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TECHNOLOGY TRANSFER AND SCIENTIFIC AND TECHNICAL COOPERATION

Addendum

*Proposals for the enhancement of the clearing-house mechanism as a key mechanism in
technology transfer and cooperation*

Note by the Executive Secretary

I. INTRODUCTION

1. In order to develop meaningful and effective action to enhance the implementation of Articles 16 to 19 as well as related provisions of the Convention, the Conference of the Parties, by decision VII/29, adopted a programme of work on technology transfer and technological and scientific cooperation. Element 2 of the programme of work provides for the development or strengthening of national, regional and international systems for the gathering and dissemination of relevant information on technology transfer and cooperation and technical and scientific cooperation, including the establishment of effective networks of electronic databases of relevant technology.

2. The preamble to the programme element further explained that activities under this programme element should build on existing initiatives and programmes with a view to maximizing synergy and avoiding the duplication of work, and should ensure accessibility of such systems for indigenous and local communities and all relevant stakeholders.

3. Under activity 2.1.2 of the programme of work, the Executive Secretary was requested to develop proposals to enhance the clearing-house mechanism, including its national nodes, particularly those in developing countries, as a key mechanism for exchange of information on technologies and as a core element in its role to promote and facilitate scientific and technical cooperation, for facilitating and promoting technology transfer and cooperation and for the promotion of technical and scientific

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cooperation relevant for the conservation and sustainable use of biodiversity or make use of genetic resources and do not cause significant damage to the environment.

4. Under activity 2.1.3, the Executive Secretary was further requested to develop advice and guidance on the use of new information exchange formats, protocols and standards to enable interoperability among relevant existing systems of national and international information exchange, including technology and patent databases.

5. In paragraph 6 of decision VII/29, on transfer of transfer and technology cooperation, the Conference of the Parties requested the Executive Secretary to convene the informal advisory committee of the clearing-house mechanism to assist the Executive Secretary, *inter alia*, in the tasks enumerated above. A draft of the present note was subsequently considered by the informal advisory committee of the clearing house mechanism at its meeting on 27 November 2005.

6. Sections II and III of the present note address activity 2.1.2, while the annexed table addresses activity 2.1.3. Section II addresses the enhancement of the clearing house mechanism as a mechanism for information exchange on relevant technologies, while section III addresses the enhancement of the clearing-house mechanism in its role to promote and facilitate technical and scientific cooperation as well as technology transfer and cooperation. The analysis and proposals presented are based on a compilation and synthesis of different existing information systems for technology transfer and cooperation, undertaken further to activities activity 2.2.1 and 2.4.2 of the programme of work. Their compilation is available as an information document. In addition, case-studies and communications provided by national focal points of the clearing-house mechanism were also considered.

II. ENHANCING THE CLEARING-HOUSE MECHANISM AS A KEY MECHANISM IN INFORMATION EXCHANGE ON RELEVANT TECHNOLOGIES

A. *General observations*

7. The present section focuses on the role of the clearing-house mechanism as a mechanism for information exchange on technologies that are relevant to the Convention, that is, according to Article 16, paragraph 1, technologies that are relevant to the conservation and sustainable use of biological diversity or make use of genetic resources and do not cause significant harm to the environment. The preamble to element 2 of the programme of work provides an indication of the types of information that would be provided and exchanged. First, at the international level, information systems, using the clearing-house mechanism, would provide, *inter alia*, information on the availability of relevant technologies, including their technical parameters, economic and social aspects, data on patents (owners and date of expiration), models of contracts and associated legislation. Secondly, these information systems would also provide through the clearing-house mechanism the identified technology needs of Parties, as well as case-studies and best-practices on measures and mechanisms to create enabling environments for technology transfer and technology cooperation.

8. Information systems are generally understood as tools used to gather and disseminate information on a specific topic; hence, they have the function of focusing and centralizing access to information, but, importantly, do not necessarily provide the information itself. A successful information system acts as a gateway for information providers and seekers on a specific topic, technology transfer and cooperation being a case in point. Simply stated, it links information to people.

