Ute Feit, Marliese von den Driesch, Wolfram Lobin (Eds.)

Access and Benefit-Sharing of Genetic Resources

Ways and means for facilitating biodiversity research and conservation while safeguarding ABS provisions

Report of an international workshop in Bonn, Germany
held in 2005, 8-10 November

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Editors' addresses:

Ute Feit
Bundesamt für Naturschutz
INA Insel Vilm
18581 Lauterbach/Rügen, Germany
e-mail: ute.feit@bfn-vilm.de

Marliese von den Driesch
Botanische Gärten der Universität Bonn
Meckenheimer Allee 171
53115 Bonn
e-mail biogart@uni-bonn.de

Wolfram Lobin
Botanische Gärten der Universität Bonn
Meckenheimer Allee 171
53115 Bonn
e-mail botgart@uni-bonn.de

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1 Introduction

Introduction to the workshop

UTE FEIT
Federal Agency for Nature Conservation

Early in this year Germany has generated the study “Users of Genetic Resources in Germany”. The objective of the study was to identify German users of genetic resources and their level of awareness concerning the access and benefit-sharing mechanism under the CBD. As the main part of this study a survey was conducted which analyzed the current involvement of different user sectors within the ABS process. To increase the users’ level of information and awareness Germany built up an internet based information platform on ABS. A short presentation of the results of the user study and the structure of the new ABS Website (www.abs.biodiv-chm.de) was given during the workshop.

In the follow-up process of the user study the idea was born to initiate sectoral user workshops bringing together experienced users and users who are willing to develop corporate policies and codes of conduct for their sector.

In the Bonn workshop on access and benefit-sharing, November 8-10, 2005, we started with two specific user sectors: the ex-situ collections, represented in this meeting by the botanic gardens and the academic research community. Both of these two specific sectors have in common that they contribute an enormous service regarding the implementation of the CBD.

Biodiversity research is one of the fundamental preconditions for the conservation and sustainable use of biodiversity. Therefore the CBD underlines in its Art. 9 and 12 that biodiversity research and measures for the ex situ conservation should be promoted to fulfil the three objectives of the CBD.

This basic concern also finds its expression in the Bonn Guidelines on access and benefit-sharing adopted in 2002, where one can find in Paragraph 16 that special terms and conditions should be established to facilitate taxonomic research for non-commercial purposes. Concerning a prior informed consent system, Paragraph 34 states that specific needs of taxonomic and systematic research should be taken into consideration.

The need for the practical implementation of these specific requirements was confirmed during the workshop through different presentations of projects and statements of academic researchers on experiences from their practical work. The presentations underlined the expectations to find facilitated and clear ABS conditions for the research and conservation sector, which are, nevertheless, in line with the basic ABS principles. An important request was here, that the demands expressed in the Bonn Guidelines concerning biodiversity research should also be taken into account by the CBD parties within their national ABS laws.

For the implementation of the two main principles of the ABS Mechanism: “Prior informed consent” and “Mutually agreed terms”, transparent national ABS regulations, which are able to show a clear way to a

legal access permit, are indispensable. Nevertheless, up to now many mega diverse countries have no ABS laws in place. Therefore, it still can be quite a challenge for a scientist from a foreign country who wants to collect biological material to identify, at the government or stakeholders level, whose consent is required or, inter alia, who has authority to negotiate on behalf of the indigenous and local communities. In opposite to no rules are very restrictive ABS rules. In some countries, we find national ABS laws which are so restrictive, that even local scientists have difficulties with collecting biological material, which is vital for research into biodiversity.

Three presentations of our workshop expressed some of these problems for research and conservation, addressing ABS regulations from Bolivia, Brazil and Peru.

Facing this situation, the workshop aimed to identify ways and means for facilitating biodiversity research and conservation while safeguarding ABS provisions.

In the past, some users of genetic resources have developed their own ABS policies, either individually or jointly, including whole sectors. During the workshop there were several presentations on ABS policies concerning the two user groups of the Botanic Gardens and the Academic Research community.

With regard to our first specific user group, the Botanic Gardens, two successful ABS policies which are already in place where presented: the Code of Conduct of the International Plant Exchange Network and the Principles on Access to Genetic Resources and Benefit-Sharing.

The Principles and the IPEN Code of Conduct are not new. They are already some years in place and have been presented at several international meetings. But to increase the trust in such instruments it is necessary to always guarantee a transparent process in further developments. Therefore the presentations dealt with current practical issues, further possibilities and limits of these instruments. An important aspect of the workshop was that we shared this information and discussed it with representatives of biodiversity rich countries.

From among the second specific user group of the workshop, the Academic Research community, mechanisms for compliance with ABS were presented by the Canadian Academic Research Community. Some Canadian universities and professional associations have developed codes of ethics for conducting genetic research.

Another promising ABS initiative from the academic research sector were the Swiss ABS tools for academic research. The ABS tools have just been developed and are not yet in place, but they should be a helpful practical instrument for scientists to implement the ABS provisions.

Additionally there were presentations and statements on funding criteria for biodiversity research to safeguard compliance with the CBD within projects in developing countries.

The application of corporate policies and codes of conduct can increase the provider countries' trust in their partners, because these instruments often have the potential to safeguard also the compliance with ABS provisions. The use of codes of conduct or other ABS sectoral policies can therefore reduce the need for other compliance procedures. Control mechanisms which apply to the early stages of research and development can be established at lower costs than those which take effect in later phases. Furthermore corporate policies and codes of conduct have the potential to alleviate uncertainty and decrease the transaction costs for users and providers. Therefore, existing institutional ABS policies, as they were presen-

ted, are worth examining as potential mechanisms for incorporating new access and benefit-sharing policies and facilitating compliance with the ABS provisions.

In this sense, the workshop facilitated fruitful discussions and an in-depth exchange of a lot of new information within the two user sectors and through the dialogue with representatives of the mega diverse countries.

This workshop report with its results and recommendations will be made available at the fourth meeting of the Ad Hoc Open-ended Working Group on ABS.

Access to Genetic Resources and Benefit-Sharing under the Convention on Biological Diversity, the Bonn Guidelines and the Negotiation of an International Regime on Access and Benefit-Sharing

OLIVIER JALBERT
Deputy Executive Secretary of the CBD Secretariat, Montreal

One of the three fundamental objectives of the Convention on Biological Diversity is to promote "*the fair and equitable sharing of the benefits arising out of the utilization of genetic resources*" (Article 1).

Access to genetic resources and benefit-sharing (ABS) has been at the heart of the work of the Convention since 1999. At its fifth meeting in 2000, the Conference of the Parties established an open-ended working group on ABS with the mandate to develop guidelines and other approaches to implement article 15. This led to the adoption of the Bonn Guidelines on Access to Genetic Resources and Fair and Equitable Sharing of Benefits Arising out of their Utilization by the Conference of the Parties in 2002 (COP-6) and, subsequently, to the current mandate decided by COP 7 (2004) to negotiate an international regime on access and benefit-sharing.

To give you an overview of the work on access and benefit-sharing, I will examine successively:

I. The Basic provisions on ABS and background;
II. The Bonn Guidelines;
III. The negotiation of an "international regime" on ABS;
IV. Measures already in place at the national level.

I. Overview of ABS Provisions

Several provisions of the Convention establish the general principles that should govern access to genetic resources and benefit-sharing.

The main substantive provisions on access and benefit-sharing are contained in Article 15 (access to genetic resources). Other provisions are also relevant: Article 16, paragraph 3 (access to and transfer of technology that makes use of genetic resources), Article 19, paragraph 1 (participation in biotechnological research on genetic resources) and paragraph 2 (access to results and benefits from biotechnologies). In addition, Article 8(j) addresses, *inter alia*, the sharing of benefits arising from the utilization of traditional biodiversity-related knowledge.

Article 15 reaffirms the sovereign rights of States over their natural resources. This is the cornerstone of the work on access and benefit-sharing. As a consequence of this principle, the authority to determine access to genetic resources rests with the national governments and is subject to national legislation. It also establishes a number of general principles and obligations relating to access to genetic resources and benefit-sharing, which flow from the basic principle. These are:

- Parties have an obligation to endeavour to create conditions to facilitate access to genetic resources and shall not impose restrictions that run counter to the objectives of the Convention;

- Access, where granted, shall be on mutually agreed terms;
- Access to genetic resources shall be subject to the prior informed consent of the Contracting Party providing such resources;
- Scientific research on genetic resources provided by other Contracting Parties shall be undertaken with the full participation of such Parties and, where possible, in the territory of such Parties;
- Parties have an obligation to take legislative, administrative or policy measures to ensure the fair and equitable sharing of the results of research and development and the benefits arising from the commercial and other utilization of genetic resources with the Contracting Party providing such resources; and
- Such benefit-sharing shall be on mutually agreed terms.

Article 8(j) addresses the maintenance and promotion of traditional biodiversity-related knowledge, innovations and practices. This issue is closely related to access and benefit-sharing and, as such, must be an integral part of any international regime on ABS. In Article 8(j), Parties to the Convention undertook to:

- Respect, preserve and maintain the knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles relevant for the conservation and sustainable use of biological diversity;
- Promote their wider application with the approval and involvement of the holders of such knowledge, innovations and practices;
- Encourage the equitable sharing of the benefits arising from the utilization of such knowledge, innovations and practices.

To implement this provision, the Conference of the Parties has adopted a programme of work involving a number of initiatives, which are complementary to the work on access and benefit-sharing. They include notably:

- The development of s*ui generis* systems for the protection of traditional knowledge;
- Guidelines for social, cultural and environmental impact assessment for developments in lands traditionally occupied by indigenous populations (known as the Akwe Kon Guidelines);
- The development of a code of conduct for research activities in lands traditionally occupied by indigenous people.

As regards technologies based on genetic resources (biotechnologies) both Articles 16 and 19 of the Convention underline the need to promote priority access to such technologies by Parties providing genetic resources, as well as the sharing of the results and benefits arising from biotechnologies based upon genetic resources provided. In this respect, Parties are required to:

- Take legislative, administrative or policy measures with the aim that Parties, in particular developing countries that provide genetic resources, are provided access to and transfer of technology which make use of those resources, on mutually agreed terms, including technology protected by patents and other intellectual property rights [Article 16(3)];

- Take legislative, administrative or policy measures to provide for the effective participation in biotechnological research activities of Parties, especially developing countries, which provide genetic resources for such research [Article 19(1)];
- Take practicable measures to promote and advance priority access by Parties providing genetic resources, on a fair and equitable basis and on mutually agreed terms, to the results and benefits arising from biotechnologies based upon genetic resources provided [Article 19(2)].

II. The Bonn Guidelines on ABS

The Bonn Guidelines on access and benefit-sharing were negotiated by a subsidiary body (Open-ended Working Group on ABS) in 2001, and were subsequently adopted by the sixth meeting of the Conference of the Parties, in May 2002 (decision VI/24). They are currently the only instrument on ABS developed under the Convention. I will focus on the content of the Guidelines and the possible gaps.

The Guidelines are intended to:

- provide governments and stakeholders with a transparent framework to facilitate access to genetic resources and ensure fair and equitable sharing of benefits;
- provide guidance to Parties in the development of access and benefit-sharing regimes;
- inform the practices and approaches of stakeholders in ABS arrangements;
- provide capacity-building to guarantee effective negotiation and implementation of ABS arrangements; and
- promote the adequate and effective transfer of appropriate technology to Parties providing genetic resources.

Some of the key features of the Guidelines that will contribute towards the effective implementation by Parties, Governments and other stakeholders of the provisions of the Convention on access and benefit-sharing include:

- The definition of the roles and responsibilities of national authorities and of users and providers of genetic resources in the implementation of ABS arrangements;
- The participation of stakeholders in the development and implementation of ABS arrangements;
- The identification of steps in the access and benefit-sharing process;
- The definition of the basic requirements for, and elements of, mutually agreed terms and benefit-sharing; and
- The identification and establishment of measures for the implementation of the guidelines and ABS arrangements.

Obligations of users of genetic resources are set out in paragraph 16(b) of the Guidelines. They are as follows:

- Seek prior informed consent prior to accessing genetic resources;
- Respect customs, traditions and values of indigenous and local communities;
- Respond to request for information from indigenous and local communities;

- Use genetic resources for purposes consistent with the terms and conditions under which they were acquired;
- Obtain new prior informed consent for uses other than those for which genetic resources were acquired;
- Maintain relevant data, especially documentary evidence of prior informed consent and information concerning the origin and use, and benefits arising from such use;
- Endeavour to carry out their use with the participation of the providing country;
- Honour the terms and conditions regarding acquired material when supplying genetic resources to third parties;
- Ensure the fair and equitable sharing of benefits, including technology transfer to providing countries, arising from commercialization or other use of genetic resources;

In addition, paragraph 16(d) of the Guidelines provides that Parties to the Convention should take appropriate legal, administrative, or policy measures to ensure that users under their jurisdiction comply with prior informed consent of the Party providing the resources and the mutually agreed terms on which basis access was granted. These measures include:

- Mechanisms to provide information to potential users on their obligations regarding access to genetic resources;
- Measures to encourage the disclosure of the country of origin of the genetic resources and associated traditional knowledge in applications for intellectual property rights
- Measures aimed at preventing the use of genetic resources obtained without the prior informed consent of the Party providing such resources
- Cooperation between Parties to address alleged infringements of access and benefit-sharing agreements;
- Voluntary certification schemes for institutions abiding by rules on access and benefit-sharing;
- Measures discouraging unfair trade practices;
- Other measures that encourage users to comply with provisions under subparagraph 16(b).

The Bonn Guidelines also include special features for taxonomic and systematic research. Indeed, the need to avoid creating obstacles to taxonomic and systematic research was recognized in paragraph 11(l) of the Guidelines, which addresses the objectives of the Guidelines:

"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."

Particular requirements of taxonomic and systematic research are also highlighted in several other sections of the guidelines (paragraphs 16(b) (viii), 34, 36(f), 42(e) and 44(f)). For example, paragraph 16(b) (viii) related to the obligations of users provides that: "….Special terms and conditions should be established under mutually agreed terms to facilitate taxonomic research for non-commercial purposes."

As has been often said, the Bonn Guidelines are a sound first step to assist with the implementation of the ABS provisions of the Convention; however other mechanisms may be needed to further assist with the implementation of these provisions.

Developing countries generally feel that more needs to be done to ensure that users of genetic resources meet their obligations under the Convention as set out in Articles 15, 16 and 19. Although the Bonn Guidelines provide useful assistance in the development of national systems for regulating access to genetic resources and benefit-sharing in provider countries, some are of the opinion that the guidelines do not sufficiently address the obligations of users of genetic resources in ensuring the fair and equitable sharing of benefits arising from the use of genetic resources. Another concern of developing countries relates to access to judicial remedy once genetic resources have left the provider country in situations where genetic resources have either been illegally accessed or when there has been a breach of the access and benefit-sharing arrangement. Other important issues such as the recognition and protection of traditional knowledge also deserve further consideration.

III. International Regime on ABS

The ink was barely dry on the Bonn Guidelines when leaders at the World Summit on Sustainable Development, in September 2002, called for the "*negotiat[ion] within the framework of the Convention on Biological Diversity, bearing in mind the Bonn Guidelines, an international regime to promote and safeguard the fair and equitable sharing of benefits arising out of the utilization of genetic resources*." (see paragraph 44(o) of the Johannesburg Plan of Implementation).

At its seventh meeting, the Conference of the Parties decided to mandate the Ad Hoc Open-ended Working Group on ABS to negotiate an international regime on ABS with the aim of adopting an instrument/instruments to effectively implement the provisions of Article 15 and 8(j) of the Convention. The terms of reference of the Working Group adopted by the Conference define the process, nature, scope and potential elements of the regime.

(i) Process: The Working Group is required to elaborate and negotiate the nature, scope and elements of the regime drawing on, *inter alia*, an analysis of existing legal and other instruments at national, regional and international levels relating to ABS, including: access contracts; experiences with their implementation; compliance and enforcement mechanisms; and any other options.

(ii) Nature: The international regime could be composed of one or more instruments within a set of principles, norms, rules and decision-making procedures, legally binding and/or non-binding.

(iii) S*cope:* The regime will cover access to genetic resources and benefit-sharing in accordance with the relevant provisions of the Convention as well as traditional knowledge, innovations and practices in accordance with Article 8(j) of the CBD.

(iv) Elements: The terms of reference establish a long list of elements to be considered by the Working Group. The following are of particular interest:

- Disclosure of the origin/source/legal provenance of genetic resources and associated traditional knowledge in applications for intellectual property rights;
- International certificate of origin/source/legal provenance;
- Recognition and protection of the rights of indigenous and local communities over their traditional knowledge associated with genetic resources;

- Relevant elements of existing instruments and processes, including TRIPS and other WTO agreements; WIPO conventions and treaties; and the International Convention for the Protection of New Varieties of Plants.

IV. Disclosure Requirements & International Certificate of Origin

One of the key issues to be addressed to ensure the fair and equitable sharing of benefits is that of monitoring and ensuring compliance with national legislation of the provider country and the terms and conditions of access, by users of genetic resources. Two measures have been proposed with this in mind:

(1) An international certificate of origin, source or legal provenance of genetic resources

(2) The disclosure of country of origin of genetic resources and the source of relevant traditional knowledge in applications for intellectual property rights.

