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IMPLEMENTATION OF THE NAGOYA PROTOCOL ON ACCESS AND BENEFIT-SHARING AND THE GLOBAL TAXONOMY INITIATIVE

Information note by the Executive Secretary

1. In decision X/39, the Conference of the Parties recognized the importance of exchange of taxonomic voucher specimens for non-commercial biodiversity research, noting that regional and subregional scientific and technical collaborations would need to be in accordance with relevant national legislation and relevant requirements, including the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization to the Convention on Biological Diversity.

2. In its Article 8 (a), the Nagoya Protocal stipulates that:

> "In the development and implementation of its access and benefit-sharing legislation or regulatory requirements, each Party shall create conditions to promote and encourage research which contributes to the conservation and sustainable use of biological diversity, particularly in developing countries, including through simplified measures on access for non-commercial research purposes, taking into account the need to address a change of intent for such research"

3. In considering these provisions, the Coordination Mechanism of the Global Taxonomy Initiative has prepared the present document for information of participants in the sixteenth meeting of the Subsidiary Body on Scientific, Technical and Technological Advice.

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EXECUTIVE SUMMARY

This document outlines implications for the Global Taxonomy Initiative arising from the implementation of regulations and legislation on access to genetic resources and the sharing of benefits arising from their utilization, in particular in the context of the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization to the Convention on Biological Diversity. In considering simplified access under Article 8 of the Nagoya Protocol, Parties should bear in mind the operations and practices of taxonomy and taxonomic institutions. The taxonomy and related non-commercial biodiversity research sectors will have to address means of ensuring and demonstrating compliance to the provisions of the Nagoya Protocol – as well as applicable national regulations.

One of the goals of the Convention on Biological Diversity (CBD) is the fair and equitable sharing of the benefits arising from the use of genetic resources (ABS). The Convention recognizes national sovereignty over all genetic resources and provides that access to these resources be carried out on 'mutually agreed terms' (MAT) and subject to the 'prior informed consent' (PIC) of the country of origin. Increased clarity on the meaning of terms, including 'utilization' of genetic material, shows that the type of work carried out by taxonomists in implementation of the Global Taxonomy Initiative (GTI), as well as other non-commercial taxonomy-linked research, increasingly includes 'use' through, for example, techniques of DNA sequencing.

Currently, permission to collect biological specimens for taxonomic or other non-commercial access is often granted through the same system as for commercial access. Some countries have already implemented regulations that allow 'simplified access' congruent to Article 8 of the Nagoya Protocol, while others have not done so or have not yet addressed such regulations. To assist Parties in their development of legislation and regulations, awareness of the benefits arising from non-commercial taxonomic activities including those under the GTI should be increased. Similarly, awareness of the needs to comply with ABS regulations and an understanding of the issues surrounding ABS should be raised within the taxonomic community.

The Nagoya Protocol asks for model contractual clauses and codes of conduct, best practices and standards. Several sources for such standards and codes of conduct are available, and from these clauses, codes and protocols should be developed that fit non-commercial taxonomic work and institutions. Ideally these should be adopted as widely as possible in the sector, thus providing certainty for provider countries and clarity to the taxonomic sector.

An important issue is clarity on third-party use, as applied to a sector which, in order to function effectively, regularly sends biological specimens between scientists and individuals. Properties of a resolution system enabling specimens and analyses on them to be tracked need to be developed in a cost-effective manner.

Although the emphasis of the document is on requirements for conducting non-commercial research in support of the Convention in the most effective manner, it is important to recall that in order to implement ABS legislation, many countries will need to improve their knowledge of species and genetic strains living within their national boundaries. This will be an area where GTI implementation (as included in the programme of work on the GTI, Planned Activity 14) is important to expedite.

The needs and possible next steps to meet them are outlined.

I. INTRODUCTION

1. The Draft Capacity-Building Strategy for the Global Taxonomy Initiative (GTI) (UNEP/CBD/SBSTTA/16/12) includes actions to improve the contribution of taxonomy for the

implementation of the Convention, including its Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from Their Utilization (hereafter the Nagoya Protocol)[1].

2. At its tenth meeting, the Conference of the Parties (COP) *encouraged* Parties, other Governments and organizations to find ways of facilitating and benefiting from regional and subregional scientific and technical collaborations in accordance with relevant national legislation and relevant requirements where applicable with due regard for the need to address changes in use and intent other than taxonomic and subject to the outcomes of the negotiation on the international regime on access and benefit-sharing under the Convention (paragraph 10 of decision X/39).

3. In this context, the GTI Coordination Mechanism considered implementation of the Nagoya Protocol and its linkage to the implementation of the programme of work for the GTI. The Coordination Mechanism further collected and examined relevant information concerning possible implications for the GTI arising from the implementation of Access and Benefit-sharing regulations and legislation, and in particular in the context of the Nagoya Protocol.

4. At its tenth meeting, the Coordination Mechanism of the Global Taxonomy Initiative (GTI) expressed the view that information on the Nagoya Protocol is important to the coordination of international collaboration on taxonomic research and capacity-building, and suggested that information about the Protocol be included in the outreach activities of the Coordination Mechanism (UNEP/CBD/GTI-CM/11/2).