9. In order for the clearing-house mechanism to meet this role as a central gateway, it will be necessary to ensure that this new (or considerably improved) information system is recognized by relevant and potential users as meeting this goal in an effective manner. Marketing will be necessary to raise awareness of the system and to generate interest among prospective users in using it whenever they are in need of information (or, in the case of information providers, in need of getting information disseminated), but will not be sufficient to sustain this interest. Another key condition must be fulfilled: the information system has to provide and sustain a critical mass of high-quality information. Only if this critical mass is reached will users be convinced about the quality of the system and, accordingly, decide to use the system as a standard information tool and/or to spread word about its quality to other prospective users, thus generating a snowball effect.

10. An analysis of existing information systems shows that it is not a trivial task to generate this critical mass of information. For instance, a number of information systems offer a small sample of information on available technology. Moreover, keeping an information system up-to-date appears to present an additional factor in sustaining the usefulness of the system. Several existing information systems keep their capacity requirements manageable by adopting a regional or sectoral approach, or a combination thereof. Given the holistic and global nature of the Convention and its Article 16, such an approach would not be feasible for the central clearing-house mechanism of the Convention. However, some options for prioritization may be considered for the national clearing-house mechanisms. More detailed proposals thereon are provided below.

11. Two general, and mutually not exclusive, strategies for the generation of a critical mass of information can be identified. First, new information could be generated, that is, existing information that is not yet accessible online would be identified, collected, and transformed so as to make it accessible and searchable through electronic means. Second, information that is already accessible in other online information systems could be used by using interoperability mechanisms.

B. Generate new information

12. In light of the holistic and global nature of the Convention, generating new and comprehensive information of technologies of relevance to the Convention would be particularly demanding for the central clearing-house mechanism in terms of the needed financial and human resources. A more practical approach may be to decentralize this task to the extent possible by making use of and collaborating with existing networks providing thematic and sectoral information. Such a decentralized custodianship of thematic and sectoral information would optimize resources and enable considerable savings by sharing responsibilities with regard to the collection and dissemination of information and, more importantly, it would also provide better access to existing information sources and networks at the national and international levels.

13. The clearing-house mechanism of the Convention is in a unique and privileged position in that its network is composed of an established and evolving global network of national clearing-house mechanisms. In turn, national clearing-house mechanism focal points are in a privileged position because of their superior knowledge of and access to national and regional information sources and networks. Thus, the clearing-house mechanism has the potential to be a useful instrument in promoting the effective implementation of Articles 16 and 19 of the Convention.

14. The identification of technology needs and the dissemination of information thereon may provide a good example. Element 1 of the programme of work calls for the identification of technology needs, of the potential costs and benefits of technologies, and of the related capacity-building needs. Such assessments shall be undertaken with the participation of stakeholders and in response to national priorities and

policies—a task that needs to be undertaken under national responsibility. National clearing-house mechanisms, in cooperation with national focal points of the Convention, could be involved in these processes and be responsible for dissemination of their results.

15. Another example is the identification of available technologies that are relevant to the Convention, and the dissemination of information thereon. Again, national clearing-house mechanisms may be more familiar with the range of technologies that are developed or improved by the public research institutions and the private sector in their home countries or region, and they may be in a privileged position for tapping this information and making it available on the global level, possibly by giving focus on specific sectors or ecosystems in accordance with national needs, priorities and strengths. In so doing, they could cooperate closely with national focal points of the Convention and/or as appropriate other national institutions working on technology transfer issues, which could act as intermediaries.

16. While national clearing-house mechanisms are therefore potentially key actors in the generation, collection and dissemination of new technology-related information, many among them, and in particular those in developing countries and in countries with economies in transition, will need to enhance their capacities in order to meet the requirements of this role in an effective manner. Different mechanisms for the building or enhancement of capacity could be envisaged and are summarized in paragraph 20 below.