The idea of an international certificate of origin/source/legal provenance has been proposed by a number of "mega-biodiverse" countries. The proponents of this concept argue that such a certificate, accompanying genetic resources, would ensure transparency and traceability and provide a guarantee that legal requirements in the country of origin have been fulfilled. It has generally been described as a type of passport or permit that would accompany the genetic material along its life cycle and could be verified at various points of that cycle, including during the application for intellectual property rights for inventions based on genetic material or related traditional knowledge. It would, therefore, ensure legal certainty for users of genetic resources and provide assurances to providers that their resources are used in compliance with relevant legal obligations.

The idea of disclosure of the country of origin of genetic resources in applications for intellectual property rights has also been proposed by a number of countries as a means to ensure compliance with prior informed consent and benefit-sharing agreements. A number of countries have in fact already adopted legislative measures requiring the disclosure of country of origin and/or evidence of prior informed consent and mutually agreed terms in applications for intellectual property rights (Costa Rica, Decisions 391 and 486 Andean Pact, Venezuela, India, Denmark, Egypt). Some of these requirements are contained in national patent law regimes (India, Egypt and Denmark). The legal consequences of non-compliance vary from refusal to grant patents and the nullification of patents where granted (Decision 486 Andean Pact; Venezuela; India; Peru, Egypt), to criminal sanctions (Denmark, Norway).

The Conference of the Parties, at its sixth meeting, invited Parties and Governments to encourage the disclosure of the country of origin of genetic resources and associated traditional knowledge in applications for intellectual property rights, where the subject matter of the application concerns or makes use of genetic resources or associated traditional knowledge in its development, as a possible contribution to ensuring compliance with prior informed consent and the mutually agreed terms on which access to those resources and related traditional knowledge was granted.

Further analytical work has been carried out by the World Intellectual Property Organization (WIPO) on disclosure issues at the invitation of the Conference of the Parties in order to examine the possibility of including the disclosure requirements in appropriate international agreements. Different views have been expressed with respect to the characteristics of such a disclosure requirement. For example, no consensus

has been reached with respect to the nature of such a disclosure requirement, whether voluntary or mandatory, or with respect to the legal consequences of failure to comply with such a requirement.

Implementation at the national level

A number of countries, mostly but not exclusively, developing countries as providers of genetic resources, have taken legislative measures to implement article 15 of the Convention. Currently, the Secretariat database comprises national legislation of 29 countries. Such national measures address a range of issues including (i) the granting of prior informed consent by competent national authorities, (ii) mutually agreed terms and benefit-sharing arrangements in access agreements, and (iii) intellectual property rights.

However, the development of national measures has proven difficult for a number of developing countries due to a lack of national capacity.

In addition, a number of countries, as users of genetic resources, have put in place complementary measures to support compliance with prior informed consent of countries of origin of genetic resources and mutually agreed terms. To date, these initiatives have generally focused on awareness raising, information exchange and gathering, policy developments and incentive measures, including the development and implementation of institutional policies and codes of conduct on access and benefit-sharing by stakeholder groups. As an example, in countries such as Denmark and Sweden, access and benefit-sharing requirements are to be met as a prerequisite for the public funding of research and development projects.

Elements common to a number of legislations in provider countries:

In the countries surveyed, an application for access must be made to the competent national authority in order to obtain access to genetic resources. The competent national authority has the responsibility of evaluating the application for access to genetic resources. However, a majority of the measures also require the prior informed consent of the relevant authority or resource provider in the geographical area where the genetic resources are found. These resource providers are generally indigenous and local communities or other relevant stakeholders (Costa Rica, Malawi, South Africa).

Most national frameworks also require an access agreement setting out mutually agreed terms for access and benefit-sharing. Generally, access agreements have to be approved by the competent national authority. However, some measures provide that the contract is to be negotiated between indigenous and local communities or any relevant stakeholder and the applicant (Art. 82(3) South Africa Biodiversity Act). Most of the measures require that standard clauses be incorporated in the contract (Bolivia, South Africa). Such clauses include the geographical area where the genetic resources are to be accessed, the quantity to be accessed, the purpose of the access, and the duration of the contract.

Access and benefit-sharing regimes address intellectual property rights to varying degrees (Brazil, Guyana, India, Peru, Philippines, Venezuela). A number of measures consider intellectual property rights in the context of benefit-sharing through the sharing of royalties (Costa Rican regulations impose obligation to pay up to 50% royalties). Besides the Andean Pact countries, only a limited number of countries include specific requirements for the disclosure of origin of genetic resources and traditional knowledge in intellectual property rights applications (Brazil, Costa Rica, India, Denmark, Norway, Egypt). However, certain countries, including some that have not yet developed specific measures related to access and benefit-

sharing, have addressed the issue of disclosure through their patent legislation (Denmark, Egypt, Norway).

Among the Scandinavian countries, Denmark has revised - and Sweden and Norway are currently revising - their respective national patent laws in order to accommodate the disclosure requirement. Denmark incorporated a new provision in its Patent Law that requires patent applicants to provide information on the origin of the genetic resources used in the invention for which a patent is sought. In cases of non-compliance, no sanctions are provided in the patent system; however, under criminal law, sanctions are established for the provision of false information to public authorities (Act No. 412 of 31 May 2000).

Issues in national implementation:

A number of issues arise in the implementation of national and regional regimes on ABS. For a number of them solutions will need to be found at the multilateral level. How they are resolved will have implications not only for the effective implementation of national legislative regimes but also for the achievement of the objectives of the Convention in this field.

Monitoring of Compliance

One of the key issues in national implementation is that of monitoring compliance with national legislation and the terms and conditions of access. The problem is at two levels. In the first instance, although a number of legislative regimes have established mechanisms for monitoring, inspections and verifications (Australia, Costa Rica, Philippines), experience has demonstrated limited resource capacity of Governments to monitor all bio-prospecting activities within national jurisdiction. In the second instance, problems arise in cases where the genetic resources have left the country. Some legislations rely on reporting requirements imposed on users in order to track compliance with the terms and conditions of access (Andean Pact Decision 391; Venezuelan; Philippines). It is in this context that the idea of an international certificate of origin/source/legal provenance has been considered. Such a certificate, accompanying genetic resources, would ensure transparency and traceability and provide a guarantee that legal requirements in the country of origin have been fulfilled.

Enforcement Problems

Difficulties also arise with respect to enforcement in cases of non-compliance with legislative requirements in provider countries or with contractual obligations. The capacity of provider countries to enforce their legal requirements will largely depend on mechanisms for access to justice and the availability of administrative and judicial remedies in foreign jurisdictions. Information provided by Parties so far indicates limited experience in this regard with disputes relating to ABS.

Intellectual Property Rights

Intellectual property rights have been at the center of incidents of unauthorized access to and unlawful appropriation of genetic resources and related traditional knowledge. There is continuing debate on how existing IPRs regimes could be made more supportive of national ABS regimes. A number of pioneering countries now require the disclosure of country of origin and/or evidence of prior informed consent and mutually agreed terms in applications for IPRs (Costa Rica, Decisions 391 and 486 Andean Pact, Venezuela, India, Denmark, Egypt). Some of these requirements are contained in national patent law regimes (India, Egypt and Denmark). The legal consequences of non-compliance vary from refusal to grant pa-

tents and the nullification of patents where granted (Decision 486 Andean Pact; Venezuela; India; Peru, Egypt), to criminal sanctions (Denmark, Norway). Disclosure requirements would support ABS arrangements more effectively in those cases where they are part of both national patent laws and the international IPR regime.

Lack of & Disparities in National Legal Regimes:
The uneven development of ABS frameworks among Parties to the Convention creates problems of implementation at two levels. First, for countries in the same bio-geographic region legislative deficiencies in one or more countries are likely to undermine the ABS objectives of other countries where genetic resources are transboundary. The harmonization of legislative requirements within such regions is therefore a prerequisite for effective national implementation. In this respect, regional and sub-regional instruments can play an important role in establishing uniform standards. Secondly, countries with users of genetic resources under their jurisdictions will need to take appropriate legislative measures in order to support and buttress the ABS regimes of provider countries. Such measures could include disclosure requirements in patent applications; access to justice; and administrative and judicial remedies in cases of breach of legislative or contractual obligations.

Scientific research

While on the one hand, the need to facilitate access for research purposes has been recognized, on the other hand there is concern that resources initially accessed for research purposes through facilitated access procedures may end up being used for commercial purposes without the consent of the provider country and consequently without the sharing of benefits. The challenge ahead lies in the development of appropriate measures to ensure, on the one hand, that no impediments to research are created by cumbersome access procedures and, on the other hand, that providers receive fair and equitable benefits from the use of their genetic resources.

Next steps

The next meeting of the Open ended Working Group mandated to negotiate the international regime on ABS will be held in Granada, Spain, in 30 January to 3 February 2006. The Working Group will report to the eighth meeting of the Conference of the Parties, which will be held in Brazil, in March 2006.

Users of Genetic Resources in Germany: Awareness, Participation and Positions regarding the Convention on Biological Diversity

CARMEN RICHERZHAGEN, SABINE TÄUBER & KARIN HOLM-MÜLLER
University of Bonn

1 Relevant background of the study

The growing loss of biological diversity during the eighties led to an increased perception in the developed countries that it was necessary to implement measures for the conservation of biological diversity. Mostly undeveloped countries which are rich in biodiversity also showed interest in the conservation of genetic resources; they called, however, upon the developed countries to take a share in the resulting costs. Those countries with potentially commercial genetic resources indicated that they would not be willing to provide any more genetic resources for commercial use without some kind of reward. These demands and the understanding of the developed countries that the conservation and provision of biological diversity requires compensation for the countries of origin, resulted - after four years of negotiations - in the adoption of the CBD at the United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro.

The entry into force of the agreement resulted in a new legal framework for the contracting parties of the CBD regarding the provision and use of genetic resources. The governments of the user countries are also facing new challenges due to the CBD regulations. Article 15 of the CBD contains the general conditions concerning ABS. The following obligations of the users (companies and institutions which utilize genetic resources) result from the CBD articles 15.3 to 15.7. The users have to acknowledge the sovereign rights of the countries of origin in conjunction with their genetic resources. Extraction and use of genetic resources may only take place after previous approval, which is based on factual knowledge ("prior informed consent") and takes place on "mutually agreed terms" (MAT). Furthermore, scientific research should be conducted to the greatest extent possible in the country of origin of the genetic resource and with the participation of the Contracting Party. The benefits resulting from any use of genetic resources should be shared with the country of origin on MAT and in a fair and equitable way (CBD Art. 15).

Even though the CBD is an international agreement between the governments of the contracting parties, the regulations have a significant impact on the users of genetic resources who are residents of these countries (ten Kate and Laird 1999, p. 293). The responsibility of the governments of user countries to take part in the implementation of the ABS concept derives primarily from the formulation of Article 15.7 of the CBD. Governments are requested to establish adequate administrative, legal, and political measures, in order to guarantee the implementation of ABS according to the CBD. The CBD articles do not contain precise suggestions or guidelines for the realization of the ABS, either at the level of the governments or at the user level.

The Bonn Guidelines on access to genetic resources and the fair and equitable sharing of the benefits arising from their utilization, which were laid down by the Conference of the Parties in 2002, specify the

CBD regulations of Article 15 about ABS of genetic resources as recommendations for action. However, the Bonn Guidelines are not legally binding.

In the last years demands on user countries have been expressed more explicitly, urging them to stand up for the implementation of the CBD regulations on ABS. In their Cancun Declaration, the so-called Like-Minded Megadiverse Countries emphasized the fact, that they do not consider themselves capable of enforcing ABS without the support of the user countries. Therefore they call for the creation of an international regime, which induces user countries to also take adequate measures for the realization of ABS according to the CBD (Like- Minded Megadiverse Countries 2002).

The idea to develop an international regime was accepted at the World Summit on Sustainable Development (WSSD), held 2002 in Johannesburg, and subsequently included as an objective in the final report. The CBD members are requested to negotiate an international regime to promote and safeguard the fair and equitable sharing of the benefits arising from the utilization of genetic resources (WSSD 2002, 44o). This means that today users of genetic resources have to be considered and involved even more as important actors in the development of comprehensive international conservation concepts.

The knowledge about users of genetic resources in Germany is very limited. It is assumed that the group of users is heterogeneous regarding level of information and awareness, channels of information, ways and problems of acquisition of genetic resources. Differentiated information about the target group is important for the development and implementation of strategies to increase users' participation in the process.

2 Objectives of the study

The study is based on a survey of potential users of genetic resources in Germany and on the analysis of the collected data. The objective of the study is on one hand to identify German users and their level of information, experience and positions regarding the regulations associated with the agreement and on the other hand to raise awareness about the CBD. From the user perspective the survey offers the opportunity to communicate experiences and problems with the institutional framework, to indicate levels of information and information deficits and to offer suggestions for the improvement of the implementation. Users' perspectives and experiences should be considered in the development of negotiating positions. Thus the survey makes it possible for users to actively participate in the CBD process.

Another objective of the study is to analyze instruments (so-called "user measures") which aim at an increased integration of users into the CBD process and a stronger user obligation to the goals of the CBD. Most of them are discussed in the CBD process and in parts already being applied. These instruments are to be tested for their acceptance among users in order to derive recommendations for the development of future user participation concepts. Based on these results determinants of users integration are derived.

The study should provide an informative basis for German and European policy makers in further CBD negotiations and in the implementation of international obligations at national level. Additionally it is to establish a basis for a stronger integration of users in the developments associated with the CBD.

3 Methodology

574 companies and institutions from different target sectors have been identified and contacted. The survey took place in August and September 2004. The target sectors were determined through the study „The Commercial Use of Biodiversity, Access to genetic resources and benefit-sharing“, of ten Kate und Laird (1999), a communication from the Commission to the European Parliament and the Council on the implementation by the EC of the Bonn Guidelines on access to genetic resources and benefit-sharing under the Convention on Biological Diversity, as well as through expert interviews.

The sectors pharmacy, botanical medicine, cosmetics, plant breeding, pest control, horticulture, cosmetics, and biotechnology were identified as the most relevant users in Germany and the European Union. Public and semi-public institutions which use genetic resources for research in the area of agriculture, pharmacy, biotechnology are only partly concerned with the CBD regulations, because usually the are non-commercial users. However, botanic gardens, herbariums and gene banks are important institutions, receiving material from different parts of the world. They collect, conserve and distribute genetic material and have to follow CBD procedures when acquiring material. As intermediaries they play an important role as link between the provider country and the commercial user.

Most addressees are members of the main sector associations. It was attempted to include all potential users in the survey.

The questionnaire is divided in five parts. The survey begins with the classification of the participating company or institution. Questions concern the sector affiliation, the kind of use, the origin and type of genetic material, results of the utilization of genetic resources in terms of product development and applications of patent and plant protection rights based on genetic resources. The second part of the survey focuses on the users' experience and difficulties with the acquisition and use of genetic resources and the reasons for not using genetic resources. The third part deals with the users' levels and channels of information concerning the CBD and the associated regulations and institutions. These insights can be used for the development of more efficient information and participation concepts. The penultimate section of the survey addresses the users' positions on and their participation in the CBD process. The information helps to develop strategies to increase the users' involvement in the CBD process. The last part on evaluation, perspectives and company data focus on the developments of the use of genetic resources and on company and institution data which are relevant for the evaluation.

4 Users of genetic resources

An important result of the study by ten Kate and Laird (1999) is that the majority of users concerned are insufficiently informed about the CBD and its associated legal framework regarding the use of genetic resources. Some of the companies do not know whether CBD regulations are relevant to them or not.

Positive attitudes towards the CBD are most common among those companies which are already participating in the political process. Among other things the following expectations from the CBD are being expressed: the improvement of legal security for issues of access and use of genetic resources, and more clearness in questions of property rights to genetic resources. From some users' point of view the CBD

can assist in developing guidelines for best practice in the use of genetic resources, thereby tackling image problems of the user sector.

The users' experiences with the impact of the CBD led in 1999 to a more critical attitude towards the CBD. The problems and disadvantages users mentioned are the insufficient level of information, inconsistent implementation of access regulations by the different countries of origin, excessive bureaucratic expenses, unrealistic expectations on part of the countries of origin regarding the sharing of benefits, delays in the research of biodiversity due to constraints in the traditional mutual exchange of genetic material for research purposes, negative incentives for research and development, and in general the disadvantage of high transaction costs due to complicated regulations.

Since then some users' initiatives have been established. In the European Union initiatives of the European botanic gardens ("Principles on access to genetic resources and benefit-sharing for participating institutions") and collections of micro-organisms ("Micro-organisms Sustainable Use and Access Regulation International Code of Conduct") exist.

5 Results of the survey

136 out of 574 addressed companies and institutions responded to the survey, which gives a return rate of almost 24 percent. Of these, 67 respondents (or nearly 50 percent) consider themselves as users of genetic resources in terms of the CBD.