5. Pursuant to decision X/39, the Coordination Mechanism, at its eleventh meeting, prepared a draft of a Capacity-Building Strategy for the GTI. During the preparation of this document, the Coordination Mechanism recognized the strong need for outreach materials to enable taxonomists and other scientists to understand the Convention and the Strategic Plan for Biodiversity, as well as the Nagoya Protocol (UNEP/CBD/GTI-CM/11/3). Therefore, the Coordination Mechanism, at its twelfth meeting, discussed the relationship between the Nagoya Protocol and implementation of the GTI.

6. The requirements of this discussion, as set out in document UNEP/CBD/GTI-CM/12/1/Add.1, were to:

(a) Stimulate early actions to promote international collaborations as part of capacity-building for the GTI;

(b) Develop suggested processes for developing guidance for academics who conduct international collaboration on non-commercial research under the Nagoya Protocol; and

(c) Develop guidance for GTI Focal Points.

7. This document could also be provided to professional associations, National Focal Points, and others to improve awareness on the GTI and the Nagoya Protocol.

8. The Coordination Mechanism considered the existing means by which the implementation of the GTI and the Nagoya Protocol could be facilitated. The Coordination Mechanism also identified the areas of work under the GTI relevant to the implementation of the Nagoya Protocol that might be considered at relevant meetings of the Convention on Biological Diversity and aspects of capacity-building that might be required.

9. As a first step in delivering guidance and stimulating actions for the above, the Coordination Mechanism has prepared the current information document to submit to SBSTTA 16 to assist its review of the revised Capacity-Building Strategy for the GTI (UNEP/CBD/SBSTTA/16/12).

1 Decision X/1, annex I, http://www.cbd.int/decisions/?id=12267

II. RELATIONSHIP BETWEEN ACCESS AND BENEFIT-SHARING AND THE GLOBAL TAXONOMY INITIATIVE

10. The Nagoya Protocol in Article 2, Use of terms, defines "Utilization of genetic resources" as meaning: "to conduct research and development on the genetic and/or biochemical composition of genetic resources, including through the application of biotechnology as defined in Article 2 of the Convention".

11. Taxonomic activity relies to a great part on examination of biological specimens for diagnostic characters, including morphological, physiological and molecular. Some classical taxonomic methods may not involve a specimen's genetic material being 'utilized' as defined by the Nagoya Protocol[2]. However, because the specimens contain genetic material, at least at the time of collection, and because an increasing proportion of taxonomic work involves research on the genetic material contained in the specimen, collecting and researching biological specimens for taxonomic and similar work is included by most Parties under ABS policies and regulations, and is likely to be covered by Nagoya Protocol implementation. Consequently, collecting biological specimens and conducting research on them in the context of GTI implementation and other non-commercial biodiversity activities may fall under the implementation of ABS legislations and regulations and, as they are developed, those resulting from implementation of the Nagoya Protocol.

12. Successful implementation of the GTI in many cases relies on collection and movement of biological specimens across national boundaries, so that they can be examined and identified by specialists. Such movements may involve tens or hundreds of thousands of specimens each year, and may involve further transfers between third parties so that different specialists can examine material as a necessary part of non-commercial research (Tobin *et al.*, 2004; Tindall and Garrity, 2008). Additional transfers may involve genetic material or information derived from the materials in question.

13. Biological specimens used for taxonomic research may be held in collections with an international remit as a permanent resource for science. Such specimens can include vouchers from such activities as inventories and surveys, cultures of living organisms or extracts thereof, microbial consortia, or other biological samples. These are curated and maintained so that results can be verified or replicated in the future, and specimens collected in future surveys can be compared with those from different times or places.

14. Activities supporting Parties in their implementation of the Nagoya Protocol and the GTI could inadvertently impede the implementation of the Nagoya Protocol. Examples of unintended impacts on GTI implementation of Access and Benefit-sharing legislation include, but are not limited to:

(a) Limited access to biological specimens for non-commercial research;

(b) Rejection or destruction of biological specimens at international borders;

(c) Discouragement for regional/international collaboration for capacity-building for the implementation of the GTI;

(d) Delays to filling gaps in information and knowledge on biodiversity;

(e) Widening the gap with regards to taxonomic capacity to support implementation of the Convention and the Strategic Plan for Biodiversity 2011-2020.

[2] Under Article 2 of the Nagoya Protocol "Utilization of genetic resources" means to conduct research and development on the genetic and/or biochemical composition of genetic resources, including through the application of biotechnology; "Biotechnology" as defined in Article 2 of the Convention means any technological application that uses biological systems, living organisms, or derivatives thereof, to make or modify products or processes for specific use; "Derivative" means a naturally occurring biochemical compound resulting from the genetic expression or metabolism of biological or genetic resources, even if it does not contain functional units of heredity. We take the view that some classical taxonomic methods fall outside of biotechnology or utilization of genetic resources.

15. Such problems have already been observed in the process of implementation of legislation and regulations regarding ABS in some countries prior to adoption of the Nagoya Protocol. The Nagoya Protocol and the current development of mechanisms to support its implementation provide an excellent opportunity to promulgate understanding of ABS issues and the Nagoya Protocol among taxonomists and other relevant stakeholders, and understanding of the GTI among the ABS community. The activities identified in the following sections intend to alleviate the above problems/unintended impacts and improve the efficacy of implementation of both ABS and the GTI.

