nematods such as *Caenorhabditis elegans*.

¹⁰ IT/COGIS-1/15/5, *The vision Paper for the Global Information System on Plant Genetic Resources for Food and Agriculture*

37. The Wellcome Trust Sanger Institute has become the central node of all these efforts, connecting initiatives and establishing collaborations that abide by the principles of rapid and open data sharing while given due scientific credit to the data generators and analysers to strategically support and enable research and accelerating translation.

38. These principles were elaborated in the *Bermuda Principles* issued in 1996. In them there was a call and agreement upon the rapid public release to the public international DNA sequence databases (GenBank, EMBL, and DDBJ) of sequence assemblies of 2kb or greater by large-scale sequencing efforts. In 2003, this call was extended to all sequence data. Rapid pre-publication release (as soon as possible), which contravenes the practice of releasing experimental data only after publication is only subject to data meeting appropriate quality assessment standards. To balance this with “publishing the first analysis of one’s own data” (i) contributions and interests of large-scale data producers should be recognized and respected by users of data; and (ii) the ability of production centers to analyse and publish own data should be supported by funding agencies.

39. These principles represent a significant achievement of private ordering in shaping the practices of an entire industry and have established rapid pre-publication data release as the norm in genomics and other fields.¹¹The governance framework supporting these kind of community resources implies the adoption of a tripartite system of sharing of responsibilities integrated by the resource producers, resource users, and funding agencies. As explained earlier in this paper, this ripartitioning can also be useful to the development of the GLIS.

40. While the above efforts are mostly among institutions located in developed countries and involve only genomic/genotypic data, an initiative called “*Cassavabase*” connects entities involved in cassava breeding and improvement located in developed and developing countries, and links accessions of cassava genetic resources with provided/shared phenotypic and genotypic information on those plant resources. The data on the database is shared according to the *Toronto Agreement* of 2009.

41. Following the principle of broad availability of data prior to publication adopted by the Human Genome Project and aware of the public benefits that this generates, the Toronto Agreement applies this principle to large reference datasets in biology and medicine, and to other types of datasets such as phenotypic data. It also addresses the importance of simultaneous release of metadata to enable users to fully exploit the data, and develops a set of suggested best practices for funding agencies, data producers, data analysers/users, manuscript reviewers and journal editors.

42. The participation of countries as members of data sharing initiatives can be reflected in projects such as *WIPO Green* and the *Clearing House Mechanism (CHM) of the Convention on Biological Diversity (CBD)*. The first one provides a database and network connecting technology and service providers related to green technology. WIPO serves as a central node to connect the participants and to organize and redistribute information supplied by technology providers. WIPO Green website describes the terms of engagement of the participants and the governance structure of the resource. The participants are divided into partners, those who contribute technology and information, and should accept the charter of WIPO Green; and the users, who need to register online and accept the terms and conditions of use of the site resources.

43. The CHM of the CBD was created to foster and facilitate technical and scientific cooperation among Contracting Parties of the CBD. The central node of this network is the CBD website; the national CHM form the network and there are various partner institutions to expand the network and services. The facility and its members function according to priority activities. The CHM is now enriched by the Access and Benefit-sharing Clearing-House, which serves as a means for sharing of information related to access and benefit-sharing. In particular, it provides

¹¹ J.L. Contreras, *Bermuda’s Legacy: Policy, Patents and the Designs of the Genome Commons*, in *Minnesota Journal of Law, Science & Technology*, Vol. 12, p. 61, 2011.

access to information made available by each Party relevant to the implementation of the Nagoya Protocol to the CBD.¹²

44. A useful organizational model to consider comes from the PGRFA sector. FAO established the World Information and Early Warning System (WIEWS) on PGRFA, as a global mechanism to foster information exchange among Member Countries and as an instrument for the periodic assessment of the State of the World's PGRFA. It presently consists of: a number of relational databases, mostly resulting from direct contributions from Member Countries; a Global Network of country correspondents; and a repository directory of documents and proceedings related to PGRFA, including an early warning system on genetic erosion. Following the recommendations of the FAO Commission on Genetic Resources for Food and Agriculture, it hosts the information sharing mechanism on implementation of the Global Plan of Action on PGRFA.

45. All the former projects have elements that overlap with the envisioned GLIS. Key common elements in all of them that could be adopted by GLIS are: (i) devising of a governance structure and modus operandi based on agreed principles and, as applicable (i.e. where the information system serves an international policy or legal instrument), under multilateral guidance; (ii) adoption of terms calling for prompt sharing of data in a public manner while acknowledging and respecting the rights of ownership, authorship and/or publishing own data first of the data/technology providers, and (iii) simple, succinct terms of engagement mainly for data providers and users.

V. CONCLUSION

46. For the GLIS to achieve its functions of facilitating exchange and availability of PGRFA-related information, a strong institutional and policy foundation is desirable. This section of the vision paper has provided a first description of some designs and mechanisms that the multiple communities which will build the GLIS, under the guidance of the Treaty's Governing Body, may consider as useful components of the system.

47. The GLIS may create and operate a common pool resource under the Treaty. As illustrated through an examination of essential requirements of institutional designs and of practical normative tools, building such a common pool calls for:

- a) a framework that enables the broad participation and contribution of multiple stakeholders; and
- b) clear "rules of engagement" that cater for access to the resource, and use of the resource to generate new knowledge and innovation.

Both aspects can form the basis of multilateral guidance under the future GLIS road map.

¹² Nagoya Protocol, Article 14.1.