The survey period (15/08/04-10/09/04) was rather short. Only one quarter of the addressees included an employee identified as a person responsible for procurement and use of genetic resources. Nevertheless the return rate in written surveys can be expected to range between five and 20 percent. Hence, the return rate of 24 percent is satisfactory.

5.1 Identification of users groups

The largest number of questionnaires was sent to addressees of the biotechnology and plant breeding sector, but the return rates of these sectors were relatively low. In the case of plant breeders the Association of German Plant Breeders represents its members in the CBD process. German plant breeders leave the political discussion on the CBD to a great extent to their association. This can explain the low return rate. The participation of ex-situ collections, the sectors horticulture, botanical medicine, universities and other research institutions is relatively high. In these sectors, except for botanical medicine and plant breeding, the group of users is comparatively large.

In order to differentiate user groups, company and institution data related to the size of the company or institution and the importance of genetic resources for the work of the company or institution measured by the number of research and development (R&D) employees, R&D budget and turnover were collected. Questions addressed the share of employees in R&D, as well as the shares of budget and turnover, in the field of genetic resources.

The user group covered by the survey is dominated by small and medium companies and institutions, even though some large users are included as well. The knowledge about small and medium-sized users is very limited. The participation of this group is exceptionally important.

The major part of the respondent users does not consider activities in the field of genetic resources as the most important area of their company or institution. However the users which produced the largest share in their turnover with genetic resources also have a large number of R&D employees working with genetic resources and/or use a great share of their research budget in the field of genetic resources.

As expected, companies or institutions which spend a larger share of their research budget in the field of genetic resources, also have a relatively high number of R&D employees in this field. Users with a significantly low or high share of research budget spent in the field of genetic resources accordingly range in the lowest or highest category, respectively, regarding the turnover by use of genetic resources.

The largest group of users applies genetic resources in the development of marketable products. Approximately half of all users have already developed products by using genetic resources, and/or applying for patents and/or plant protection rights. Four additional users are currently in the process of doing so.

5.2 Experiences of users with acquisition and use of genetic material

Most of the users receive their material from trade partners rather than collect or reproduce it themselves, while collecting is reported significantly more often than the reproduction of genetic material. Providers from the countries of origin and from other countries constitute the most important supply sources for all sectors. “Own collecting” activities are carried out above all by users at universities and other research institutions, as well as ex-situ collections and users from the field of biotechnology.

Most users directly approach providers in the countries of origin, establish co-operation in the countries of origin and/or contact ex-situ collections. Only few users obtain PIC before using of genetic resources or conclude MTAs with the country of origin.

The main reason for the survey participants, who classified themselves as non-users, to not work with genetic is that they have no use for them. Apart from that the relatively biggest problem reported by users and non-users is the difficulty to find an appropriate responsible contact person for the arrangement of access modalities in the country of origin. Compared with the users a higher share of non-users states image problems as one reason for not using genetic resources. In the past, incidents where genetic resources were illegally obtained led to a negative impact on the image of using such material, as well as on the image of the users themselves.

Except for two individual cases in the sectors of horticulture and pest control, the respondents of both groups - users and non-users - have not had difficulties in gaining access to the genetic resources of their interest, and therefore do not consider it as substantial problem. This result contrasts the information obtained in an expert interview that users in the field of ornamental plant breeding face considerable problems when seeking access to genetic resources.

Only few respondents are able to give a statement on the problem of excessive costs resulting from benefit-sharing. This seems rather unexpected, since especially commercial users often complain about disproportionate expectations of monetary benefit-sharing. The expert interviews, however, revealed that users support the idea of non-monetary benefit-sharing. The survey result can be explained by the evaluation of the question about the users’ awareness of the CBD, which reveals that only few users actually know the CBD and the meaning of benefit-sharing.

The same holds for the answers regarding problems which result from the strictness and complexity of international regulations on ABS, as well as from insufficient knowledge about these regulations. A large share of users and non-users does not make a statement in this context.

5.3 User awareness of current international framework of the use of genetic resources

The most relevant result of this section is that many users do not know the CBD exactly and consider themselves insufficiently informed about international regulations about ABS. More than half of the respondent users do not know the CBD at all. 20 users (32 percent) approximately know it and only nine (14 percent) exactly know what the CBD is about. Thus, the users are apparently aware of the lack of information.

According to the study from ten Kate and Laird it was assumed that larger companies and institutions tend to be better informed. The survey was not able not confirm the assumption. Groups of users which have a similar size and structure do not automatically have the same level of information. This result was obtained by comparing the levels of knowledge about CBD terms (know exactly, know approximately, don't know) with the size and structure of the respective companies and institutions (R&D employees, research budget, and turnover). In all groups classified by these aspects, the majority of users are not informed about the CBD. The number of survey participants from each category of size, however, was not large enough to support the conclusion that in Germany the company and institution size generally do not correlate with the information level.

The examination of information level by sector results in more explicit findings. Ex- situ collections are most familiar with the CBD, followed by universities and other research institutions. The awareness of survey participants from the private sector turns out to be considerably lower.

The most important sources of information about the CBD include, in descending order, the internet, associations and scientific journals. Firsthand information from German authorities which act as National Focal Point and are involved in the international CBD process is only consulted by few users. This confirms the result observed by ten Kate and Laird that users are often informed about the CBD through secondary sources.

5.4 User participation in the CBD process

To the question whether or not the users so far consider their interests to be represented in international negotiations on the design of the CBD, the answers differ.

Only few users give suggestions on how to improve their participation in the CBD process. They propose more decentralized information strategies, e.g. the integration of many local contact points, such as botanic gardens and an increased involvement of associations, representing user sectors.

In the survey users were asked about there attitude towards different „user measures", which are political, administrative or legislative measures promoting users' participation in the field of ABS, encouraging compliance with the CBD criteria and being currently discussed on the international level.

In the study the following "user measures" are discussed:

- National Focal Point, which is a central information point in Germany, which actively informs users about access possibilities and conditions in provider countries and assists in approaching the competent authorities in these countries;
- Governmental assistance in the development and realization of projects promoting co-operation between users and countries of origin, and introduction of internationally standardized agreements on ABS;
- Disclosure of the country of origin when applying for a patent if the innovation is based on the use of genetic resources;
- Corporate and institutional policies and codes of conduct: measures assist in the development and implementation of ABS arrangements in compliance with the CBD
- Voluntary certification systems which verify practices of organizations related to acquisition and use of genetic resources
- Certificates of origin: document the exchange and transfer of genetic resources

Users consider instruments in form of services as more useful than measures regulating their handling of genetic resources. The intensity with which user measures interfere in their activities is also of importance. Interferences of minor intensity are preferred to those of high intensity. The suggestion to establish a central information point in Germany, which actively informs about access possibilities and conditions in provider countries and assists in approaching the latter, is considered the most useful instrument, with an approval of 90 percent. Most users also support the idea of governmental assistance in the development and realization of projects promoting co-operation between users and countries of origin.

Many users also support other suggestions, particularly the introduction of internationally standardized agreements on ABS, which reduce uncertainty and transaction costs for both, users and providers, similar to co-operations in countries of origin. The disclosure of the country of origin when applying for a patent developed by the use of genetic resources is considered very useful by 40 percent of the users and possibly useful by another 20 percent.

The positive acceptance of a certification system is rather remarkable. Only one user reports image problems in the context of the use of genetic resources.

The certification of origin, source and legal provenance is probably the most unknown instrument and considered more critically than other instruments, yet the number of approval still outweighs the refusals.

Apart from estimating certain instruments, some users give their own suggestions on how to increase the users' commitment to CBD regulations. These suggestions concern the further involvement of associations and sector initiatives (e.g. botanical gardens).

Nine users actively take part in sector initiatives which deal with the handling of genetic resources, as for example the International Plant Exchange Network".

Development of use of genetic resources

Half of these companies and institutions believe that it has become more difficult for German users to gain access to genetic resources, since the CBD entered into force. The majority of the users report an

approximately constant use of genetic resources since the CBD entered into force. In future the importance of genetic resources for users will increase.

6 Integration of users in the CBD process: determinants and opportunities

The integration of users has to be increased particularly in order to place the CBD process on a large and informed basis and support the users' compliance with the CBD on part of the users. Integration strategies should include user measures which aim at an increased participation of users in the CBD implementation process and a stronger user obligation to the CBD goals. They should be accepted and positively assessed by the respondents of the survey.

The heterogeneity of the users' composition, the level of information, awareness and participation, and the users' perspectives and concerns can be identified as the major determinants which have to be considered by policy makers when developing strategies to promote the integration of users into the CBD process.

- Heterogeneity: reasons for non-use by potential users, difficulties of users, intention and results (patents, products, etc.) of use, source and level of information and attitude towards user measures are evaluated differently by each sector.
- Information and awareness: users of genetic resources are poorly informed about the international legal framework of access to and use of genetic resources and not familiar with CBD terms. Users are aware of this deficit.
- Willingness to participate: despite the positive evaluation of user measures user participation in the CBD process is very low, especially in the private sector.
- Perspectives, expectations and concerns: genetic resources will continue to play an important role in the future. The concerns regarding the introduction of user measures and the associated establishment of an international ABS regime seem to be small.

Opportunities for the increased user participation are improvement of national focal points and the clearing house mechanism (CHM), promotion of co-operation and provision of standardized contracts, monitoring of intellectual property rights applications, development of corporate or institutional policies and codes of conduct, establishment of a voluntary certification system, and documentation and monitoring of the transfer of genetic resources.

- Improvement of national focal points and the clearing house mechanism: the national focal point needs to gain stronger recognition and its responsibilities should be extended not only to fulfil the CBD obligations but also to create incentives for user participation. The CHM should be used for dissemination of information.
- Promotion of co-operation and provision of standardized contracts: cooperation between users and providers of genetic resources, and the national competent authorities and national focal points can be improved through the support of projects. Standardized contracts can provide transparency and certainty.

- Monitoring of intellectual property rights applications: the disclosure of origin in intellectual property rights applications can control compliance with the CBD in the final stage of R&D. Users assume control responsibilities and are integrated in the in the CBD process.
- Development of corporate or institutional policies and codes of conduct: the application of corporate policies and codes of conduct increases user transparency and therefore provider countries' trust in partners. Supporting the establishment of corporate policies and codes of conduct can be an important measure to enhance participation of users. Workshops can help to disseminate information on existing examples and support the development of new initiatives.
- Establishment of a voluntary certification system: a successful certification system increases the participation and reputation of users of genetic resources. Already existing systems, e.g. EMAS, need to be considered when developing a certification system.
- Documentation and monitoring of the transfer of genetic resources: certificates of origin can alleviate uncertainty and complexity related to acquisition and regulations. Certificates of origin can be used as evidence of compliance for disclosure of origin requirements. Again, already existing control systems, e.g. CITES and IPPC have to be considered regarding their transferability.

7 Conclusions

Integration strategies have to be developed to increase the participation of users in the CBD implementation process. The heterogeneity of the user sector, the level of information and awareness, the willingness to participate and the perspectives and concerns are important determinants which should be considered for the design and implementation of these strategies.

The group of users of genetic resources in Germany is characterized by its heterogeneous structure. In all target sectors and all size categories actual and potential users could be identified. The sectors differ especially regarding the reasons for non-use of potential users, the difficulties of users, the intention and the results of use, the source and the level of information and the attitude towards user measures.

In general, users are poorly informed about CBD and ABS regulations. The fact that many CBD member countries have their own authorities (national focal point and national competent authority) which serve as contact partners in questions of ABS is widely unknown, as well as the existence of CHMs for information exchange.

The user participation in the CBD process is very low, especially in the private sector. Only some public institutions, organized in sector initiatives, have developed policies and codes of conducts with governmental support. Nevertheless, users strongly support measures which address and alleviate the problem of information and uncertainty and do not restrict their activities. The actual level of participation and the willingness to participate differs by sectors and should be taken into account while aiming at a stronger user integration. Some sectors are already more involved in initiatives or more willing to participate than other.

In some sectors (e.g. plant breeding) associations play an important role regarding information dissemination and participation in the political processes. In these sectors policy makers should especially involve these groups. The respondents appear to be very open to CBD issues and the possible results of the CBD process. The future concerns regarding user measures and an international ABS regime seem to be

small. Users positively judge the user measures which are under discussion on the international level. They consider instruments in form of services as more useful than measures interfering in and regulating their activities, but all measures are supported by a majority of the respondents.

Awareness training, regarding both scope and content of the CBD, is essential to enable users to adequately respond to CBD requirements. The demand for more information and the relatively high willingness to participate offer an entrance. With respect to this study the responsible authorities should use this favourable atmosphere to contact users and their representatives.

We suggest authorities to integrate those channels of information more efficiently which are already being used predominantly. The internet, scientific journals and in particular sector-specific associations appear to be the most suitable media. The users themselves presented the further involvement of associations as an option to improve participation. An emphasis is to be placed on the co-operation between authorities and associations. It should be considered to inform representatives of user sectors in workshops about the context of the CBD. In turn the responsible authorities can gain insight into the positions of the associations. The transfer of information to the actual user can be arranged by the associations on a decentralized basis. This way the process of information is significantly simplified for the users.

It is essentially important that the German focal point gains further recognition as contact partner regarding the CBD. Actual and potential users report difficulties in identifying responsible contact partners, when trying to find out about access modalities. We are convinced that this problem in the context of implementing ABS regulations can be alleviated by measures on part of the user countries. The users greatly supported the idea of the national focal point as central contact point in Germany, which informs about possibilities and conditions of access in foreign countries, and assists in approaching representatives from the country of origin. Thus, we recommend to review if these suggestions can be included into the tasks of the responsible authority. The CHM is still unknown, but it could be developed to the major information forum of stakeholders. Therefore it is necessary to inform users about its existence and to broaden its supply of information by e.g. a specific section on ABS issues or by the publication of existing corporate policies and codes of conduct.

Apart from the problem to find appropriate contact partners in the country of origin, the uncertainty about the enforceability of contract contents regarding access conditions has been identified by the respondents as a further institutional problem in the context of ABS. Continuous co-operation between users and their authorities on one side and the countries of origin on the other side, as well as standard international agreements can help to reduce uncertainties of enforcement and complexities in initiating and negotiating, implementing, and controlling the subject matters of contract. Therefore users support both, the idea of government sponsored projects to develop such co-operation and the introduction of standard international agreements on ABS. In their own interest user countries should support these user measures.

In single cases users report image problems resulting from the provision and use of genetic resources. Whether or not users will continue to face image difficulties which lead to restraints of use depends on the kind of information which shapes the public opinion. The introduction of a certification system which proves CBD-compliant conduct is considered useful by several users. Existing certification system (e.g. EMAS) should be taken into account for its development. Following the example of the botanical garden

initiative the government can promote private sector initiatives to develop and establish certification systems or codes of conduct. An objective public debate should be further facilitated by the provision of information through the responsible authorities.

In order to support the compliance with the CBD commitments control and monitoring are necessary. Through the users' participation in certain measures they can facilitate the application and implementation of control instruments. The disclosure of origin in IPR application provides a useful instrument to control the CBD compliance if the user of genetic resources applies for an IPR. The EC directive on the legal protection of biotechnological inventions has to be immediately implemented in Germany in order to create a legal basis for this measure and support its implementation. The import control of genetic resources and a certificate of legal provenance allow to observe the movement of genetic resources and the legal acquisition of the material. The suitability of already existing international agreement as for example CITES and IPPC should be examined.

The user countries are challenged to increase their efforts in the implementation of ABS regulations. This requires the realization of measures to improve the information level of the concerned sectors and users, as well as to integrate the latter more into the CBD process. Germany and most user countries already dispose of some instruments for the realization of these suggestions. Now it is essential to use the existing institutional environment to an optimum extent.

2 Specific User Group I: Botanic Gardens

The International Plant Exchange Network (IPEN): An instrument of botanic gardens to fulfil the ABS provisions

MARLIESE VON DEN DRIESCH[1], WOLFRAM LOBIN[1], THIERRY HELMINGER[2], ANDREAS GRÖGER[3] & BERT VAN DEN WOLLENBERG[4]

[1] Bonn University Botanic Gardens, Germany, [2] Arboretum Kirchberg, Luxembourg, [3] Botanic Garden of Munich, Germany, [4] Botanic Gardens Conservation International, Regional Office of The Netherlands, Utrecht

1 Abstract

Botanic gardens have a longstanding tradition in botanical and horticultural teaching and research. Today, they also play an important role in environmental education, as well as in ex-situ and in-situ conservation. Through this work, they contribute significantly to the conservation of the world's biological diversity, which is one of the three major objectives of the Convention on Biological Diversity (CBD). Sustainable use and the access and benefit-sharing regulations of the CBD (§ 15) are also of special importance to botanic gardens.

In this context much work has been done by botanic gardens towards the development of a model for voluntary implementation of the CBD's access and benefit-sharing (ABS) provisions. Initiated by pilot projects at Bonn Botanic Gardens on behalf of the German Association of Botanic Gardens (VBG) and funded by the Federal Agency for Nature Conservation an "International Plant Exchange Network (IPEN)" was developed and adopted by the BGCI/IABG-Consortium of Botanic Gardens in the EU. The consortium supports the implementation of IPEN.