Relevant COP decisions for Access and Benefit-Sharing and the Global Taxonomy Initiative

16. The Conference of the Parties to the Convention on Biological Diversity has noted in its decisions III/10, IV/1, V/9, VI/8, VII/9, VIII/3, IX/22, and X/39 that implementation of the Global Taxonomy Initiative, with the purpose of providing taxonomic information and expertise for support of other cross-cutting initiatives and programmes for the thematic areas of the Convention, should include regional activities. This necessitates trans-border activities including transfer of biological (and hence genetic) material across national boundaries.

17. In its first meeting, the Coordination Mechanism of the GTI recognised that there were concerns regarding acquiring appropriate permission for trans-border taxonomic activities, and how this relates to Article 18 of the Convention on technical and scientific cooperation. The report of the first meeting of the Coordination Mechanism stated: "Biological species do not observe national boundaries, and can only be understood and sustained if their variation can be studied and assessed in the natural habitats throughout their entire geographic range. Much taxonomic research depends on transnational activities and international cooperation involving joint fieldwork, travel of personnel, and the frequent exchange of data, samples, and biological specimens. The Coordination mechanism advises the Executive Secretary to urge Parties to the Convention to facilitate such efforts of international cooperation for taxonomic research as are needed to help implementing activities of the Convention by, *inter alia*, establishing clear and unambiguous mechanisms for granting the necessary permissions for approved research projects, field work, collection of biological specimens, and free exchange of personnel, data and relevant materials." (Report of the GTI Coordination Mechanism meeting, Montreal 23 November 2000 (http://www.cbd.int/gti/coordination.shtml)).

18. In paragraph 10 of decision X/39, the Conference of the Parties stated that "Recognizing the importance of exchange of taxonomic voucher specimens for non-commercial biodiversity research, encourages Parties, other Governments and organizations to find ways of facilitating and benefiting from regional and subregional scientific and technical collaborations in accordance with relevant national legislation and relevant requirements where applicable with due regard for the need to address changes in use and intent other than taxonomic and subject to the outcomes of the negotiation on the international regime on access and benefit-sharing under the Convention;"

19. The programme of work for the Global Taxonomy Initiative (annex to decision VI/8) includes Planned Activity 14, "Access and Benefit-Sharing". This refers to decision V/26 of the Conference of the Parties, which identifies "Assessment and inventory of biological resources as well as information management" as key capacity-building needs with respect to access and benefit-sharing arrangements, and outlined mechanisms whereby these needs could be met.

20. The Bonn Guidelines on Access to Genetic Resources and Fair and Equitable Sharing of the Benefits Arising From Their Utilization, as adopted by the Conference of the Parties to the Convention at its sixth meeting, included as an objective in paragraph 11 (l) "Taxonomic research, as specified in the Global Taxonomy Initiative, should not be prevented, and providers should facilitate acquisition of material for systematic use and users should make available all information associated with the specimens thus obtained." The Guidelines also provide a range of possible benefits arising from the utilization of genetic resources including some likely to arise from non-commercial taxonomic research carried out as a part of the Global Taxonomy Initiative.

21. The Nagoya Protocol in Article 8, Special Considerations, states: "In the development and implementation of its access and benefit-sharing legislation or regulatory requirements, each Party shall:

(a) Create conditions to promote and encourage research which contributes to the conservation and sustainable use of biological diversity, particularly in developing countries, including through simplified measures on access for non-commercial research purposes, taking into account the need to address a change of intent for such research;

(b) Consider the importance of genetic resources for food and agriculture and their special role for food security.

Awareness-raising

22. Article 21 of the Nagoya Protocol sets out possible measures for Parties to raise awareness of the importance of genetic resources and traditional knowledge associated with genetic resources, and related access and benefit-sharing issues.

23. The second meeting of the Open-Ended Ad Hoc Intergovernmental Committee for the Nagoya Protocol, to be held from 9 to 13 April 2012 in New Delhi, will consider measures to raise awareness on the importance of genetic resources and associated traditional knowledge (UNEP/CBD/ICNP/2/1).

24. The programme of work for the GTI includes, as its Planned Activity 4, "Public awareness and education" and in paragraph 9 (e) of decision VIII/3 the Conference of the Parties urged Parties and other Governments to undertake, as part of the Global Initiative on Communication, Education and Public Awareness programme and in collaboration with relevant partners, activities demonstrating the importance of taxonomy.

25. Under the Nagoya Protocol, Parties may require that collections of biological specimens be made only with the appropriate Prior Informed Consent (PIC) and Mutually Agreed Terms (MAT) (or permit, as discussed in Article 6 of the Nagoya Protocol). Parties may seek to "create conditions to promote and encourage research which contributes to the conservation and sustainable use of biological diversity […] including through simplified measures on access for non-commercial research purposes" (Article 8).