17. Currently, 151 Parties and other Governments have established national clearing-house mechanisms ^{1/}. Of these only 76 have established websites in support of its work and to assist with information exchange. ^{2/} And among these with sophisticated information exchange web-based systems, only a few refer to technology transfer. Encouraging the design and establishment of national clearing-house mechanisms, with the requisite information exchange infrastructure, is therefore an essential precondition in ensuring the accessibility of information related to technology transfer and cooperation.

18. The Convention could also benefit from collaboration with the World Summit on the Information Society (WSIS). ^{3/} The World Summit on the Information Society seeks to bridge the digital divide by ensuring equitable access to new information technologies and to promote bottom-up development of an information infrastructure required to sustain effective participation in world affairs. In support of this broad objective, the World Summit on the Information Society launched a “Digital Solidarity Fund” to finance projects that address the digital gap in using new information and communication technologies. It could be explored whether this institution could also provide funding for the activities proposed in this note or if collaborative activities could be developed to optimize human and financial resources.

19. In summary, the following activities could be envisaged to enhance the collection and dissemination of pertinent information:

(a) National clearing-house mechanisms should be established pursuant to paragraph 15 of decision III/4 and paragraph 1 of decision VI/18;

(b) Whenever national clearing-house mechanisms have access to web-based systems, webpages, databases or other information dissemination and exchange tools could be developed specifically on technology transfer and cooperation;

^{1/} The Conference of the Parties has stressed the need for the development of national clearing-house mechanisms (see paragraph 2 of decision III/4, paragraph 15 of decision III/4, paragraph 1 of decision VI/18).

^{2/} The Convention on Biological Diversity website: <http://www.biodiv.org/chm/stats.asp>

^{3/} See: <http://www.itu.int/wsis/>

(c) These webpages, databases or systems could be populated with relevant information by the national clearing-house mechanisms through suitable arrangements in cooperation with the national focal point of the Convention as well as other national institutions working on technology transfer issues that could act as intermediaries, relevant research institutions, the private sector, indigenous and local communities, and stakeholders and international organizations;

(d) Information could be generated/collected by links to national, regional or international electronic databases as well as by personal communications/contacts. It could also be envisaged to hold national conferences or workshops on technology transfer and cooperation (e.g., for the identification of technology needs), possibly in cooperation with national authorities responsible for implementation of other Rio conventions or biodiversity-related conventions, or to use other biodiversity-related events to gather technology-related information;

(e) Developing countries and countries with economies in transition should assess their capacity building needs and opportunities to undertake the activities (a) to (d) above, in accordance with activity 4.2.1 of the programme of work;

(f) The Convention's clearing-house mechanism should act as a central gateway to the information on technology transfer available on national clearing-house mechanisms. To meet this goal, deep links would first be established to webpages hosting such information systems. Data-mining mechanisms would be established in a second step. In this context, it would also be important to ensure full interoperability through the use of common protocols, formats and standards. (See further proposals in the next section and, in particular, in paragraph 27 below).

20. The following activities could be undertaken to provide technical or financial support to the activities enumerated above:

(a) Technical and financial support for activities (a) to (e) above could be provided by the Global Environment Facility and other funding institutions, possibly including the Digital Solidarity Fund of the World Summit on the Information Society, in accordance with activities 4.2.1 and 4.2.2 of the programme of work;

(b) Technical support could also be provided through twinning arrangements whereby the national clearing-house mechanism of a developed country provides targeted support to one (or several) clearing-house(s) of developing countries, similar to existing or past clearing-house mechanism partnerships;^{4/}

(c) Technical support and advice could be provided by the Convention Secretariat in making collected data accessible by web-based or other electronic means, and in particular on the use of metadata standards and controlled vocabularies to ensure full interoperability, in line with the guidance provided in the annex to the present note.