The base of IPEN is the registration of botanic gardens declaring their adoption of a common policy (Code of Conduct), which is in compliance with the provisions of the CBD. This registration is limited to botanic gardens only. IPEN covers

- Transfer of living plant material from countries of origin to botanic gardens
- Plant exchange between IPEN member gardens
- Supply of plant material to gardens and other institutions that are not member of IPEN
- Sharing of benefits arising from non-commercial use (e.g., basic research).

Exchange and supply within IPEN is only possible for non-commercial purposes. For commercial purposes, individual agreements between the countries of origin and the users are required.

By creating a system that is transparent to countries providing plant material, and by the inclusion of regulations for sharing benefits with these countries of origin, it is hoped that IPEN will create confidence in the work of botanic gardens worldwide and thus facilitate their access to genetic resources. At the same

time it is intended to minimize bureaucracy for plant exchange between botanic gardens within the scope of their traditional seed exchange. IPEN intends to be an instrument to safeguard the conservation work of botanic gardens.

2 Introduction

2.1 The role of botanic gardens in implementing the CBD and their link to ABS

Botanic gardens traditionally play a major role in plant science, horticulture and education. In the last decades, they have also become important centres for biodiversity conservation and have acknowledged the need to undertake a global mission for conservation. This was expressed for the first time in *The Botanic Gardens Conservation Strategy* (IUCN-BGCS and WWF 1989) and refined and updated in the light of the CBD as *International Agenda for Botanic Gardens* (Wyse Jackson et al. 1997, Wyse Jackson & Sutherland 2000). Botanic Gardens Conservation International (BGCI) was considerably involved in the development of the *Global Strategy of Plant Conservation* (GSPC), that was adopted by the Conference of the Parties to the CBD in 2002. As one of the leading institutions of the Global Partnership for Plant Conservation (GPPC) BGCI takes an active role in the implementation of the Strategy (see also www.plants2010.org).

Over 2000 botanic gardens around the world are cultivating more than 80.000 species, almost one third of the known vascular plant species of the world, and are visited by over 150 million visitors each year: a great chance for conservation and raising public awareness. Being very diverse in size, structure, and organization botanic gardens perform a multitude of different roles in conservation. The major activities range from education, building public awareness and research to ex-situ and in-situ conservation and should be considered as implementation of a number of articles of the CBD (see Box 1). As a result, botanic gardens are actively involved in stemming the loss of plant species and their genetic diversity and heightening the level of awareness of plant diversity, its value and the need for conservation. Capacity building and co-operations amongst botanic gardens are the key to strengthen these efforts (Cheney 2000, Rauer et al. 2000, Wyse Jackson & Sutherland 2000, Klingenstein et al. 2002).

Box 1

Some examples for implementation of the CBD by botanic gardens

Ex-situ/in-situ conservation (Art. 8 and 9):

- *Rothmannia annae* (Wrights Gardenia), a nearly extinct Rubiaceae tree with a tiny remaining population on one of the Seychelles Islands: Royal Botanic Gardens, Kew, together with Seychelles Botanic Gardens realized a population survey as well as a re-establishing program.
- *Sophora toromiro*, a legume treelet from the Easter Islands, extinct in the wild: Bonn University Botanic Gardens participated in a reintroduction program (Lobin & Barthlott 1988).
- Trésor Rainforest Project in French Guyana by BGCI Netherlands, based at Botanic Garden of Utrecht University: Ten years ago an area of 2400 ha was acquired with financial support from sponsors. Soon a Voluntary Nature Reserve was established. Now a local association, which was founded in 1999, cares about a botanical trail, which is visited regularly by primary schools.

Research, training and exchange of information (Art. 12 and 17):
Most of the gardens are tightly joined to research institutions or are research facilities on their own. The research realized is mainly in the fields of systematics and ecology, sometimes in the fields of ethnobotany and horticulture. BGs are an important source for these types of research. The outcomes of this research are made available for the scientific community by joined publications and with training courses.

Public education and awareness (Art. 13)
Public education and awareness is one of the major objectives of botanic gardens. They have an enormous potential as mediators. Especially in urbanized areas, botanic gardens play an important role in children's education. For them botanic gardens are frequently the only place to get into contact with plant diversity.
Generally botanic gardens are perfectly equipped institutions to promote the understanding and enthusiasm for plants. Even subjects like species conservation and the CBD can be transmitted to the public by botanic gardens (e.g., botanika at the Rhododendron park of Bremen: a part of the permanent exhibition is dedicated to the content of the convention).

Benefit-Sharing (Art. 15)
Co-operations of botanic gardens with countries of origin are common. Naturally, they focus on partner gardens in those countries. Sometimes it is pure hardware support with instruments, labels, paperwork etc. Besides that there is an extremely efficient know-how transfer by staff exchange programs. These programs are practiced since decades and are part of the tradition of many botanic gardens. So, examples are numerous. A very recent example of a staff exchange is between Munich and Katse Botanical Garden, a very new garden in the Lesotho Highlands, Lesotho. Botanic gardens not only support partner gardens in mega diverse countries. Sometimes new gardens are established with the help of existing gardens, e.g., the foundation of a new botanic garden in Southern China by Royal Botanic Gardens of Edinburgh.

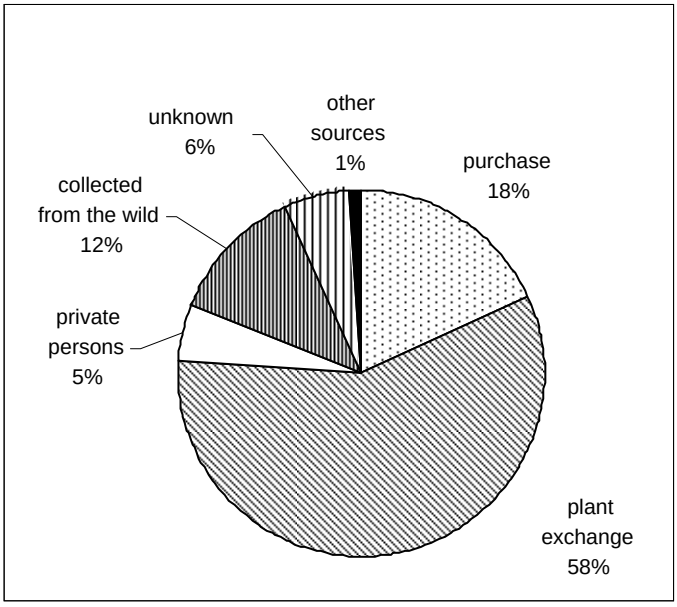

Figure 1: Sources of plant material in botanic gardens: results of a survey in botanic gardens of German speaking countries (Krebs et al. 2003)

The daily work of botanic gardens depends basically on the exchange of plant material between the gardens and on access to plant material from the wild. As shown in a survey led by the Association of Botanic Gardens in German speaking countries (Verband Botanischer Gärten e.V., VBG), international seed exchange is the most important mechanism for acquiring plant material and thereby conserving the ex-situ collections. As shown in Fig. 1, in Germany, Switzerland, and Austria the exchange of plant material between the gardens accounts for nearly 60 % of all the movements, some 12 percent of the plants come from the wild (Krebs et al. 2003). In the same survey, some 326.000 transactions of seed exchange were counted per year for 95 gardens. International seed exchange has a long-standing tradition, going back to

the 18th century. Its purpose has always been mainly non-commercial. This exchange system runs within a more or less closed circuit of botanic gardens and other botanic research organisations and takes place free of charge.

Consequently, botanic gardens are deeply affected by the ABS provisions of the CBD as recipients of genetic resources on the one hand and as institutions supplying plant material on the other hand.

The CBD underlines in its Article 15 the sovereignty of States over their natural resources and their authority to determine access to such genetic resources. According to this article, access shall be on mutually agreed terms (MAT) and be subject to prior informed consent (PIC). The recipients of genetic resources are required to share benefits resulting from its use. However, the article also states that each Contracting Party shall endeavour to facilitate access to genetic resources for environmentally sound uses.

Article 15 particularly aims at the commercial sector and intends to promote a sustainable use of the natural resources (ten Kate & Laird 1999). In the course of history, for example during colonial times, botanic gardens have played an important role in commercialisation of plants. They were declared turntables of Plant Genetic Resources, which were to promote the worldwide exchange of economic plants. Actually, in that time some botanic gardens have been founded especially for the import and acclimatisation of tropical plants to Europe (e.g. Rio de Janeiro, Orotava). This role changed fundamentally. As outlined above, research, education and conservation activities are the main tasks of botanic gardens nowadays.

Nevertheless, under the provisions of the CBD botanic gardens have to redefine their position in the worldwide transfer of Plant Genetic Resources, for example the relations to plant enthusiasts, to the pharmaceutical as well as to the agricultural industry. In Germany, this role of botanic gardens has been discussed in 1996 for the first time. These discussions have been the initial point for the development of IPEN, as the next chapter will show.

2.2 History of IPEN

In 1996, the issue of access to genetic resources has been discussed within the Association of Botanic Gardens (Verband Botanischer Gärten e.V., VBG) in German speaking countries for the first time, initiated by an expert meeting held by the Klimabündis e.V. (“Climate Alliance”, German NGO). As a result of these discussions, the VBG became the first national network of botanic gardens to develop a “Declaration on Biological Diversity” based on the CBD (1997, published in Rauer et al. 1999). At the same time, the Federal Agency for Nature Conservation funded a project on “Botanic Gardens and Conservation of Biodiversity” at Bonn Botanic Gardens in order to define the potential role of botanic gardens in implementing the CBD. Initiated by this project, in 1997, a working group “CBD” was founded within the Association of Botanic Gardens (VBG) (Rauer et al. 2000, von den Driesch & Lobin 2001).

The working group developed a common Code of Conduct for botanic gardens and a standardised Material Supply Agreement (Klingenstein 2002). To implement this Code of Conduct an “Exchange Circuit for Botanic Gardens” was founded in 2001. This so-called “German model” was recommended as basis for ABS-policies by the Consortium of Botanic Gardens in the European Union in April 2001. Driven by BGCI-Netherlands, the model was enhanced and presented at the Conference of the Parties to the CBD in The Hague in April 2002.

In December 2002, IPEN was endorsed by the EU-Consortium and a "task force" for its implementation was constituted. In 2003, it was presented to all EU-gardens at the Third European Botanic Gardens Congress (EUROGARD III). The participants of the Congress endorsed IPEN as an appropriate model to meet the requirements of the CBD on access to genetic resources and benefit-sharing (Resolution 2 of the EUROGARD III, in: Robbrecht & Bogaerts 2004).

Since then there have been workshops on IPEN in France, Switzerland, Italy and Greece and IPEN has been presented in a session at the International Botanical Congress in Vienna in July 2005. In Germany, IPEN has been included in the draft National Strategy on Biodiversity as an example of good practice. This strategy still is in the process of being adopted by the government.

Today, IPEN counts 67 member gardens from Germany, The Netherlands, Austria, Switzerland, Luxembourg, France, Sweden and United Kingdom.

3 IPEN: A Code of Conduct and its implementation

3.1 Description of the Network

The idea behind the International Plant Exchange Network was to develop a model for the acquisition and the exchange of living plant material within the botanic gardens community in respect of the ABS requirements of the CBD. IPEN is a voluntary registration system intending to facilitate the botanic gardens plant exchange in accordance with the CBD provisions. IPEN is characterized by the following aspects:

- only for botanic gardens according to the definition by Peter W. Jackson, BGCI (see Box 2)
- IPEN covers only the exchange of living plant material, meaning living plants or parts of plants, e.g., diaspores
- only for non-commercial exchanges: Plants must not be sold for profit or used for any kind of commercial activity
- IPEN includes a documentation system (the so-called IPEN numbers, see Box 4), that makes the origin of the plant material traceable at any stage of plant exchange

Box 2

Definition of a botanic garden:

"Botanic gardens are institutions holding documented collections of living plants for the purposes of scientific research, conservation, display, and education" (BGCI 1999)

The backbone of the network is the IPEN Code of Conduct, a three-page document stating the unified policy of the IPEN member gardens (see Box 3 and www.bgci.org/abs). It covers acquisition, maintenance and supply of living plant material by the gardens as well as benefit-sharing. One key element is the above mentioned documentation system with the so-called IPEN-numbers (see 3.2.3 and Box 5). The Code further provides a Material Transfer Agreement (MTA) to be used for exchanges with institutions that are not member of the IPEN network.

Only botanic gardens that commit themselves to act according to the Code of Conduct can become member of the IPEN network. This commitment is expressed with the signature of the IPEN Code of Conduct.

Box 3

IPEN Code of Conduct

for botanic gardens[1] governing
the acquisition, maintenance and supply of living plant material[2]

The conservation of the Earth's biological diversity is the responsibility of all humankind. Throughout their history, botanic gardens have made an essential and indispensable contribution to preserving the diversity of plant life. The *Convention on Biological Diversity* (CBD, Rio de Janeiro, 1992) respects the sovereignty of individual countries over their own biological resources as elements of biological diversity.

In compliance with this Code of Conduct, botanic gardens and their employees contribute to implementing the goals of the Convention on Biological Diversity.

Under this Code of Conduct, the garden commits itself with regard to acquiring, maintaining, and transferring living plant material to act within the framework of the CBD and the Convention on International Trade in Endangered Species (CITES). In addition, the garden will endeavour to act in compliance with further national and international laws.

Member gardens of the International Plant Exchange Network will act under the following Code:

1. Acquisition: How plant material enters the International Plant Exchange Network

a. To the best of its knowledge, the garden shall only accept plant material (including material derived from in-situ and ex-situ conditions) which has been acquired in accordance with the provisions of the CBD and further national and international laws related to the protection and sustainable use of biological diversity, access to genetic resources, associated knowledge, and Benefit-Sharing, as far as can be ascertained.

b. When acquiring plant material from in situ conditions, the garden shall obtain information on the country of origin's access laws and the procedures for obtaining Prior Informed Consent and relevant permits. One source of this information is from the national focal point of the CBD (or the national focal point for ABS, if one exists).

c. When acquiring plant material from ex-situ conditions the PIC will be obtained according to national law from the institution that holds the collection[3].

1.1 Procedure of material entering IPEN

Not all the plant material of a botanic garden that is IPEN member garden is automatically to be distributed within IPEN. Material entering the IPEN means material that is supplied by one IPEN member to another. The terms and conditions under which the plant material was acquired have to be kept. That means only plant material that was acquired without restrictions in respect of its use or its supply to third parties may enter the International Plant Exchange Network and be exchanged within it (see also "1.2 Material unsuitable for the International Plant Exchange Network").

In case of being the first garden supplying a specific plant sample (accession) within IPEN this garden has to provide the material with an IPEN-number consisting of an acronym of the country of origin, a note about the existence of any restrictions, the acronym of the first supplying garden and a identification number (see annex 3). Furthermore, the material that shall be supplied as well as the terms under which it was introduced have to be documented by the supplying IPEN garden (e.g. with the "documentation sheet for plant material entering the International Plant Exchange Network ", annex 4).

In case of receiving material from another member of IPEN it is sufficient to document the information listed in the "Minimum set of data to be documented in any case of transfer of plant material" (annex 5).

1.2 Material unsuitable for IPEN

If the terms and conditions under which the material was acquired do not allow the transfer to third parties, this material cannot enter IPEN.

[1] ‚Botanic gardens are institutions holding documented collections of living plants for the purposes of scientific research, conservation, display and education' (Wyse Jackson, BGCI 1999)

[2] According to the CBD "genetic resources" means genetic material of actual or potential value. This definition covers both living and not living material. The Code of Conduct and the IPEN covers only the exchange of living plant material (living plants or parts of plants, diaspores) thus falling in the definition of genetic resources.

[3] When requesting plant material for non-commercial purposes, the request will automatically be considered as a request for the PIC. A positive response, i.e. the supply of the requested material, will be considered as granting the PIC.

Even in the case that the transfer to third parties is allowed but other restrictions are given the material may be unsuitable for the network. Examples for imaginable restrictions:

- the country of origin wants to be informed about any plant transfer in advance
- the use for public display is not allowed
- annual reports on the use of plant material are requested by the country of origin
- etc.

Theoretically it would be possible to exchange such material within the IPEN because the IPEN-number includes a code for the restrictions (see annex 3), so the recipient garden may get the information on the specific restrictions. But, in practice it would be very difficult to honour the restrictions in such a dispersed network. Therefore such material is unsuitable for the network and should not be circulated within it.

1.3 Pre and post CBD material

Botanic gardens are strongly advised to treat all plant material 'as if' acquired after the CBD came into effect and therefore subject to the CBD. By doing so, it should be clear however that no responsibility is accepted for retroactive Benefit-Sharing claims regarding commercial use of plants acquired before the CBD came into effect.

2. Maintenance: What happens with the material within the IPEN member gardens?

2.1 Curation/Documentation

For the purposes of conserving biological diversity, supporting scientific study, education and Benefit-Sharing, the garden will make best efforts to ensure the care and cultivation of the plants entrusted to it and to keep the relevant information, especially the terms under which the plant material was acquired.