26. However, such provisions and requirements will not be helpful if the key stakeholders are unaware of them. Accordingly, awareness of the Nagoya Protocol needs to be sufficiently developed among the stakeholders in Natural History Museums, Herbaria, Culture Collections, databases holding genetic information, and other bodies providing taxonomic support for the Global Taxonomy Initiative. In concert with this, awareness of the GTI and the benefits that can be expected of its implementation by non-commercial taxonomic research needs to be raised among appropriate bodies implementing the protocol, and for those responsible for issuing permits / agreeing to Prior Informed Consent (PIC) and Mutually Agreed Terms (MAT) within countries.

27. Resources that can be used in developing this part of a strategy exist in publications such as the "CBD for Botanists" and documents and tools accessible on the CBD web site at http://www.cbd.int/abs/instruments/. However, some more accessible and tailored brochures and presentations would be helpful, perhaps made available through the Secretariat of the Convention or the clearing-house mechanism in the form of presentations, posters and documents. These may need to be created for the purpose.

Simplified access

28. As noted above, specimens collected as a part of taxonomic work to implement the Global Taxonomy Initiative will require Prior Informed Consent (PIC) and Mutually Agreed Terms (MAT) to be negotiated and obtained (often in the form of permits).

29. As noted in paragraph 21 above, Article 8 of the Nagoya Protocol allows for simplified measures on access for non-commercial research purposes.

30. An example of such a process is provided by Australia (Environment Protection and Biodiversity Conservation Regulations 2000 Statutory Rules 2000 No. 181 as amended in October 2011. http://www.comlaw.gov.au/Details/F2011C00848, accessed January 2012). Other countries including, *inter alia*, Mexico, Indonesia and Brazil also distinguish between research for non-commercial purposes and commercial research.

31. Parties may find simplified access easier to grant if sureties can be provided enabling them to recognise the nature of the research as non-commercial and delivering benefits to biodiversity management and conservation. Taxonomic work may lead to non-commercial or commercial research; document UNEP/CBD/WG-ABS/7/INF/6 includes indicators to distinguish non-commercial and commercial research.

32. A tool that could be of assistance to Parties in establishing the nature of proposed research and the appropriate form of access to grant is a decision tree exploring various possible uses of biological material. Such a tool does not at present exist, but could be created with appropriate actors (see paragraph 66 below). A related document could comprise a framework indicating broad contexts for why people collect specimens and how this relates to taxonomic work.

33. Additional components to assist providers and users in negotiating MAT with confidence might include standard (model) contractual clauses, recognition in the agreement of appropriate non-commercial benefits, agreement on the part of the users to abide by sectoral best practices, codes of conduct and guidelines, and employment by the prospective user of an appropriate tracking system for material accessed. Further advantages of these sureties to the user are in removing uncertainty as to correct procedure and in removing bureaucratic issues around third-party transfer. The overall result should be to reduce administrative burden on provider and user while facilitating the application of taxonomic expertise to implementation of the Convention on Biological Diversity through benefits provided to the provider country and providing confidence to both provider and user.

Model contractual clauses and benefits arising from non-commercial research under the GTI

34. Article 19 of the Nagoya Protocol obliges Parties to encourage, as appropriate, the development, update and use of sectoral and cross-sectoral model contractual clauses for Mutually Agreed Terms. Such clauses need to be developed for non-commercial taxonomic work, but even in the short term both users and providers have resources available to provide suitable contractual terms. The indicators used to distinguish non-commercial and commercial research presented in document UNEP/CBD/WG-ABS/7/INF/6 might be transformed into standard clauses covering non-commercial research. Some model clauses are on various documents available through the CBD web site at http://www.cbd.int/abs/resources/contracts.shtml. These date from before the Nagoya Protocol, but are applicable to transactions under the Protocol; however, they need to be reviewed to determine their suitability specifically for non-commercial taxonomic applications. When codes of conduct, guidelines and best practices are agreed by the taxonomic community, reference could be made to these in model contractual clauses.

35. Possible benefits that might arise from non-commercial research are listed in both Appendix II of the Bonn Guidelines and the Annex to the Nagoya Protocol. These lists are not exhaustive, but provide a useful basis for agreements of Mutually Agreed Terms.

III. CODES OF CONDUCT, GUIDELINES AND BEST PRACTICES AND/OR STANDARDS

36. Article 20 of the Nagoya Protocol obliges Parties to encourage, as appropriate, the "development, update and use of voluntary codes of conduct, guidelines and best practices and/or standards in relation to

access and benefit-sharing". Many taxonomic institutions already have policies and protocols regarding ABS, and there are several relevant sectoral policies and Codes of Conduct developed prior to the Nagoya Protocol. These might be further developed and extended to include both the explicit reference to the Protocol and also to operations of non-commercial taxonomic and related research that currently are not adequately covered. However, these extant documents can continue to be used and adopted now.