C. Use existing information

21. The second strategy consists in the bundling of information available online in diverse electronic databases on national, regional and global levels. The amount of relevant information contained in these information systems is substantial. However, the information systems, as well as the data search/retrieval

^{4/} Information on current partnering opportunities is available in module 4 of the CHM Toolkit. Information on past partnering projects is available on the Convention's website at: <http://www.biodiv.org/chm/partners.asp>

tools provided, are typically not geared towards the specific requirements on technology transfer and cooperation that arise under the Convention. This observation carries the consequence that the relevant information is typically scattered across these diverse systems.

22. Uncovering this relevant information will therefore require sophisticated mechanisms for data-mining, which in turn requires interoperability of the information systems made available through the Convention clearing-house mechanism and national clearing-house mechanisms. To facilitate the development of such an interoperable system by national clearing-house mechanisms, it will be necessary for the Convention clearing-house mechanism to advise on the use of common protocols, formats and standards through its toolkit.

23. Ensuring interoperability with information systems operated by international or regional initiatives may be a challenging task, due to the need to achieve an agreement among these different initiatives on the application of common formats, protocols and standards. It may therefore be advisable to focus on cooperation with those systems that are promising in terms of achieving synergy with the specific technology transfer needs of the Convention.

24. Interoperability could arguably be more easily achieved between the central clearing-house mechanism and the network of national clearing-house mechanisms. Article 17 of the Convention, on exchange of information, foresees that Parties shall facilitate the exchange of information from all publicly available sources including, *inter alia*, the exchange of results of technical, scientific and socio-economic research. Information exchange among the Convention clearing-house mechanism and the national clearing-house mechanisms can be facilitated by use of the agreed upon common formats, protocols and standards. The Convention's clearing-house mechanism could facilitate this endeavour by developing a technical plan and further enhancing its toolkit to assist parties in the use of such common formats, protocols and standards, by building on the guidance provided in the table that is annexed to the present note.

25. Interoperability would allow users to access information located in national clearing-house mechanisms or other information mechanisms or systems through a central interface, ideally developed and operated by the Convention's clearing-house mechanism. In this manner, the Convention's clearing-house mechanism would fulfil its mandate to facilitate access to information and assist in the development of decentralized information systems. The net result would be a standardized global network of biodiversity information on technology transfer where duplication would be minimized and search efficiency maximized.

26. Implementing the plan may be costly for developing countries, specifically in terms of hardware and technical expertise. Different mechanisms for the provision of technical or financial support for capacity building can be identified (see paragraph 28 below).

27. In summary, the following actions could enhance use of existing information systems through interoperability mechanisms:

(a) The Secretariat, with the advice of the informal advisory committee and the Expert Group on Technology Transfer and Scientific and Technical Cooperation, could prepare a brief list of the most relevant regional and international initiatives related to information systems on technology transfer, and explore opportunities for data-mining these systems. In addition, the Secretariat should explore the potential to make these systems interoperable with a view to facilitate the searching, locating and retrieval of information on technology transfer. The Secretariat will undertake to develop thematic and sectoral systems of information on the transfer of technology;

(b) In close consultation with national clearing-house mechanisms and the informal advisory committee, the Secretariat could develop a technical plan for enhancing interoperability, including options for pilot projects with interested national clearing houses;

(c) The Secretariat could also further enhance the clearing-house mechanism toolkit to further assist Parties and other Governments in the use of common formats, protocols and standards, in line with the guidance provided in the annex to the present note;

(d) Developing countries and countries with economies in transition could assess their capacity-building needs and opportunities to implement the technical plan, in accordance with activity 4.2.1 of the programme of work and building in the Revised Guidelines for Additional Funding of Biodiversity Enabling Activities;

(e) Data-mining mechanisms would be established under the Convention's clearing-house mechanism. The Convention clearing-house mechanism would act as a central gateway to the information that is accessible on the technology transfer web pages of the national clearing-houses through the development of a metadata registry.