That means they need to use a database or record system that tracks all relevant data as plant material comes in and out of the garden. International standards on data exchange and taxonomic databases (e.g. by the Taxonomic Databases Working Group, http://www.bgbm.org/TDWG/) should be considered. The database must easily distinguish between material that is suitable for the IPEN and the unsuitable material.

2.2 Use

Any use of the plant material is restricted to the terms under which it has been acquired. For uses not covered by these terms, the garden commits itself to obtain a new Prior Informed Consent of the country of origin.

Commercial use of the plant material is not covered by IPEN. In case of intended commercial use and other uses not covered by these terms and conditions, the participating garden commits itself to obtain a new Prior Informed Consent of the country of origin.

2.3 Benefit-sharing

In the spirit of implementing the objectives of the CBD, the garden shall endeavour to share benefits resulting from the use of plant material with the country of origin. Since the garden‘s use of the material covered by this exchange network is non-commercial, such benefit-sharing will be non-monetary.

The following list includes examples of non-monetary benefit-sharing which are already in practice among botanic gardens and are based on co-operation with partner institutions:

- joint expeditions and projects with a partner institution in the country of origin
- knowledge and know-how transfer
- technical support
- exchange of gardeners and other staff
- reintroduction of threatened plant species
- joint publications with scientists and institutions from the country of origin or
- publication of research results in the country of origin or at least providing access to the research results in the country of origin

3. Supply

3.1 Supply of plant material within the International Plant Exchange Network

1. Plant material will be supplied under the same terms under which it was acquired.
2. The supply of plant material includes the transfer of information connected to the material especially data relevant for benefit-sharing with the country of origin (see “Minimum set of data to be documented in any case of transfer of plant material”, annex 5).

3.2 Supply of plant material outside the International Plant Exchange Network

1. Plant material will be supplied under the same terms under which it was acquired.
2. The supply of plant material includes the transfer of information connected to the material, especially data relevant for benefit-sharing with the country of origin (see "Minimum set of data to be documented in any case of transfer of plant material", annex 5).
3. The garden supplies plant material for non commercial uses by using the „Agreement on the supply of plant material for non-commercial purposes leaving the International Plant Exchange Network" (annex 6). By signing this Agreement the recipients commit themselves to act in compliance with the CBD and its agreed provisions on access and benefit-sharing. This includes a new Prior Informed Consent (PIC) of the country of origin for any uses not covered by terms under which it has been acquired (such as commercialisation).
4. The garden supplies plant material for commercial uses only if adequate evidence is provided that the country of origin's Prior Informed Consent has been granted. In this case, too, it is the recipient's responsibility to ensure an adequate and equitable sharing of benefits with the country of origin. The supply of material for commercial purposes requires a bilateral agreement. Examples for such agreements will be available at the BGCI Homepage soon.

Annexes to the IPEN Code of Conduct, see www.bgci.org/abs

Main principles of the IPEN Code of Conduct are summarized below.

- The garden shall only accept plant material which has been acquired in accordance with the provisions of the CBD
- When acquiring plant material from in-situ conditions, the garden shall obtain Prior Informed Consent of the country of origin and any other relevant permits.
- The garden will only distribute plant material within IPEN that has been obtained without any restrictions in respect of its use, especially regarding its supply to third parties.
- IPEN distinguishes between two types of documentation: The first, so-called 'maximum documentation' has to be kept by the first garden introducing an accession (plant material) into IPEN. In this documentation sheet all relevant information about the plant accession are recorded, such as taxonomic data, type of material, source, permits related to the acquisition and any conditions or terms of the country of origin. This first garden also has to provide the accession with the "IPEN number" (see 3.2.3), which will follow the accession and all its descendants through all exchanges within IPEN as the so-called 'minimum documentation'.
- Plant material distributed through IPEN is intended for use in display, education, rising public awareness, scientific research and conservation activities. In case of intended commercial use and other uses not covered by the IPEN Code of Conduct, the participating garden commits itself to obtain a new Prior Informed Consent of the country of origin.
- In the spirit of implementing the objectives of the CBD, the gardens shall do their best to share benefits resulting from the use of plant material with the country of origin. Since the garden's use of the material covered by this exchange network is non-commercial, such Benefit-Sharing will be non-monetary (see Box 4).

Within IPEN the supply of plant material is very easy, as all member gardens share the same policy on access and benefit-sharing and through the IPEN-number one can always easily trace back the origin of the material. If the recipient is not member of IPEN, he will have to sign the IPEN Material Transfer agreement, which will bind him to the same terms and conditions.

Box 4

Examples of non-monetary benefit-sharing of botanic gardens

The following list includes examples of non-monetary benefit-sharing which are already in practice among botanic gardens and are based on co-operation with partner institutions:

- joint expeditions and projects with a partner institution in the country of origin
- knowledge and know-how transfer
- technical support
- exchange of gardeners and other staff
- reintroduction of threatened plant species
- joint publications with scientists and institutions from the country of origin or
- publication of research results in the country of origin or at least providing access to the research results in the country of origin

If at one point an IPEN garden wants to start a commercial use with a given plant material, this material will leave IPEN. Therefore the garden will first have to get the Prior Informed Consent of the country of origin (found in the IPEN number) and find a bilateral agreement with that country on the terms of benefit-sharing. Only then the commercial use may be started.

Material can only be provided to an institution for commercial purposes, if this institution has the Prior Informed Consent of the country of origin and has negotiated a bilateral agreement regarding access and benefit-sharing.

Thus, IPEN is a closed network of botanic gardens committed to respect and enforce the provisions of the CBD. As all member gardens follow the same policy of the IPEN Code of Conduct, plant material can be exchanged freely between them, but of course only for non-commercial use.

3.2 Realisation of IPEN in botanic gardens: practical issues, possibilities and limits

3.2.1 Criteria for IPEN membership and registration

Since IPEN is only open to botanic gardens according to the above mentioned definition and only for non-commercial use of the plant material exchanged, it was necessary to define criteria for the IPEN membership:

1. Only botanic gardens (see definition in Box 2) can be accepted as IPEN members.
2. The botanic garden has to be a legal entity or part of a larger legal entity. That means that it is not possible to include private gardens or private individuals.
3. Within IPEN, no commercial use of the plants is allowed.
4. The botanic garden has to sign the IPEN Code of Conduct and thereby to commit itself to work according to the IPEN requirements.
5. A computer based documentation system is necessary to fulfil the documentation requirements of IPEN.

Any individual botanic garden that wants to become member of IPEN has to send a written declaration to BGCI that it intends to comply with the IPEN Code of Conduct (download registration form under www.bgci.org/abs). BGCI asks the respective "National Node" (see 3.2.2), if the application of membership can be accepted. The National Node decides whether the applicant garden fulfils the IPEN criteria. According to the decision of the respective National Node and after consulting the IPEN task force, BGCI will add the names of accepted gardens to the list of IPEN members and make the list available via internet. After 5 years, the procedure of adoption must be renewed.

3.2.2 Organisation behind IPEN

IPEN is a voluntary approach of botanic gardens, not a funded organisation. So, the work has been shared between several organisations and individuals.

BGCI has undertaken the task of hosting the website, collecting the membership applications and providing the actual list of IPEN members.

At first, the IABG/BGCI Consortium of Botanic Gardens in the EU was the panel to promote IPEN. In order to decouple IPEN from the European level, it has been decided to create another panel for this task: the **IPEN National Node Network**. Every representative of the Consortium was asked to seek for a person within his national network of botanic gardens who will act as national contact person for IPEN, the so-called IPEN National Node. The IPEN National Node Network is open to representatives from any country. The role of the **IPEN National Nodes** is:

- to promote IPEN in their country or region by initiating the discussion on IPEN in their national network.
- to ensure, that the IPEN applicants of their country meet the IPEN criteria
- to advise BGCI in the decision if the applications for membership can be accepted
- to ensure that all accepted applicants are put on the IPEN membership list

The working group responsible for the further development and conception of IPEN is the so-called **IPEN task force**, appointed by the IPEN National Node Network. The work of the task force includes:

- further development and updating of the IPEN website
- further development and updating of the IPEN documents
- finding answers to the "Frequently Asked Questions"
- assist the discussions within the national networks of botanic gardens

3.2.3 Documentation and IPEN numbers

If a botanic garden has become IPEN member, the most important thing to do is establishing a computer based documentation system that allows to introduce the IPEN numbers or to modulate the existing system. The system must allow the introduction of IPEN numbers for all plants that shall be distributed.

All plant material supplied within IPEN by an IPEN member needs to be accompanied by an IPEN-number that remains connected with that material and its derivatives through all generations to come. With the aid of this number it is possible to trace back where and under which conditions the plant

material entered IPEN. So, the first IPEN member garden that supplies a specific plant sample within IPEN has to provide this material with an IPEN-number (see Box 5).

Box 5

IPEN number

The IPEN number consists of four elements:

1. Country of origin (two positions, abbreviation according to ISO 3166-1-alpha-2 (http://www.iso.org), "XX" for unknown origin).
2. Restrictions of transfer (one position, "1" if there exist a restriction, "0" if none).
3. Garden Code (from which the IPEN number originates: BGCI provides each new registered IPEN member garden with a Garden Code. A list of the Garden Codes will be provided at the BGCI website. Some examples can already be found on the list of registered IPEN members.
4. Identification number (accession number of the garden).

Example: LU 0 Lux – 2004-149

3.2.4 Possibilities and limits

On the one hand, the implementation of IPEN within the gardens is dependent on the limited staff capacity. Staff training is necessary to explain the CBD requirements and the consequences of the IPEN Code of Conduct to the daily work within the botanic gardens. Some gardens have much to do in collecting the required data on their plant collections and creating a new documentation system while others only need to modify their existing databases.

But, on the other hand, the discussions on IPEN and its implementation had a lot of positive effects:

- there is an increasing number of botanic gardens using computer based documentation systems;
- existing databases have been improved;
- the scientific quality of the plant collections has been improved by better documentation;
- the discussions on IPEN and documentation systems have stimulated networking of gardens e.g., by establishing working groups.

4 Conclusions and outlook

IPEN is an advanced approach of botanic gardens responding to the ABS provisions of the CBD. It provides a basis for more transparency in the transfer of plant material. At the same time it is a practicable way for botanic gardens to safeguard their traditional seed exchange complying with the CBD but avoiding extra levels of bureaucracy.

The IPEN member gardens are already on the point of implementing the IPEN Code of Conduct and introducing the IPEN numbers. Nevertheless, there is still some need for action. The IPEN task force, for example, is working on more detailed criteria for the IPEN membership. IPEN aims on increasing the number of member gardens worldwide. This demands to create an organisation behind IPEN or at least to

strengthen the existing forces. Maybe, it will be necessary to organise periodical meetings of the IPEN members to give authorization to the IPEN task force for further discussions and proposals for open questions etc.

But, the most important task at this stage is to present IPEN to botanic gardens and decision-makers in mega diverse countries and to discuss if IPEN really is seen as an approach that creates more transparency and confidence. Stakeholder meetings and workshops like this ABS workshop in Bonn are an important step to answer this question. Others have to follow.

It is hoped that the importance of botanic gardens, their work and IPEN will be acknowledged by governments of mega diverse countries in the future. Confidence on both sides, the supplying and recipient countries of genetic resources, is the basis for more long-term partnerships as a way to ensure collaborative research and benefit-sharing. Only a facilitated access to genetic resources as required in the CBD may generate benefits than can be shared.

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The Principles on Access to Genetic Resources and Benefit-Sharing and Implementation by the Royal Botanic Gardens, Kew

KATE DAVIS
Royal Botanic Gardens, Kew, United Kingdom

The exchange of biological material and information has been a central function of *ex situ* collections such as botanical gardens and herbaria throughout their history. As the world's socio-political, economic and environmental backdrop has changed, so have the purposes and priorities of such collections: their primary role has shifted from clearing houses for newly-described and economically useful plants to centres for biodiversity conservation, research and education. The Convention on Biological Diversity underlines the necessity to build stronger connections between *ex situ* collections and countries of origin so that material is obtained with appropriate consent and the benefits arising from these uses can be shared fairly and equitably. However, the different national approaches to ABS regulation, different paces of action in each CBD Party, and other factors such as uncertainty over how to handle transboundary resources and pre-Convention collections have all resulted in a confusing situation for *ex situ* collections. This is all the more problematic in the face of limited institutional resources for tracking and interpreting legal changes and implementing new practices.

This paper describes a pilot project that set out to develop a voluntary, harmonised ABS policy for botanical institutions, with the aim of building trust between such institutions and governments and other stakeholders. The major output of the project, the Principles on Access to Genetic Resources and Benefit-Sharing, has proved useful and influential at a policy level and on a practical basis, and this paper provides examples of their use. I will then describe in more detail how the Royal Botanic Gardens, Kew is implementing the Principles, according to Kew's own institutional structures and activities.

1 Principles on Access to Genetic Resources and Benefit-Sharing

The Pilot Project for Botanic Gardens was conceived to bring botanical institutions together during these uncertain times to develop and spread best practice for continuing acquisition and exchange of material. The original aims of the project were to develop (1) a voluntary, harmonised policy, (2) standard Material Transfer Agreements, and (3) a publication setting out the policy and agreements and explaining the choices that were made. A harmonised policy could encourage government authorities to simplify and facilitate access, and it was hoped that by adopting such a policy, participating institutions could become 'favoured partners', as providers and recipients could know what to expect and rely on them to implement clear policies. The use of common or consistent MTAs between institutions could result in fast-track exchange.

The Pilot Project involved a series of four workshops over four years (1997-2000). Participants were drawn from a diverse range of large and small botanical institutions, from developed and developing countries (see Box 1) with differing national approaches to ABS. Initially there were representatives from 16 institutions from 13 countries, growing to 28 institutions from 21 countries by 2000. The project was

coordinated by the Royal Botanic Gardens, Kew, and funded by UK Department for International Development. Participants discussed concepts, definitions and practical implementation at the workshops, and between workshops took these ideas home to discuss in depth with colleagues. One major output was the development of Common Policy Guidelines (CPG). Leading up to the final workshop it was decided that the CPG provided very useful guidance, but were too complex and prescriptive for some gardens to put into practice, and that a simpler approach was necessary to take different circumstances into account.

The agreed final result was the voluntary, one-page Principles on Access to Genetic Resources and Benefit-Sharing for Participating Institutions ('the Principles'; see Box 2). These are designed to be a framework to facilitate the development of institutional policies. They cover all types of genetic resources from both living and preserved collections, acquisition from *in situ* and *ex situ* conditions, curation, use and supply of material, commercialization and benefit-sharing. The results of the Pilot Project, including the Principles, Common Policy Guidelines were published with an explanatory text that includes agreed definitions and model material transfer agreements[1].

The Principles and CPG have achieved wide international recognition. They were disseminated widely to and discussed by international policymakers in the run-up to and during the 1st ABS working group in Bonn in 2001. They have been used by a number of countries developing ABS legislation, for example by the Indian Ministry of Environment and Forests while preparing the final drafting of the 2003 Indian Biodiversity Act. The Australian Commonwealth Government's Environment Australia Department has used the Principles and CPG in the development of regulations regarding access to biodiversity on Commonwealth Lands, is considering granting facilitated access to participating institutions, and is promoting a nationally consistent regulatory approach by individual Australian states.

The Pilot Project outcomes have proved to be particularly useful for those *ex situ* institutions that are based in, or actively work with, biodiverse countries (where there may be stricter ABS legislation in place or in development)[2]. The Limbe Botanical and Zoological Gardens (Cameroon) reviewed its policy after the project and developed a suite of policy documents and model agreements to be used for interactions with other scientific institutions and commercial organisations[3]. The majority of the state collections in Australia has endorsed the Principles and has developed material transfer agreements based on the project models. Rio de Janeiro Botanic Garden (Brazil) established a cross-departmental staff team to monitor acquisition and supply, draft necessary documents and develop policy. The South African National Biodiversity Institute established new staff guidelines and an interlinked gardens database, and uses transfer agreements based on the project models[4].

The Principles are a useful tool for gaining international trust and structuring CBD implementation, but require further actions by gardens. The simple, non-prescriptive approach of the Principles enables gardens to use and adapt their own institutional procedures. The Principles are not themselves legally-binding and there is no central body that monitors compliance; however institutions may use legally-binding agreements as part of their implementation, and may be judged according to their policy and performance. The model agreements have been very useful; but experience has shown that some of the clauses

1 LATORRE (2001); available online at www.kew.org/conservation
2 See www.kew.org/conservation for a list of institutions that have endorsed the Principles.
3 See www.mcbcclimbe.org/publications.shtml
4 DAVIS & WILLIAMS (in press); WILLIAMS (2002)

are impractical to implement (see below) and new issues have arisen, so institutions may find they need to adjust their agreements accordingly. The Principles have mainly been endorsed by larger institutions; although smaller institutions have endorsed them too, our perception is that the requirement for an individual institutional policy has been off-putting for those gardens with fewer staff, less international research, and very limited resources for legal assistance where necessary. As the negotiations towards an international regime develop, there may be need for a new project to bring diverse institutions together again to develop newer guidance and tools.