37. Relevant documents include, *inter alia*, Latorre Garcia *et al.* (2001) for botanic gardens (the Principles on Access to Genetic Resources and Benefit-sharing from this work are available at http://www.kew.org/conservation/principles.html), the International Plant Exchange Network (IPEN) (2003) for botanic gardens, the International code of conduct for plant germplasm collecting and transfer, Micro-Organisms Sustainable Use and Access Regulations International Code of Conduct (MOSAICC), and Good Practice for Academic Research on Genetic Resources (Bibier-Klemm & Martinez, 2009) and Sample ABS Agreement for Non-commercial Research (Bibier-Klemm et al, 2010). The European Culture Collections' Organisation has produced a Core Material Transfer Agreement (MTA) for supply of biological materials from public collections (ECCO, 2009). Most of these documents, and others, can be obtained through links on the CBD website at http://www.cbd.int/abs/instruments/.

38. A feature of some available protocols is the importance of requiring Mutually Agreed Terms and from Indigenous and Local Communities (ILC), particularly in the case of traditional knowledge (TK). Guidelines with regard to TK and ILCs might be helpfully developed for the taxonomic community.

39. Current protocols are designed particularly for researchers and collection-holding institutions. While some donors are clear on requirements for compliance, other funding bodies may also wish to establish protocols and common requirements for compliance by researchers and others they fund. This may be a requirement for national funding bodies.

40. A further sector, which may require development of guidance, are publishers of research papers in taxonomy, conservation and related fields. Currently few if any journals require clarity from authors as to the legal basis for the nature of their research on the specimens studied. A helpful development would be for journals to require permit numbers or equivalent (such as International Certificate of Compliance number) to be associated with published data.

IV. DATABASES AND A RESOLUTION SYSTEM FOR BIOLOGICAL SPECIMENS

41. If taxonomic institutions are to be compliant, they need to be able to manage activities carried out on biological and genetic material, as well as the permissions and restrictions that must be applied to that material under Prior Informed Consent (PIC) and Mutually Agreed Terms (MAT). Biological specimens and samples of specimens (e.g. plant cuttings, culture subsamples, extracted genetic material) are generally sampled at some level, in order to effectively track them (for some types of organisms a database entry at lot/sample level may be sufficient, as long as subsamples can be effectively linked to the main sample).

42. A key element in the development of systems by collection-holding institutions is that agreements under MAT are likely to be in perpetuity, and consequently collection management systems must accommodate potential change of use and thus triggers for any renegotiation of MAT and compliance management. Some biological collections are shared between institutions before registration with collection management systems, so MAT information needs to be associated with specimens prior to any sharing process.

43. Currently there are estimated to be more than a billion biological specimens held in museums, herbaria and culture collections worldwide, many of these being held outside the country of origin (Arino, 2010). Probably no more than 4 million of these are captured on electronic databases as individuals. Loans or transfers of specimens or subsamples between institutions to support non-commercial research

reach tens if not hundreds of thousands of specimens and samples each year, almost all of which are not captured at the individual level on a database (although they may be databased at a 'lot' level).

44. The Nagoya Protocol is not retrospective, so there is no requirement to treat specimens collected prior to the entry into force of the Convention on Biological Diversity (29th December 1993), unless they were covered by an earlier permit, Material Transfer Agreement (MTA) or Mutually Agreed Terms (MAT). Many of the current protocols devised for biological specimens, including those mentioned in paragraph 35 above, include the intent to share benefits arising from the use of genetic resources acquired prior to the entry into force of the CBD, as far as possible, in the same manner as for those acquired thereafter. Because of such intent to share benefits, and to deliver other benefits of digitisation of information of specimens, some institutions may increase their retrospective digitisation programmes. However, retrospective data capture from specimens already in collections can be expensive, and cost and time availability are strong limiting factors on capturing these data (Tobin *et al*., 2004).

45. Constructing and managing appropriate databases to manage material obtained with PIC and MAT, ideally using standards that enable them to be accessible outside the institution, will be a key activity of compliance by institutions and of inter-institution collaborations. Some specimens are held, at least temporarily, as part of research projects not expected or planned to lead to long-term preservation, and where databasing using the current standards employed by collections-holding institutions is not undertaken. Such projects will find a need to manage specimen and sample tracking where this is not currently part of the project. Research funding bodies may wish to consider this a necessary part of a funded project.

46. Initial information captured in a database about a specimen, sample, or a DNA sequence should be added to as sequence data are extracted, samples of specimens separated for different analyses, or the results of research published; information in the database is incomplete without linkage to or incorporation of these subsequent analyses. Effective tracking systems to manage such additions and processes have been extensively explored by Garrity *et al.* (2009, 2009a), and have been established for commercial and non-commercial activities in the field of microbiology (Garrity *et al.*, 2010). Many tracking activities are currently undertaken by collection-holding institutions in the context of loans to other such institutions or of distribution of living specimens or sub-cultures of a micro-organism. Such tracking systems may also contain reference to agreements signed by the borrower with the lending or providing body, undertaking to respect conditions applied to the specimens or samples.

47. Establishing the requirements for a database and tracking system, based on the work already done, and facilitating its implementation, may be important for both commercial and non-commercial research conducted at natural history museums, botanical gardens, culture collections and other collection-holding organizations. Such a system might have separate components functioning within institutions and between institutions, and also differ between microbiological, living plant, and other collection types. It is also important to note that many institutions have already invested in internal databases that may or may not meet the requirements of the system considered here. Moreover, given that the overwhelming nature of the research conducted on the specimens is non-commercial and thus not generating money to support a system, additional resources are likely be required to develop any such system and populate it with data. Tobin *et al.* (2004) explored these issues at length and informatively in the context of proposed certification.