28. The following activities could be undertaken to provide technical or financial support to the activities enumerated above:

(a) Technical and financial support for implementing the technical plan, including pilot projects, could be provided by bilateral and multilateral financial institutions, including the Global Environment Facility, in accordance with activities 4.2.1 and 4.2.2 of the programme of work;

(b) Technical support could also be provided through new partnering projects whereby the national clearing-house of a developed country provides targeted support to one (or several) clearing-house of a developing countries;

(c) Promotion of activities aimed at promoting best practices and lessons learned on issues related to the implementation of Articles 16 and 19 of the Convention.

III. ENHANCING THE CLEARING-HOUSE MECHANISM IN ITS ROLE TO PROMOTE AND FACILITATE TECHNICAL AND SCIENTIFIC COOPERATION AS WELL AS TECHNOLOGY TRANSFER AND COOPERATION

29. Experience shows that successful technical and scientific cooperation, including the successful transfer of technology, was often initiated through intermediaries who had personal contacts to technology providers and technology seekers and brought both sides together. ^{5/} While this observation does not preclude undertaking efforts to develop or enhance electronic information systems, relying exclusively on Internet-based means of information exchange alone may not be sufficient. The important role of institutions acting as intermediaries was also underlined in the compilation and synthesis on measures and mechanisms that foster an enabling environment in developing and developed countries for cooperation as well as the transfer, adaptation and diffusion of relevant technologies. It seems that an interactive system that operates through personal contact, assumed by an intermediary, between the seeker and the provider

^{5/} See submission to the informal advisory committee meeting of 9 November 2003 by the representative from New Zealand (<http://www.biodiv.org/doc/meetings/chm/chmiac-2003-02/other/chmiac-2003-02-nz-tt-en.doc>).

of technology is of key importance—it would directly connect people to people, not just information to people.

30. It could be further explored, on the national level, whether and to what extent this role could be performed by the national clearing-house mechanisms. Ideally, technology seekers could use the expertise of the national clearing-house mechanism to assist in locating and contacting providers of appropriate technology in his/her home country. This function could be implemented by national clearing-house mechanisms in developed countries. ^{6/} Lack of human and financial resources, as well as a lack of access to information caused by the digital divide between developed and developing countries may create obstacles in the development and implementation of this role by developing countries. The provision of technical and financial support would also be required, as described below.

31. The following activities could be undertaken to enhance the clearing-house mechanism in its role to promote and facilitate technical and scientific cooperation as well as technology transfer and cooperation:

(a) National clearing-house mechanisms, in close cooperation with the Convention clearing-house mechanism, and as appropriate in cooperation with relevant authorities responsible for the implementation of other biodiversity-related conventions and Rio conventions, as well as with relevant institutions that act as intermediaries in technology transfer, could organize national or regional workshops, possibly with a thematic or sectoral focus, for the purpose of identifying technology needs and/or technology requirements and of connecting technology providers and seekers;

(b) At a global level, technology fairs could be organized that aim to bring together technology providers and seekers. Such technology fairs could for instance be held on the side of major meetings under the Convention and be organized by host Governments with assistance by the Secretariat.

(c) As appropriate, and subject to the availability of funding, Convention meetings on specific thematic or cross-cutting issues could provide space for the exchange of information pertaining to technology transfer and cooperation.

(d) As appropriate, and subject to the availability of funding, meetings that address cooperation among biodiversity-related conventions or Rio conventions could also provide an opportunity to exchange information pertaining to technology transfer and cooperation;

(e) Subject to the availability of funding, the organization, back-to-back with major processes under the Convention, of meetings of national clearing-house mechanisms with a focus on exchange of information on technologies would also strengthen the role of national focal points as intermediaries in technology transfer.