2 Implementation at Kew

The Pilot Project group recognised that each individual institution will be working under different circumstances and has different internal structures, hence the need for a very short and simple framework. What works for Kew would not necessarily be relevant or practical for other institutions. Kew is a large, historic and complex institution with diverse activities and its own particular infrastructure. There are five science and horticulture departments, each of which holds different types of collections, such as the Herbarium (pressed dried specimens), the spirit collection (liquid-preserved specimens), the DNA bank (purified DNA samples), the horticultural collections (living plants) and the Millennium Seed Bank (cryo-preserved living seed). Material is often transferred between the collections as it is sampled, preserved or grown for identification, and Kew acquires material from and supplies it to a range of scientific, horticultural and conservation sectors.

Internal working group and CBD Unit

In 1999-2000, a cross-departmental working group was established; working from the Common Policy Guidelines, to identify a clear, practical framework of measures that would ensure Kew's policy and legal obligations could be met whilst enabling its botanical work to proceed, building on existing structures, groups and procedures wherever possible. Internal task forces were set up to examine the nature of materials curated and used at Kew, commercialization, process and criteria for the prioritisation of collaborative partnerships in countries, planning processes for overseas fieldwork, processes for acquiring *ex situ* and unsolicited material, benefit-sharing and tracking. Besides identifying implementation measures, this working group effectively broadened the range of staff able to discuss these issues with confidence and willing to play an active role in disseminating the working group's conclusions within their departments, and this familiarity continues to be invaluable. Kew also set up the CBD Unit, with 1.5 core staff positions, to work with staff to implement Kew's policy, provide advice, develop agreements and other necessary tools, train staff and students, and coordinate with the UK government and other institutions on ABS policy, practical implementation and capacity-building[5].

Partnerships and agreements

Kew now focuses its international efforts to a greater extent, working in fewer countries but through longer-term partnerships with in-country institutions. (This is probably true for many institutions, and this trend began well before the CBD or the Principles, but this change is in tune with both.) These in-depth relationships enable Kew to understand and adapt to particular national legal frameworks, to focus

[5] See WILLIAMS et al. (2003), available online at www.kew.org/data/cbdbotanists.html.

benefit-sharing more effectively and to contribute significantly to national CBD implementation. The partnerships are formalised through written agreements that clearly set out the terms of our collaborations. The original framework for such agreements is set out in the Pilot Project explanatory text, though the agreements have since evolved through negotiation with partners and practical experience. The agreements suggest areas for collaborative work, clarify what (if any) material will be collected, how it may be used by Kew, and what benefits may arise and be shared. In the case of the Millennium Seed Bank Project, which involves the collection and storage of sensitive living germplasm, such access and benefit-sharing agreements generally have a government ministry as one of the signatories, and explicitly include prior informed consent of that body[6]. For other collaborations, such as those involving research on less sensitive dead herbarium material, Kew usually develops simpler Memoranda of Collaboration with institutional in-country partners, setting out the requirement to obtain prior informed consent through the existing permit systems and from other stakeholders. Some shorter-term work (e.g. collecting far-flung taxa for monographs, or participating in trips organised by other institutions) is carried out solely under existing national permit systems rather than longer-term agreements.

Overseas Fieldwork Committee

Kew acquires a significant amount of material via fieldwork in other countries. In 2004, the Kew Herbarium accessioned around 37.000 new specimens, 6.300 (17 %) of which came from Kew fieldwork. Kew had an Overseas Fieldwork Committee for some time, to disburse core funds. This pre-existing mechanism was adapted to become a peer review process and awareness-raising measure for anyone conducting fieldwork under Kew's name – fieldworkers must receive an OFC registration number for each trip before they can receive funds or insurance. Representatives from across Kew review applications for an OFC number, and check that applicants (a) are working with partners; (b) can identify relevant stakeholders; (c) have obtained or are in the process of obtaining appropriate permits and other prior informed consents; (d) understand terms of use; and (e) are planning benefit-sharing. Permits are collected and filed with OFC records after each trip.

Acquisition, use, exchange, supply

Kew receives a greater proportion of material from other sources - exchange with other institutions, donations and commercial sources – to which the Principles also apply. The internal working group examined the points of entry and exit of material, re-defined the responsibilities of collections managers and identified tools necessary to control the flow of materials, such as standard documents. The Principles state that 'material should be used and supplied on terms consistent with those of the terms of acquisition'. Especially in the Herbarium, the size of the collection and the volume of exchanges make it difficult to handle too large a variety of terms, so certain **standard terms** and uses were set out – for example use for non-commercial purposes only. If the terms of acquisition are stricter than these, the collection manager needs to decide whether Kew is able to curate the material. If we can, the material is accessioned and its restrictions noted on labels or databases as appropriate. If the terms are too strict for Kew's curators to handle (e.g. if the material must not be accessed by visitors, or if we have to get PIC for or send reports back for all uses of the material), the material usually must be declined.

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[6] For a full description of a typical Kew access and benefit-sharing agreement, see CHEYNE (2004).

As in any scientific collection, core scientific data (e.g. country of origin, collector, date) are always kept with individual specimens, physically attached via labels or tags where possible, with further information in databases and/or files. To prioritise limited resources, Kew uses two different approaches to its data-

base systems for curation and tracking, based on whether the genetic resources in the collections concerned are perceived as being at potentially higher risk of exploitation (living material such as seeds and plants, and DNA) or lower risk (e.g. dead herbarium specimens). 'Higher risk' specimens are individually databased, while 'lower risk' herbarium material is accessioned and exchanged on a batch basis. Individual herbarium specimens currently only receive their own database records if they are 'type' material on exchange, or prioritised for particular projects.

Exchange tools

Kew uses several tools to communicate standard terms for plant exchange. A **use of material letter**, setting out the standard uses in Kew's various departments, is available for botanists seeking prior informed consent from government permit offices and other stakeholders. A **donation letter** is used in certain circumstances when material is acquired without an MTA from the donor, in which Kew seeks undertakings relating to the legal acquisition of the material and sets out Kew's standard uses (the donor can specify stricter terms). The **Material Supply Agreement** (MSA) sets out standard terms for use by recipients of material from Kew, such as non-commercialization, terms for transfer to third parties, and benefit-sharing (stricter terms can be added, depending on the original terms of acquisition). Kew's MSA is based on the Pilot Project model but has been modified with experience and newer developments. For example, rather than requiring that recipients always ask for PIC from Kew before they supply to third parties - which had proved very impractical - the new MSA requires recipients to notify Kew, to keep retrievable records and to provide a copy of their MTA on request (of course, material with terms requiring stricter PIC for third party transfer is treated accordingly). The new MSA also contains terms related to invasive alien species and use of data.

Staff training and awareness-raising

Policies and procedures are often developed in a top-down fashion, but they are unlikely to succeed unless they have involved and are understood by the people directly working with the material. Kew's complex infrastructure presents particular challenges that require staff awareness and responsibility - for example staff need to ensure that they transfer special terms and other necessary information between separate curation systems when they work on material from other departments. An **intranet staff guide** was launched in 2002 to put Kew's ABS policy into context and guide staff through sectional processes. The guide contains advice on conducting overseas and UK fieldwork, contact details for collections managers, links to standard documents, and guidance on a range of topics such as benefit-sharing, agreements, data and images, compliance by visitors and students, dealing with unsolicited material and interactions with commercial sectors. This type of tool could be very useful for other large, multi-departmental institutions.

Kew also runs regular **staff training courses** on the CBD, CITES and plant health regulations. These target staff across the institution, not just those working directly with collections. The courses provide background lectures, guidance on practical implementation and Kew procedures, exercises using online

resources and group problem-solving exercises for diverse scenarios. They have proved to be not just a powerful tool for awareness-raising, but also a forum for debate and a means to find out how well the procedures are working and identify areas that need attention. This is another tool that could be employed by larger institutions, or groups of smaller collections.

Commercialization policy

The Principles set out the need to develop a clear commercialization policy, using a definition of commercialization and setting out how pre- and post-CBD material is treated. Kew uses the definition from the Common Policy Guidelines, and its policy[7] is essentially that for post-CBD material we would obtain prior informed consent and share benefits, and for pre-CBD material we would share benefits (source data are often lacking for earlier material). Kew is a not-for-profit institution and carries out very little commercially-oriented work, although some sustainable use projects are aimed at discovering and developing marketable products. The plants available for sale to garden visitors are sourced from the commercial sector, not Kew's collections. Horticultural development is not one of Kew's current priorities; Kew lacks the staff resources necessary to implement a commercialization project following the letter and the spirit of the CBD, with PIC and involvement from the country of origin and an appropriate commercial partner. The normal response to commercial requests for Kew horticultural material is to provide contacts in the country of origin for direct communication. However, Kew does make some of its horticultural collections available for sale by special annual auction. The plants selected are checked very carefully for any restrictive conditions, no sensitive material is supplied, and all auction attendees must sign a non-commercial Kew MSA prohibiting commercial use without PIC from Kew. A proportion of the profits from the auction go to a benefit-sharing trust fund, which is used to support horticultural capacity-building activities for developing country partners.

Benefit-sharing

Kew and other *ex situ* collections share a broad range of benefits with countries of origin; these are almost all non-monetary in nature. Other participants in this workshop have already provided excellent examples of benefits commonly shared by gardens, such as joint fieldwork, joint research, equipment donation and staff exchange programmes. Some benefits arise directly from access (rather than use), such as the invaluable sharing of knowledge and experience during joint fieldwork, and the improvement of national collections. Some benefits arise from multilateral, rather than country-based projects. Researchers using Kew's global 'library' of specimens produce shareable conservation and research products such as identification tools, phylogenies, vegetation maps and conservation assessments, all of which are important for national CBD implementation. Kew also provides generic benefits such as visitor facilities and training; the Higher Education section runs a series of international diploma courses for professionals to develop specialist and technical skills[8]. Places on these courses are often made available to partners as part of a benefit-sharing agreement. The Millennium Seed Bank Project offers a wide range of technology transfer opportunities to partners. Additionally, staff regularly co-supervises Masters and PhD students from countries of origin.

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[7] See Kew ABS policy at www.kew.org/conservation

[8] www.kew.org/education/highered.html

Kew is working hard to make its collections more widely available accessible to the international conservation and scientific community, through specimen 'digitisation' projects (databasing, geo-referencing, imaging and making such information available on the Web – as terms of acquisition allow), taxonomic databases, bibliographies and the digitisation of floras and other publications[9].

3 Kew and the Principles

The Principles have provided a useful framework for Kew to examine its diverse activities and design its new ABS policy and implementation tools. The Kew internal working group's focus on using existing structures where possible helped to soften the impact on staff of major changes in the international environment. The active involvement of collections staff in the working group and the development of awareness-raising measures (intranet guide and staff training) have been central to effective practical implementation. So far, the Principles remain current, but the implementation measures naturally need to evolve with experience and new developments. Although the bilateral approach and the emphasis on institutional policy of the Principles may sometimes seem very unwieldy, they have proven very useful in providing clarity and confidence to overseas governments and partners, and have allowed Kew to continue working closely with a range of biodiverse countries. Many of the individuals and institutions that participated in the Pilot Project continue to communicate actively about ABS and form a wonderful international peer group with which to share ideas and experiences.

Box 1

BOTANIC GARDENS AND HERBARIA WHICH PARTICIPATED IN THE PROJECT:
Aburi Botanic Gardens, **Ghana**; Australian National Botanic Garden, **Australia**; Beijing Botanical Garden, **China**; Botanic Garden of Irkutsk State University, **Russian Federation**; Bonn University Botanic Gardens, **Germany**; Botanic Garden and Museum, Berlin-Dahlem, **Germany**; Freiburg Botanic Garden, **Switzerland**; Forest Research Institute, **Malaysia**; Herbarium of the University South Pacific, **Fiji**; Jardín Botánico de La Paz, **Bolivia**; Institut Agronomique et Vétérinaire Hassan II, **Morocco**; Jardín Botánico 'Arturo E. Ragonese', Castelar, del Instituto Nacional de Tecnología Agropecuaria, **Argentina**; Jardín Botánico del Instituto de Biología, UNAM, **Mexico**; Jardín Botánico de Bogotá, "José Celestino Mutis", **Colombia**; Jardín Botánico del Quindío, **Colombia**; Jardín Botánico de Puebla, **Mexico**; Jardín Botánico Guillermo Piñeres", **Colombia**; Jardim Botânico do Rio de Janeiro, **Brazil**; Kirstenbosch National Botanical Garden, **South Africa**; Limbe Botanic Garden, **Cameroon**; Missouri Botanical Garden, **USA**; Nanjing Botanic Garden, **China**; National Botanical Research Institute, **India**; National Herbarium, **Ethiopia**; New York Botanical Garden, **USA**; Royal Botanic Gardens Hamilton, **Canada**; Royal Botanic Gardens, Kew, **UK**; Royal Botanic Gardens, Sydney, **Australia**

Observers:
Botanic Gardens Conservation International; International Association of Botanic Gardens

[9] www.kew.org/data/index.html

Box 2

PRINCIPLES ON ACCESS TO GENETIC RESOURCES AND BENEFIT SHARING FOR PARTICIPATING INSTITUTIONS

Participating Institutions endorse the following Principles on access to genetic resources and benefit-sharing:

Convention on Biological Diversity (CBD) and laws related to access to genetic resources and associated traditional knowledge and benefit-sharing

- Honour the letter and spirit of the CBD, The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) and laws relating to access and benefit-sharing, including those relating to traditional knowledge.

Acquisition of genetic resources

- In order to obtain prior informed consent, provide a full explanation of how the genetic resources will be acquired and used.
- When acquiring genetic resources from in situ conditions, obtain prior informed consent from the government of the country of origin and any other relevant Stakeholders, according to applicable law and best practice.
- When acquiring genetic resources from ex situ collections (such as botanic gardens), obtain prior informed consent from the body governing the ex situ collection and any additional consents required by that body.
- When acquiring genetic resources from ex situ sources, whether from ex situ collections, commercial sources or individuals, evaluate available documentation and, where necessary, take appropriate steps to ensure that the genetic resources were acquired in accordance with applicable law and best practice.

Use and supply of genetic resources

- Use and supply genetic resources and their derivatives on terms and conditions consistent with those under which they were acquired.
- Prepare a transparent policy on the commercialisation (including plant sales) of genetic resources acquired before and since the CBD entered into force and their derivatives, whether by the Participating Institution or a recipient third party.

Use of written agreements

- Acquire genetic resources and supply genetic resources and derivatives using written agreements, where required by applicable law and best practice, setting out the terms and conditions under which the genetic resources may be acquired, used and supplied and resulting benefits shared.

Benefit-sharing

- Share fairly and equitably with the country of origin and other Stakeholders, the benefits arising from the use of genetic resources and their derivatives including non-monetary, and, in the case of commercialisation, also monetary benefits.
- 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.

Curation

In order to comply with these Principles, maintain records and mechanisms to:

- record the terms and conditions under which genetic resources are acquired;
- track the use in the Participating Institution and benefits arising from that use; and
- record supply to third parties, including the terms and conditions of supply.

Prepare a policy

- Prepare, adopt and communicate an institutional policy setting out how the Participating Institution will implement these Principles.

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Access to genetic resources and associated traditional knowledge in Brazil and the role of the Brazilian botanic gardens

TÂNIA SAMPAIO PEREIRA
Rio de Janeiro Botanic Garden Research Institute, Brazil

The dimension of the country's territory with the different climatic zones and geological diversity confers to Brazil the mega diverse conditions; the biggest country of the Latin America is also huge to maintain and control its natural heritage, and also to conserve biological resources in it. Biological conservation is one of the objectives of the Convention on Biological Diversity – the CBD, and the task to implement the articles of this Convention is one of the National Government's duties and the Ministry of Environment is in charge of it.

Botanic Gardens are important tools to help the nations to implement the CBD, because of their intrinsic attributions: to study plant diversity, to register plant names and their properties, to conserve plant diversity and to educate the public about the importance of plants. In spite of its megadiversity, Brazil has not enough botanic gardens, or research institutes or expertise to cover the needs of knowledge about plant diversity inside the country, and the need to increase knowledge about the Brazilian Flora is urgent to promote conservation.

On the other hand, biopiracy begun to appear as a such common news in the Brazilian and in the international tabloids, and both Government and research institutions became very worried. It was in 2000 when the press announced the Contract between the Social Organization "Bioamazonia" and the pharmaceutical company Novartis Pharma AG (Azevedo 2005), this fact started a process which launched the Provisional Measure 2.186-16/01; which is the "Brazilian Law on ABS" in effect. It established the rules for the access and sending of genetic heritage components and the access to associated traditional knowledge. This norm foresaw the creation inside the Ministry of the Environment of the Genetic Heritage Management Council CGEN, which is the national competent authority to deliberate on such access requests to associated traditional knowledge and access to and shipment of components of genetic heritage for any of the three purposes prescribed by the Provisional Measure: scientific research, bioprospecting or technological development (Azevedo 2005).

In the very beginning of the Council works it generate many conflicts, first because its had a Government composition and many social organizations was unhappy about it; besides, the academy was not sufficient represented and the letter of the Provisional Measure don't make any difference between terms which denotes pure science and bioprospecting. Notwithstanding, this Council only began its activities in April 2002, which produced a state of uncertainty as to the possibility to carry out research in the country and difficulties concerning the exchange of biological matter for scientific purposes. The terminology used by the Provisional Measure which does not define clearly what "access and shipment of genetic heritage" is, was one aggravating factor in this scenario.