V. TAXONOMY AND SUPPORT FOR AGRICULTURE, FORESTRY, FISHERIES AND BIOLOGICAL CONTROL

48. Biological and genetic material of agricultural, fisheries and forestry pests, pathogens and beneficial organisms, threatened and endangered species and biological control agents may be collected for non-commercial uses, including for rapid identification outside the country of origin to the benefit of

that country. This service is a vital part of implementing the GTI, the lack of access to taxonomic expertise either locally or internationally being part of the taxonomic impediment.

49. In many cases specimens are received with no prior discussion and are not solicited by the taxonomists. Such specimens, including genetic material, may have been sent across national boundaries. Often a rapid identification is necessary to deal with an issue such as quarantine, crop destruction or management of an outbreak of pests or invasive species.

50. Under Article 8 of the Nagoya Protocol, "In the development and implementation of its access and benefit-sharing legislation or regulatory requirements, each Party shall: … (c) Consider the importance of genetic resources for food and agriculture and their special role for food security." However, many submissions for identification (which may require sequencing of genetic material to be accurate) have not passed through national ABS processes.

51. Identifications are already being hindered because of uncertainties attendant on the introduction of ABS legislation. Protocols need to be developed to manage this case, including standard agreements on what can be done by the identifier with the biological and genetic material involved in terms of sequencing and retaining specimens as vouchers.

52. Biological control agents can only be developed with the involvement of precise taxonomic work on both the putative agents and the organism to be controlled. Although financial benefits may accrue from successful introduction of biological control agents, such benefits are in many cases likely to be distributed among a very large number of farmers or others, often at low income levels, and thus significant profits for single commercial organizations are not generated. The concerns of biological control development were discussed by the Coordination Mechanism of the GTI, and are further discussed by Cock *et al*. (2009, 2010) and Cock (2010). Given that there are also some organizations that do distribute biocontrol agents on a commercial basis, clear guidelines for biocontrol screening need to be developed to facilitate research while protecting the interests of provider countries.

VI. FACILITATING IMPLEMENTATION OF THE NAGOYA PROTOCOL THROUGH TAXONOMIC WORK

53. Parties will find it challenging to fully implement legislation and regulation arising from the protocol without knowing the nature and identities of genetic resources existing within the country.

54. Enabling such surveys and inventories to be carried out, including at the genotype level, is a part of the GTI programme of work, and will need to be expedited. Considerable detail is provided in the programme of work for the Global Taxonomy Initiative.

Next steps

55. Several areas of action have been outlined above.

56. Research and collection-holding institutions will need assistance in managing compliance with the Protocol in a transparent manner. This capacity-building issue is included in Draft Capacity-Building Strategy for the Global Taxonomy Initiative (UNEP/CBD/SBSTTA/16/12, to be further discussed at SBSTTA 16).

57. A first step must be the development of awareness of the CBD, including the Nagoya Protocol, among such institutions. A parallel area of awareness-raising will be among those engaged in developing and implementing legislation and regulations on ABS, among whom it would be helpful to increase understanding of the GTI, its benefits, implications and the methodologies employed. Accomplishing this will require the production of novel materials for awareness-raising specifically explaining the GTI and

the Nagoya Protocol. These novel materials should incorporate and build on existing resources, including those listed above and in the reference list below, and made available through the CBD web site.

58. Research institutions where taxonomic or other relevant non-commercial collections work is carried out may benefit from examples of how to formulate and implement policy.

59. Model Contractual Clauses need to be developed, building on the extensive work already available.

60. Codes of conduct, guidelines and best practices and/or standards need to be developed for the relevant research communities, including museums, herbaria, culture collections, botanic gardens, universities and others where taxonomic and related research is carried out, again building on the extensive work already available, and agreed by as many institutions as possible. These will need to include guidelines with regard to Traditional Knowledge (TK) and Indigenous and Local Communities (ILCs).

61. As described in paragraphs 48-51, protocols for dealing with specimen identifications need to be developed and included in sectoral codes of conduct e.g. agriculture, forestry and fisheries, biocontrol and ecotourism.

62. A broad survey of relevant data-models for resource tracking of samples, specimens and analytical products needs to be conducted, together with technology for their implementation and system requirements (see paragraph 49 above), and standards be agreed.

63. Additional information and resources as they are developed could be made available on the web site of the CBD, with appropriate links between the pages relating to Global Taxonomy Initiative and the Nagoya Protocol. Meeting resources and documents on the CBD site or referred to from there may need to have the GTI added as metadata to ensure they can be accessed effectively.

64. The decision tree identified as a potentially valuable tool in paragraph 34 above could be created through work with representatives from specific areas (e.g., universities, culture collections, and agricultural research institutions), and might include developing a series of talking points or key questions, that can be useful when entering discussions with agencies such as US National Science Foundation, US National Institutes of Health, and associations of museums, natural history collections, or culture collections. An ‘ideal’ GTI-ABS process might be developed. This could be in the context of a document discussing the purpose of biological collections and the associated best practices, which might be compiled by the Coordination Mechanism of the GTI.