32. The following activities could be undertaken to provide technical or financial support to the activities enumerated above:

(a) Financial support for activities (a) and (b) above could be provided by bilateral and multilateral financial institutions in accordance with activities 4.2.1 and 4.2.2 of the programme of work;

(b) Financial support for activities (a) to (e) above could also be provided by Parties and other funding institutions in accordance with activities 4.2.1 and 4.2.2 of the programme of work;

^{6/} Submission to the informal advisory committee meeting of 9 November 2003 by the representative from New Zealand (<http://www.biodiv.org/doc/meetings/chm/chmiac-2003-02/other/chmiac-2003-02-nz-tt-en.doc>).

(c) The Convention clearing-house mechanism could assist Parties and other Governments to announce on the Convention's website concrete initiatives and networks on technological cooperation and transfer.

IV. CONCLUSION

33. The potential for optimizing the role of the clearing-house mechanism as the key mechanism in information exchange is considerable. The clearing-house mechanism has significant technical experience in the development of interoperable information systems such as those used by the Biosafety Clearing-House, and has also experience in the organization of technical workshops in the use of new information technologies.

34. In addition, the informal advisory committee, at its meeting on 6 February 2005 in Bangkok, recommended that the updated strategic plan of the clearing-house mechanism include information exchange as one of its three goals (UNEP/CBD/COP/8/18).

35. As well, the draft strategic plan of the clearing-house mechanism explicitly states that the facilitation of the transfer of technology and technology cooperation is one of the key components of its first goal of technical and scientific cooperation.

36. The time, therefore, may be opportune to better focus the activities of the clearing-house mechanism to assist Parties and Governments with issues related to information on technology transfer and to discuss ways to enhance the role of the clearing-house mechanism in technology transfer and scientific and technological cooperation.

Annex

The Informal Meeting on Formats, Protocols and Standards for Improved Exchange of Biodiversity related Information, held in Montreal, Canada from 19 to 20 February 2002, recommended 10 guiding principles for the application of formats, standards and protocols in interoperability:

- 1- Open standards in common and future usage;
- 2- Future extensibility and backwards compatibility;
- 3- Phased, incremental development;
- 4- Build on existing services and capabilities;
- 5- Scalability;
- 6- Inclusion (e.g. facilitate local-language queries) in the design of applications;
- 7- Language neutrality in the design of applications;
- 8- Use of interoperability as a tool for fostering cooperation;
- 9- Incorporation of scientific and technical cooperation and capacity development;
- 10- Respect for intellectual property rights and cross-boundary issues.

The following formats, standards and protocols are recommended for the development of information sharing systems:

<i>Formats</i>	
Dublin Core (ISO 15836:2003)	Dublin Core metadata is used to supplement existing methods for indexing Web-based metadata
XML as description language	eXtensible Markup Language is used to structure data
XSD (XML Schemas Definition)	WSDL is an XML format for describing network services operating on messages containing either document-oriented or procedure-oriented information.
HTML as presentation language	Hyper-Text Markup Language is used to structure data
<i>Standards</i>	
Dublin Core (ISO 15836:2003)	Dublin Core metadata is used to supplement existing methods for indexing Web-based metadata
ISO 2788 (monolingual) and ISO 2788 (multilingual) Thesauri	Used for the establishment and development of monolingual and multilingual thesauri. Terms in the thesauri can be used as descriptors in the metadata. Adherence to a common terminology assists in the searching, locating and retrieving of information
ISO 3166 country codes	Country codes assist in standardizing description of countries to assist in the searching, locating and retrieving of information
ISO 639 language codes	Language codes assist in standardizing the description of languages to assist in the searching, locating and retrieving of information
<i>Protocols</i>	
HTTP (hyper-text transfer protocol)	The standard protocol used in the world wide web
FTP (file transfer protocol)	Used to assist in the transfer of files between computer servers
SOAP (Simple Object Access Protocol)	SOAP is a protocol intended for exchanging structured information in a decentralized, distributed

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