After four years working hard and learning many things about how to conduct the differences on request and how to give the most adequate authorizations, the Council is able to define special documents - the

Technical Guidelines - to help to implement this Provisional Measure and to be absolutely fair with who is running pure science and who is intending to run bioprospection with commercial interests. Currently, in Brazil it is necessary to obtain specific authorization to access traditional associated knowledge and/or components of genetic heritage for scientific research, bioprospecting and technological development purposes. Individuals, institutionally unaffiliated researchers, are not allowed to request such authorizations; this is also the case for foreign institutions, which must become associated with national research and development institutions in the biological and correlated fields in order to participate in research, involving access. The procedures for cases in which there was participation of foreigners working on national territory were still pending, as the Ministry of Science and Technology – MCT, also intervened in the control of collecting, done by foreigners, regarding data and Brazilian scientific materials (Azevedo 2005).

It has been the same procedure from the past – before the Provisional Measure, where the foreign entities such as the botanic gardens worldwide search Brazilian botanic gardens and other botanic institutions to run collaboration on research projects. For a while, some foreign botanic gardens were very suspicious to send their botanic material to our herbaria or to keep on collaboration on research because Brazilian intentions were not clear, neither for the Brazilian researchers. But CNPq continue to be in charge of giving authorization for that collaboration inside Brazilian territory.

The Technical Guidelines also clarified that the shipment, ruled by the Provisional Measure, is only the temporary or permanent shipment of samples of genetic heritage

components aimed at access to scientific research, bioprospecting or technological development (Azevedo 2005). The shipment of exsiccates for morphological analysis, except with molecular techniques, for example, does not have to go through the rulings established in the Provisional Measure.

In the cases of shipment of material to be submitted to activities of access to genetic heritage, CGEN has established Resolutions which institute models of “Material Transference Agreement - MTA”. This prerequisite also produces complaints by research institutions which traditionally only used the shipment guides to manage the exchange of biological material. Some of the critiques have provided changes which have already been incorporated into CGEN in the revision of these Resolutions (Azevedo 2005).

As one can verify all those activities are common to the botanic institutions and Brazilian Botanic Gardens, they became very astonished with all those new obligations which inspire a lot of extra paperwork. In the beginning it was very confusing, but those authorizations will fall in the routine of the institutions, not without complain, but with the understanding of that something is needed to be controlled, and that was the chosen way.

The letter of the Provisional Measure also worried the botanic gardens because of their taxonomic exchange – in the herbaria, and seed exchange – done by the seed banks; for the herbarium material there is no more doubts since is clearly defined in the Technical Guidelines that collection is different from access. But questions lay down on; do the botanic gardens could keep on exchanging seeds since it is a reproductive material, and could be transferred to thirds, as they done in the past? Has not an open discussion about this in Brazil, what is not forbidden because was not foresaw in the Provisional Measure, but when one asks if the Botanic Gardens can keep on exchanging seeds from their collections, nobody knows what to answer, then Botanic Gardens decided do not exchange and wait.

After having established that collection is different from access, the jurisdiction to issue a license for collections was assigned to IBAMA - Brazilian Environment Institute. In order to expedite the handling of requests for access to genetic heritage for scientific research, CGEN accredited IBAMA to deliberate over such requests. Thus, research entailing collection and access receives simultaneously, respectively, the license and authorization from IBAMA. As this sort of request is no longer required to undergo appraisal by CGEN, it should be sent directly to IBAMA (Azevedo 2005). Meanwhile there is a big controversial discussion among the academic representatives about the collecting rules and respective authorizations by IBAMA, those rules are under suspicions and mainly they do not fit the needs of the increase of knowledge about biodiversity recommended by the CBD by the restrictions they impose to researchers in their field works; there is a quite big reaction about it.

One of the most highly criticized prerequisites of the Provisional Measure by the academic sector is the demand to present the prior informed consent of the holder of the private area; of the indigenous or local community involved; of the legal entity, whenever protected areas are involved; and of the marine authority or National Defense Council. The three most frequent arguments are: first, the fact that it is not always possible to know in advance where the material will be collected, and upon which genetic heritage access activities will be carried out; second an increase in research costs as it becomes necessary to travel back and forth to the field twice; once to obtain prior informed consent and another time to carry out the field work, which can only be done after consent is obtained; and last, the difficulty to locate and identify with certainty the holder of the area (Azevedo 2005).

With their mission linked to botanic studies, biodiversity conservation and education awareness, the botanic gardens in Brazil are trying to implement the Global Strategy for Plant Conservation – GSPC targets and fixed their own targets to be reached until 2014, in the Action Plan for the Brazilian Botanic Gardens (Pereira et al) which involve - Documentation of the national flora, Conservation of Brazilian plant diversity, Sustainable use of Brazilian plant diversity, Education for conservation of plant diversity and Brazilian institutional capacity building on botany. The hope is that the Brazilian Law on ABS which is in the Deputy Chamber, written by many hands and trying to ascertain, allow the academic institution to promote the increase of knowledge about diversity conservation without the restrictions imposed by the Provisional Measure in force and represent the main toll to implement the Convention on Biological Diversity.

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Expectations of biodiversity rich countries from commercial and non-commercial users like botanic gardens: the Ethiopian case

SEBSEBE DEMISSEW & TEWOLDE B.G. EGZIABHER
The National Herbarium, Science Faculty, Addis Ababa University, Ethiopia

1 Introduction

Ethiopia is one of the biodiversity rich countries in the world with 6500 to 7000 plant species (vascular plants and bryophytes) with about 12% endemism. However, the current estimate is about 6000, with 10-12 % endemism.

In addition to the wild plant diversity, Ethiopia is one of the 12 Vavilov Centres of Agrobiodiversity and hence one of the main centres of origin/diversity for several cultivated crops and their wild relatives. Ethiopia has a very high genetic diversity: in three of the world's widely grown food crops: wheat (*Triticum aestivum*), barley (*Hordeum vulgare*) and sorghum (*Sorghum bicolor*); in three of the world's most important industrial crops: linseed (*Linum usitatissimum*), castor *Ricinus communis*) and cotton (*Gossypium arboreum*), in the world's most important cash crop, coffee (*Coffea arabica*); in a number of food crops of regional or local importance: TEFF (*Eragrostis tef*), finger millet (*Eleusine coracana*); ENSET (*Ensete ventricosum*).

2 Access to Genetic Resources and Benefit-Sharing in Ethiopia

2.1 Ethiopia's experience on access to its biological diversity previous to the CBD

2.1.1 Commercial usage from agricultural crops and their wild relatives

The indigenous landraces of various crop plant species, their wild relatives, and the wild and weedy species are all highly prized for their potential value as sources of important variations for crop improvement programs. Among the most important traits that are believed to exist in these farmers varieties (landraces) are, disease and pest resistance, nutritional quality, resistance to drought and other stresses.

The significance of Ethiopia as a source of important plant diversity is evidenced by the flow of germplasm in and out of the country since historical times. With regard to intellectual property claims on Ethiopian plant and gene materials, the utility patents or plant breeders' rights certificates have been granted for TEFF, coffee and ENDOD.

These examples illustrate the weakness of bilateral negotiations for strategic plant genes and varieties. All concern the Ethiopian and the Africans as well. In this case, it could be noted that a company could use the indigenous knowledge of people of another country to seek specimens of the same species (or a related species) of Ethiopia or could seek samples from a botanical garden in an industrialized countries.

In all cases, while bilateral agreements are often promoted as a vehicle for benefit-sharing, it was a usual past phenomenon that the overwhelming advantage goes to the party in a position of power. However, sustainable establishment of equitable and fair share among these parties is desirable.

2.1.2 Non-commercial usage

This includes biological material transferred to other countries allegedly for research, and for botanic gardens for public education and creation. We will only mention those used for International Agricultural agencies

Some international organizations such as FAO had accessed plant genetic resources mainly for agricultural purposes from many biodiversity countries with the view to increase international cooperation and also with the view that biodiversity resources as a global heritage and hence access to any country that would like to use it. It is with such intentions that FAO had accessed plant genetic resources. For example coffee from Ethiopia and distribute them to various countries such as Brazil where recently scientists in Brazil had identified a cafein free coffee among the specimens collected from western Ethiopia in the 1960's.

2.2 Evolution of ABS

Ethiopia recognizes the need to conserve and foster the sustainable use its biodiversity (both wild and cultivated) resources. To this end, the Ethiopian Government is party to various conventions (at the international and regional levels) that cater for the Conservation of Biodiversity. Ethiopia signed the CBD in 1992 and ratified it in May 1994.

The CBD is the first international convention, which acknowledges a state's sovereign rights over the genetic resources within its jurisdiction and the resulting authority to regulate and control access to these resources (Article 15). However, the degree and extent to which the state could exercise this right has to be determined by national law. Parties to the Convention are also required to promote the fair and equitable sharing of benefits arising from the use of genetic resources and the development of biotechnologies (Articles 15 and 19); and to facilitate access to, and transfer of technology, including biotechnology (Article 16).

Genetic resources have been developed and used since the dawn of civilization in Ethiopia. Although the use of some traditional genetic materials has declined over time as new, high-yielding varieties have been introduced, there is still considerable potential for further development of native genetic resources. For example, there are hundreds of species of wild plants found in different parts of Ethiopia, which can be used for medicinal purposes. At present, their use is limited to traditional medical practice, often localized.

The draft protocol on access and benefit-sharing (ABS) prepared by the Institute of Biodiversity Conservation (IBC), the Institute Responsible for Biodiversity and Environmental Protection Authority (EPA), the CBD focal point.

The protocol stems with the consideration of relevant articles of the CBD: 1, 15, 16, 17, 18 and 19; the Bonn Guidelines on Access to Genetic Resources and the Fair equitable Sharing of the Benefits Arising Out of their Utilization, and the decisions of VII/19 of the convention.

Thus, the draft protocol is in conformity with international negotiations on ABS.

2.3 Ethiopia's recent experience on its biodiversity post CBD

2.3.1 Commercial usage

The Biodiversity Conservation Institute, the institute responsible to deal with Biodiversity issues has entered an agreement with The Netherlands to use various products based from Tef (*Eragrostis tef*). This involves direct economic benefit to Ethiopia and hopefully to the Ethiopian farmer who is the custodian of the genetic resources and the variablity within the species in cultivation. Thus the institution that wanted to develop the TEFF has access the genetic resource and Ethiopia and the Ethiopian farmer will share the benefit.

2.3.2 Lack of Trust on the sincerity of some institutions.

We have heard of some botanic gardens sending some of their staff on a botanical collecting trip through private arrangements with the intention of collecting specimens of particular groups of plants mainly succulents. Once collected specimens are sent through diplomatic pouches. Such acts/arrangements are not only bad but irresponsible that will undermine the positive efforts being made to develop a workable access and benefit-sharing arrangements based on the principles laid down in the CBD.

2.3.3 Lack of Knowledge about ABS by academicians.

The National Herbarium receives requests by many academicians to get specimens of various taxa to conduct their research. They always ask for how much money they should help to get materials from the field, but do not mention about ABS or even CBD.

We are not blame the individual scientists for making the requests, but a clear indication that the institutions fail to have educated or inform their scientists about ABS and CBD. Thus the institutions responsible should make every to educate and inform their scientists. It is such matters that hinders the positive relationship that should be developed between herbaria, botanic Gardens and other academic institutions in developed and developing countries.

2.3.4 Shady Botanical Collections

There are some that use botanical investigation that would go into another country and take out material illegally and describe as new taxon/taxa. How would you see such people? This is not an attempt to stop scientists from other countries to work in another country's flora, rather to the contrary. We in Ethiopia have benefited from international collaboration of scientists that have significantly contributed to the writing up and the almost completion of the Flora of Ethiopia. We are still collaborating legally under agreement with the Royal Botanic Gardens, Kew; Universities of Copenhagen, Oslo, and recently with Bonn. We know what the scientists coming from these institutions are doing, we have duplicates of their collections of in our Herbarium. We do not stop them from describing new taxa from the families in their field of expertise. But I would like to come back to those who are going to another country acting as tourists or some other means and taking materials out illegally as "thieves". It is such individuals or those sponsoring such people who are prohibiting positive collaboration between academic institutions.

We do not think it will help anyone by dwelling on what happened in the past, but what should we do next as scientists working in taxonomic botany? Do we want our colleagues to continue doing this? I think we as practicing botanists should do something about it not least to educate/inform botanists about these issues and to refrain from doing such activities and botanical journals involved in taxonomy to try to ask the origin of the material to be described, particularly those collected recently. I hope such practices would help those scientists to learn the principles of ABS.

3 Expectations from ABS

The expectations from biodiversity rich countries in my view are different depending who they are, and what they represent.

At present Ethiopia has prepared a Model Agreement on ABS with regard to with genetic resources a draft national protocol of the same.

3.1 Institutions with monetary benefits.

Institutions and individuals that have the potential/intent in making economic benefits (monetary benefits) should directly enter into negotiations with the concerned government institutions based on the CBD principles on ABS.

1. These institutions will cover the costs borne by the provider in collecting or compiling the object accessed shall be charged to the recipient at the time of access or at any other time that the provider and the recipient mutually agree to.

2. The provider may require a specified up-front payment from the recipient. The amount will be mutually agreed.

3. When commercialisation starts, a royalty of an agreed percentage will be paid of the equal to half of the net profit from the monetary benefits that accrue from the object accessed shall be paid each year to the provider.

4. The provider shall pay directly to the local community or communities concerned the royalties earned. If the local community or communities concerned so desire, this money shall be used to implement programmes that they determine; otherwise, it will be made available to them as cash.

3.2 Institutions with non-monetary benefits.

These include: academic institutions (universities, herbaria, botanic gardens and international gene banks).

Institutions with non-monetary benefits (research institutions, herbaria and botanic gardens) .

In both cases, the provider and the recipient should follow the principles of: Prior Informed Consent (PIC), Ownership of the genetic resource at all times be the property of the people of the country of origin; conditions governing the Use of the accessed Object; clear unambiguous agreement on the rights and obligations of the Provider and the Recipient.

Non-monetary benefits shall accrue to the country of origin of the accessed object and shall include:

a) Complete access to all research and development results;

b) Capacity building in research and development through the recipient carrying out all research and development activities wished by the country of origin of the accessed object in that country with the participation of those of its citizens its government specifies. For example, the Environmental Prtection of Addis Ababa City Administration and Addis Ababa University obtained about 704 hectares to develop GULELE Botanic Garden on the outskirt of Addis Ababa. We would expect major botanic gardens to provide expertise, capacity-building (infrastructure and training) and financial assistance to develop the Botanic Garden. We also hope we would be able to entertain requests by Botanical Gardens through the appropriate Government authorities based on the principles of ABS

c) Participation in product development, including the establishment and running of joint ventures that the government of the country of origin wishes to join in or wishes any of its citizens to join in;

d) Transfer of any technology used on the accessed object to the country of origin of that accessed object.

4 Conclusions and Recommendations

If the ABS is to be realized at the global level, the following issues have to be attended to:

- The need for a comprehensive global agreement on ABS between parties based on a genuine negotiation between parties under auspices of the CBD secretariat. The agreement between provider and recipent of genrtic resources to include the rights and obligations of both partners.
- To implement Article 12 of the CBD that deals with Capacity Building with a focus on the need for research and training, recognizing the special needs of developing countries in this regard.
- Institutions in party and non-party countries responsible dealing with the exchange of genetic resources and academic institutions to educate their politicians and scientists about the intentions and the principles behind ABS;
- Developing Trust between the countries that provide the genetic resources and those at the receiving end. In order to realize this, there is a need for a code of conduct by academic research institutions and Botanic Gardens. What are they expected to do? Academic Research institutions including herbaria and Botanic Gardens are expected not to accept any donation or exchange of materials of unknown origin or without entering ABS agreements including the principles of prior informed consent from the country of origin) through gifts.

5 Acknowledgement

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3 Specific User Group II: Academic Research

Access and benefit-sharing regulations in Bolivia: consequences for research and biodiversity conservation

PIERRE L. IBISCH
University of Applied Sciences Eberswalde, Germany

1 The setting: poorly known but definitely rich diversity of biological systems and genetic resources

A decade ago scientists started to claim that Bolivia should figure among the 10 to 15 most biodiverse countries (IBISCH 1998). Bolivia is, without doubt, still among the least biologically studied territories in the world. However, with the data already available it can be appreciated that Bolivia is one of the mega diversity countries. Recently, a first comprehensive assessment was published that provides updated information on the state of Bolivia's biodiversity and its conservation (IBISCH & MÉRIDA 2004). The data presented in the following paragraphs is extracted from this multi-authored document.