65. Possible actors in developing the awareness-raising materials for the GTI and ABS, guidance and tools include, *inter alia*, the Coordination Mechanism of the GTI, members of the Consortium of Scientific Partners for Biodiversity (where resources can be found), other taxonomic institutions, the Global Biodiversity Information Facility, Botanic Gardens Conservation International, the World Federation for Culture Collections, LOOPs of BioNET-INTERNATIONAL, CODATA, and other taxonomic or related networks working with the Executive Secretary.

66. Parties, other Governments and relevant organizations may wish to convene expert meetings to develop requirements for (i) data management and tracking of samples, specimens and analytical products, and technology for their implementation and; (iii) other relevant tools for Parties to consider their implementation.

VI. REFERENCES

This is by no means an exhaustive list of valuable references. A more complete list can be found on the CBD web site at http://www.cbd.int/abs/references/?field=area&value=ABS. Existing Protocols and standards are available at http://www.cbd.int/abs/instruments/, and model clauses are available at http://www.cbd.int/abs/resources/contracts.shtml.

Arino, A.H. 2010. Approaches to Estimating the Universe of Natural History Collections Data. *Biodiversity Informatics*, 7: 81-92. https://journals.ku.edu/index.php/jbi/article/view/3991/3805

Biber-Klemm, S. and S. Martinez. 2009. Access and Benefit-Sharing: Good practice for academic research on genetic resources. pp. 1-58. 2nd edition, Bern, Swiss Academy of Sciences. http://abs.scnat.ch/downloads/documents/ABS_GoodPractice_2009.pdf

Biber-Klemm, S., Martinez, S., Jacob, A., and A. Jetvic. 2010, Agreement on Access and Benefit Sharing for Non-Commercial Research. Swiss Academy of Sciences, Bern, Switzerland. http://abs.scnat.ch/downloads/documents/NonCommResearch_ABS_Agreement.pdf

Cock, M.J.W. 2010. Biopiracy rules should not block biological control. *Nature*, 467: 369.

Cock, M.J.W., van Lenteren, J.C., Brodeur, J., Barratt, B.I.P., Bigler, F., Bolckmans, K., Cônsoli, F.L., Haas, F., Mason, P.G. and J.R.P Parra. 2009. *The Use and Exchange Of Biological Control Agents For Food And Agriculture*. Commission on Genetic Resources for Food and Agriculture. Background Study Paper No. 47.

Cock, M.J.W., van Lenteren, J.C., Brodeur, J., Barratt, B.I.P., Bigler, F., Bolckmans, K., Cônsoli, F.L., Haas, F., Mason, P.G. and J.R.P Parra. 2010. Do new Access and Benefit Sharing procedures under the Convention on Biological Diversity threaten the future of biological control? *BioControl*, 55: 199-218.

ECCO. 2009. The ECCO core Material Transfer Agreement for the supply of samples of biological material from the public. http://www.eccosite.org/MTA_core.html

Garrity, G., Thompson, L., Ussery, D., Paskin, N., Baker, D., Desmethe, P., Schindel, D. and P. Ong. 2009. Studies on Monitoring and Tracking Genetic Resources. United Nations Convention on Biological Diversity. UNEP/CBD/WG-ABS/7/INF/2. pp.1-100.

Garrity, G.M., Thompson, L.M., Ussery, D.W., Paskin, N., Baker, D., Desmeth, P., Schindel, D.E. and P.S Ong. 2009a. Studies on Monitoring and Tracking Genetic Resources: An Executive Summary. *Standards in Genomic Sciences*, 1: 78-86.

Garrity, G.M. and C. Parker. 2010. Recent trends in US patent grants and issues to be considered. Nature Proceedings available at http://dx.doi.org/10.1038/npre.2010.4998.1

Government of Australia. 2008. Model Access and Benefit Sharing Agreement. Australian Government and Access Party. http://www.environment.gov.au/biodiversity/science/access/model-agreements/index.html.

International Plant Exchange Network (IPEN). 2003. Code of Conduct for botanic gardens governing the acquisition, maintenance and supply of living plant material. http://www.bgci.org/files/ABS/IPEN/ipencodeofconduct.doc

Latorre Garcia, F., Williams, C., ten Kate, K. and P. Cheyne. 2001. Results of the Pilot Project for Botanic Gardens: Principles on Access to Genetic Resources and Benefit-Sharing, Common Policy Guidelines to Assist with Their Implementation and Explanatory Text, Royal Botanic Gardens, Kew.

Tindall, B.J. and G.M Garrity,. 2008. Proposals to clarify how type strains are deposited and made available to the scientific community for the purpose of systematic research. *International Journal of Systematic and Evolutionary Morphology*, 56: 1987-1990.

Tobin, B., Cunningham, D. and K. Watanabe. 2004. The feasibility, practicality and cost of a certificate of origin system for genetic resources Preliminary results of comparative analysis of tracking

material in biological resource centres and of proposals for a certification scheme. UNEP/CBD/WG-ABS/3/INF/5. http://www.cbd.int/doc/meetings/abs/abswg-03/official/abswg-03-07-en.pdf

Secretariat of the Convention on Biological Diversity (SCBD). 2009. Report of a Workshop on Access and Benefit-Sharing in Non-Commercial Biodiversity Research. UNEP/CBD/WG-ABS/7/INF/6. http://www.cbd.int/doc/meetings/abs/abswg-07/information/abswg-07-inf-06-en.pdf

Williams, C., Davis, K. and P. Cheyne. 2009. The CBD for Botanists (3rd Edition): an introduction to the Convention on Biological Diversity for people working with botanical collections. Kew: Royal Botanic Gardens, Kew and Darwin Initiative. CD-ROM. (available in English, French and Spanish).

Annex

Needed deliverables	Current status	Suggested actions and timing	Actor(s) and process
1. Information material on ABS / Nagoya Protocol for taxonomic / non-commercial research sector.	Much already in place, including from SCBD, Swiss Academy of Sciences, BGCI, WFCC etc. Helpful if SCBD could make selected items available through GTI part of web site.	a) Produce overarching material (CBD Technical Series or other web learning module?) To be ready by 2013 b) Submit INF to SBSTTA17/COP12 for review by Parties at COP12 c) Encourage GTI NFPs to assist in their countries. **Rationale:** Action 2 and 3 of the GTI Strategy; regional workshops may engage ABS and GTI communities with these materials.	**GTI Community** • GTI CM might assist in preparation of and overarching document (s). (There is currently no mandate to the CBD Secretariat to produce this) • GTI NFPs to disseminate the overarching document. **ABS Community** ABS experts to advise in preparation of document (s).
2. Information materials on GTI for ABS sector	Materials need to be newly prepared and disseminated.	a) Produce materials (CBD Technical Series or other web learning module?), to be ready by 2013 b) Submit INF to SBSTTA17/COP12 for review by parties at COP 12. c) Make available to target audiences **Rationale:** Action 2 and 3; regional workshops under the GTI Capacity-building Strategy may engage ABS and GTI communities with these materials	**GTI Community** GTI CM to draft (There is currently no mandate to the CBD Secretariat to produce this) **ABS Community** National ABS / Nagoya Focal Points; additional partners may need to be identified to aid dissemination.

Needed deliverables	Current status	Suggested actions and timing	Actor(s) and process
3. Specimen management protocols, requirements, and standards including tracking system(s) enabling research institutions to build cost-effective tools and systems to manage biological and genetic material in the context of the Nagoya Protocol.	Some resources available (including Garrity et al., 2009, 2009a, Garrity & Parker, 2010). Interested organizations exist (e.g. GBIF, TDWG, Society for Industrial Microbiology and Biotechnology, WFCC, American Phytopathological Society, ISBER	a) Prepare scoping document setting out requirements for system; b) Submit INF to SBSTTA17/COP12 c) Design and implementation by appropriate organizations with agreed information architecture ; d) Toolkit for collections-holding and research institutions **Rationale:** effective tools and systems to include location of specimens, samples and cultures, analytical processes to which they have been subjected, researchers who have access, and MATs which govern use of the specimens are important in management of the material, and to enhance transparency about utilization of genetic resources. This will develop trust between stakeholders. This is critical for operation of non-commercial research and benefit sharing in both con-commercial and commercial research.	**GTI Community** Major natural history museums, botanical gardens, seed banks, culture collections, smaller taxonomic institutions, other institutions without major taxonomic interests but users of biological specimens or data (e.g. Genome or other 'omics community). e.g. CSP constituencies WFCC, GSPC constituencies GBIF, iBOL NamesforLife TDWG **ABS Community** ABS experts (non-commercial research area; compliance area including commercial research; database and data exchange area) **Others** There may be a rationale to bridge between non-commercial research communities and commercial research communities to share the issues **Process** Possible Joint ABS-GTI expert meetings [#1-2] to recommend requirements, protocols, and possible standards and examine the existing technology and practices for tracking usage and movement of biological specimens in 2012 or 2013 (intersessional between COP11 and 12). Review by ICNP3 or 4 then COP 12

Needed deliverables	Current status	Suggested actions and timing	Actor(s) and process
4. Model contractual clauses, codes of conduct, guidelines and best practices and/or standards need to be developed for non-commercial biological research, including, *inter alia*: identification protocols, use management, third-party transfer, accessioning process, tracking system use, research grant requirements, best practice for journal editors.	Some material already available but scattered. Will depend on Item 3 to be completed, for inclusion, but work can start immediately.	a) Bring extant material together; b) Consider what is necessary and sufficient; c) Discuss with group from Parties (ABS community); d) Revise and disseminate.	**GTI Community** Large and small taxonomic institutions including culture collections, herbaria and botanic gardens, universities (including non-taxonomic research), research funders and donors, taxonomic institutions to obtain definitive basic set. **ABS Community** ABS experts **Process** Possible Joint ABS-GTI expert meeting [#3] 2012-2014 (intercessional between COP 11 and 12) Dissemination using GTI NFPs, taxonomic networks, including BioNET-INTERNATIONAL.
5. Decision tree for assessing access requirements.		After items 1-4 become clear (2014)	**GTI Community** GTI-CM GSPC constituencies **ABS Community** ABS experts

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