For example, it is shown that there are at least 12 distinct ecoregions with a very high ecosystem and species diversity (e.g., up to 20,000 species of spermatophytes - possibly 20-25 % endemic; >1,400 bird species – 1 % endemic; >350 mammals – 5 % endemic). Considering this rich biodiversity, it is not surprising that uses of biological resources are very diverse, as well. Bolivia's society, among other diverse cultural groups, comprises dozens of ethnic groups whose roots go back several centuries in the history. Thousands of years ago, agriculture was established in the territory corresponding to modern Bolivia. Consequently, the country is known as a globally important centre of domesticated plants, and also of wild relatives of cultivated species. For example, Bolivia (along with Peru) is the country of origin for the potato: 31 wild and seven cultivated species, as well as countless potato varieties (*Solanum tuberosum*, *S*. spp., Solanaceae) have been registered. Another species possibly originating in Bolivia and/or neighbouring countries and which is among the most important crops in the world is the peanut (*Arachis hypogaea*, Fabaceae). Among further domesticated plants of native origin figure diverse tubers, grains, fruits and vegetables. The taxa that are important as wild relatives of crops include potatoes and peanuts, but also sweet potatoes (*Ipomoea*, Convolvulaceae), beans (*Phaseolus*, Fabaceae), yucca (*Manihot*, Euphorbiaceae), pineapples (*Ananas*, Bromeliaceae), chili peppers (*Capsicum*, Solanaceae), papayas (*Carica*, Caricaceae), passion fruits (*Passiflora*, Passifloraceae), tobacco (*Nicotinia*, Solanaceae), pumpkins (*Curcubita*, Curcubitaceae), cocoa (*Theobroma*, Sterculiaceae), and vanilla (*Vanilla*, Orchidaceae).

Apart from the domesticated species, thousands of taxa are used as wild resources. An important knowledge regarding the traditional uses of biodiversity is still preserved in the rural communities (still, 38 % of the >8 million inhabitants are living in rural areas). Almost 3,000 species of medicinal plants with verified taxonomic identity are known in the country. Less than 50 % of these species have been

investigated in the framework of chemical, biological, or pharmacological studies focusing on anti-bacterial, anti-fungal, anti-malarial, trypanosome and leishmaniasis-destroying properties.

These bioprospecting activities were developed mainly by national institutes and collaborating foreign research institutions. Until now, there has not been a systematic industry-driven and investment-intensive bioprospecting. However, there are first examples of severe problems in the context of access to genetic resources and benefit-sharing deficiencies. Especially instructive is a Franco-Bolivian research project dealing with *evanta* (*Galipea longiflora*), in 1993, leading to an international patent which excluded the indigenous groups who provided the information and the plant samples that permitted the 'discovery' of new efficient and non-toxic molecules for the treatment of leishmaniasis. The molecules in question were named 'chimaninas' (in acknowledgement to the Chimane indians), which shows some recognition but which would not represent sufficient compensation in the event of an industrial application generating economic benefits.

The policy process initiated by UNCED in Rio de Janeiro was a strong stimulus for the modernization of the Bolivian state. The country, in the 1990s, turned to a policy model not exclusively oriented in economic development (MÉRIDA 2004). As one of the first countries, it established a Ministry for Sustainable Development and Environment. Bolivia ratified the Convention on Biological Diversity under the Law of the Republic No. 1580 in 1994, and as such it forms part of the country's environmental legislation. From the mid-90s onwards, in Bolivia governmental and non-governmental actors hoped that a new mechanism for sustainable development and biodiversity conservation could be developed. Exactly one decade ago, from 1996 onwards, the national regulations relating to the access to genetic resources and corresponding benefit-sharing were established, and first pioneering activities aimed at the application of this new legislation. Thus, it is time to evaluate the eventual achievements and failures.

2 Material and methods

The following evaluation is based on first-hand experience with the evolution of Bolivia's National System of Genetic Resources. This experience was gained through the involvement in the activities of the conservation NGO Fundación Amigos de la Naturaleza, FAN, (serving as head of the Science department from 1997 to 2003) that made possible:

- the accompaniment of the formulation of the national ABS regulations, the development of related biodiversity legislation initiatives, and the initial CBD reporting (first national report, MDSP 1997) as an independent NGO adviser of the government,
- the participation in pioneering access requests and the subsequent follow-up (from 1997-2003),
- the participation in the establishment of a non-governmental institution that was created to assure civil society's contribution to the establishment of a National System of Genetic Resources (ABORIGEN, see below; temporarily serving as vice-president),
- and the support of the formulation of the Bolivian biodiversity strategy (MÉRIDA et al. 2004).

3 Results

3.1 Historical sketch of the development of the Bolivian ABS regulations and the development of a National System of Genetic Resources

On July 2 1996, in the Andean Community (*Comunidad Andina*; agreement of Cartagena, comprising Bolivia, Colombia, Ecuador, Peru and Venezuela) the Decision 391 came into force relating to the Common Regime of Access to the Genetic Resources. This decision was regulated by means of the *Decreto Supremo* 24676 (June 21 1997). Among others, it was explicitly established how to present requests for access to genetic resources, how to process these solicitudes and to develop contracts between the Bolivian government and the soliciting party. According to the regulation, any request will be assessed by a Technical Advisory Body with participation of several ministries, scientists, and other representatives of the civil society, including indigenous peoples or rural communities when they are involved as providers of associated intangible components of genetic resources. When a contract is signed the corresponding prospecting activities must assure the participation of a National Institution of Support. Important elements of the decree are the just and equitable participation of the Bolivian State in any economic, technological or other benefit or another one of any nature that derive from the access to the genetic resources, as well as the participation of indigenous and *campesino* communities whenever they become involved.

The decree was elaborated in a participatory way including an effective consultation of the relevant stakeholders, such as conservation NGOs, indigenous organizations, researchers, etc. Actually, the government facilitated the active involvement of civil society in the establishment of the National System of Genetic Resources of Bolivia, an instrument that according to the decree 24.676 is thought to promote the conservation, development and sustainable use of the genetic resources through the implementation and execution of programs and projects in the framework of the legal norms. The corresponding initiative followed the recommendations suggested in the context of a Dutch-funded project concluded in 1996.

Consequently, the government supported the creation of a voluntary association conformed by diverse institutions active in the conservation and development of biological resources, such as NGOs, universities, and research centres: ABORIGEN (Asociación Boliviana para *la Conservación, Uso y Desarrollo de* los Recursos *Genéticos de Bolivia*; 1997). Unfortunately, most member institutions were not involved in active programs targeting the development of genetic resources. Thus, after the initial enthusiasm and the end of the governmental funding, due to the lack of priority and urgency, the initiative never came to an effective existence.

A German-funded project (GTZ; Project Implementing the Convention on Biological Diversity; measure “Implementation of the National Regulations on Access to Genetic Resources”), in the late 1990s, supported the Competent National Authority, the General Directorate for Biodiversity (Ministry for Sustainable Development and Environment), at the application of the ABS regulations by providing funding for staff, workshops and expert consultancies.

3.2 Application of the ABS regulations

From 1996 onwards, first initiatives tried to put into practice the brand-new regulations. The conservation NGO FAN supported the elaboration of requests for the access to genetic resources proposed by Crop & Food, New Zealand. One project targeted the development of novel ornamental plants from the high Andes; a preliminary approval was achieved, and collecting and research activities were started. After the coming into force of the Decision 391 and the corresponding national decree, four requests were presented (GALARZA 2004). Due to the lack of continuity in the communication between solicitors and government, enormous time lags between requests and responses, and other factors to be discussed below, all requests failed to become completed and approved.

One of the prominent requests that failed referred to the establishment of an ex-situ conservation collection of threatened species of peanut wild relatives. The project was presented by the United States Department of Agriculture (USDA; technically supported by CIAT, Colombia) and again involved the NGO FAN as candidate for being the National Institution of Support. Although it was not expected that the project would generate any short-term economic benefits, an attractive proposal for immediate non-monetary benefit-sharing was proposed. Among others, apart from the inventory research, a national strategy for the conservation of wild peanuts was to be developed, and a backup of the ex-situ collection had to be founded in Bolivia. After completing the complex request, among others, including public announcements of the proposal in rural areas where material might be collected, the Technical Advisory Body did not make a decision within the periods established by the decree. A public debate was raised by environmental activists who integrated harsh criticism of the peanut project into a campaign against a gas pipeline that was built in the Chiquitano dry forest (without having any direct relationship apart from the fact that the researchers expected wild peanut species in the region affected by the pipeline). This happened in a time when diverse social conflicts increased the severe governance problems that led to the current status of extreme weakness of the Bolivian state. Finally, in 2002, USDA decided to withdraw the request and implement a similar project in a neighbouring country.

Very recently, a program called TCPB (Trade Cooperation Program with Bolivia), promoted by the Swiss consultant TULUM, “after a two-year preparation process has succeeded in sponsoring an agreement – the first one of its kind - on access to genetic resources between the Government of Bolivia and the biggest retail chain in Switzerland, the MIGROS Federation of Cooperatives. Under this agreement, MIGROS has the right to protect, multiply and market five native Bolivian potato varieties, and is committed to pay a sales commission to the farmers, which have developed and maintained these varieties. The in-vitro plantlets from Bolivia have passed with success the stringent quarantine regulations in Europe, and are now entering a strictly controlled multiplication sequence, in-vitro, in greenhouses and in fields” (TULUM 2005). Finally, after one decade, the application of the ABS regulation seems to have started.

4 Discussion

4.1 Shortcomings of the regulation and reasons for the application failure

Some criticism has been published complaining that the ABS regulations are not complete enough to guarantee the adequate benefit-sharing for owners of intangible components of genetic resources: Mérida (2004) refers to the fact that there is no effective protection of collective intellectual ownership rights. However, this should not be any reason for the failure of the application of the regulation during one decade.

Fowler (2002) stated that the CBD-subsequent "controversies over intellectual property rights and charges of 'biopiracy' have fuelled passions and convinced many countries that they are sitting on genetic gold mines. Countries still routinely deny access, even to plant-collecting missions organized to rescue unique populations from the threat of extinction. Recent efforts to collect and conserve wild relatives of peanuts in Bolivia and papaya in Colombia have been turned back, perhaps because these countries, like others, equate potential usefulness with current (and substantial) monetary value". Definitely, some Bolivian authorities and consulted stakeholders were cautious to accept ABS contracts because they feared to sell their putative 'green mines' for an inadequate price, having in mind the abundant historical experience with betrayal and forced exploitation of natural resources, but without reflecting that the alternative might be simply not obtaining any benefits or even harming conservation initiatives and development.

Additionally, Galarza (2004) suggests several plausible operative reasons of the non-application, such as the fact that the party interested in access "must establish negotiations with all the potential agents that profess having an interest in a specific resource. Thus a contract enabling access to genetic resources requires the negotiation of various other contracts, considerably increasing the transaction costs and the risks incurred by the petitioner. Even after a long process of negotiation, there is always a risk that one of the possible partners (each of who are negotiated with independently) exacts a demand that cannot be satisfied, or simply thwarts the whole enterprise. The norm also establishes the obligation that the petitioner report on the commercial knowledge gained with the genetic resource to a competent authority and a national entity, charged with conducting a permanent follow up. The development of knowledge and technology being the principal asset of investors in biotechnology, this obligation imposes a disproportionate risk to the investor that no contractual clause of confidentiality could alleviate. To this is added the fact that the current regulations do not distinguish between large and small-scale petitioners". So, there is a fatal combination of high transaction costs and a lack of investment security.

Realistically, this lack of security for investments has been enhanced by the ever increasing governance crisis that shows severe socio-political symptoms especially since 2003. Definitely, this crisis and the many social conflicts that have distracted the governments for many years did not favour the application of the complex ABS regulations. One element of the current crisis of the Bolivian state is related to the export of national natural resources (in this case, mainly natural gas) while a vast percentage of the population remains severely poor not being benefited by the economic development and resource use. This governance crisis has become a major challenge for the whole conservation sector (IBISCH 2005). A high-ranking official of the national authority confirmed (in a personal communication) that in times of severe social conflicts there was the fear to commit mistakes regarding the access to genetic resources that might be criticized publicly and fuel the general crisis.

4.2 Consequences of the non-application

Opportunities of funding and technology transfer have been lost, as in the case of the USDA peanut project or projects planned by Crop & Food, New Zealand. Existing research and development programs had to close after many years of patient waiting for the advancement regarding the application of the ABS regulations (FAN R&D-program under the Noel Kempff Climate Action Plan). Trained staff and young scientists had to be dismissed. The general nervousness regarding permits for research and bio-trading activities affected other projects not targeting the development of genetic resources, such as the commercialisation of plantlets cultivated in vitro (among others, orchids and bromeliads). Thus, an unfortunate consequence of the non-application is that Bolivian institutions pioneering in the field of research and development of genetic resources and innovative uses of biodiversity since the 1990s, have been completely discouraged and harmed institutionally.

"There are indications that the susceptibility is increasing regarding the legitimate preoccupations that arise in the debate about the access to genetic resources and the related benefits" (IBISCH et al. 2004). It is interesting to observe how governmental advisers from the scientific community have started to argue against research projects, explaining their positions with sometimes irrational arguments referring to expected insufficient benefits. Anecdotally remarkable is a statement by a government adviser from the research sector that Bolivia should not commercialise endemic in-vitro-plants because this might harm the economy as tourists would stop to come when they could appreciate Bolivian biodiversity outside the country.

Another problem is that locality information of biological vouchers increasingly is managed with extreme care. As illegal extraction of potential resources is feared, access to theoretically public information held in herbaria and zoological collections becomes more and more difficult. "It is paradoxical: On the one hand, in Bolivia there is limited access to relevant conservation information as, due to the historical development of scientific research in colonial times and afterwards, this information is not found in the country. On the other hand, there is important information held in Bolivian institutions that is likewise not easily available. The problem is multiplied if, apart from the limited access to existing information in the collections and databases, the processing of research requests from foreign or national institutions is blocked. (…) The consequence of all this is that the availability of biological data needed for conservation planning diminishes instead of increasing" (IBISCH et al. 2004).

However, it is a fact that aficionados or traders interested in certain species are well informed about the localities of their targets (sometimes better than national researchers); e.g., this applies for ornamental orchid or cacti species. On the one hand, many specimens have been reported to be brought out of the country by individuals violating not only CITES but also ABS regulations in force. On the other hand, there are cases of other plant collectors who, without any success, tried to obtain legal permits for the exportation of single plants that possibly were important scientific discoveries (e.g., a case of an Australian bromeliad collector).

As it was well known that – until recently – the approval of access contracts and collecting permits was improbable, potentially or actually interested parties did not start any negotiations with the competent authority. In the best case, they simply decided to go to other countries, but in the worst case they chose the option of illegal trafficking of biological material. E.g., there was information that Japanese

researchers interested in pharmacological studies, who were properly informed about the ABS regulations in force, developed a plant-collection contract with a municipal botanical garden without approaching the competent authority.

An illustrative example represents the case of two of the most endangered Bolivian plant species (IBISCH 2004), *Parajubaea torrallyi* and *P. sunhka*, locally endemic from inter-Andean valleys. There is a worldwide demand for theses attractive palm species as they are rather frost-resistant and might represent new ornamentals for temperate regions (without long frost periods). The species might represent a promising product and could turn out to be a valuable plant genetic resource. While proposals for conservation and bio trade initiatives involving sustainable in-vitro propagation and controlled commercialisation (originally proposed by Crop & Food, New Zealand, and later developed by the Bolivian conservation NGO FAN) did not prosper due to reasons explained above, seeds of the species have been publicly available for many years in the internet (e.g., in November 2005: www.ortanique.com; www.trebrown.com; www.europalms.be; www.tropengarten.com). At least in one occasion, foreign traders were reported to move around in the area of the natural range of the palm species contacting local peasants (Israel Vargas, pers. comm.).

5 Conclusions

Until now, the ABS regulations did not stimulate novel bioprospecting activities or innovative uses of genetic resources. While targeting the optimum gain, Bolivian society failed to generate any benefits. Furthermore, it failed to protect the country from ongoing biopiracy. Additionally, the decade-long non-application frustrated several idealistic R&D initiatives developed within Bolivia. Taking into account, among others, the reports concerning illegal commercialisation of Bolivian palm seeds, it is important to acknowledge that in a poor developing country like Bolivia it is impossible to control trafficking of genetic resources (e.g, long borders without effective migration control, lack of trained staff at migration offices, problems related to corruption). While there is fair chance of discovering the illegal trafficking of 50 individuals of a CITES-annex parrot, the smuggling of a handful of seeds or soil in a traveller's trouser pocket is impossible to control. Additionally, it is well known that it is difficult to track the geographic origin of material, especially when not endemic in certain countries, and it is equally not realistic that violations can be persecuted – at least when not committed by prominent large companies.

Of course, a rather radical and provocative question arises: when the enforcement of legal restrictions is impossible, do then the regulations themselves really make sense? Or are they simply instruments that catalyse displacement behaviour of authorities that tend to hinder weak parties that opt for avoiding illegal action? Actually, similar displacement behaviour is observed, for instance, in the case of protected area managers who strictly control activities of researchers who extract tiny portions of biodiversity for taxonomic or ecological purposes while it is impossible to stop cases of large-scale deforestation by settlers. Instead of hindering the controllable researchers who actually contribute important data for the management and public presentation of the protected areas, it might be a better deal to invite them actively facilitating easy access to permits. Similarly, an incentive-driven approach to the ABS challenge might generate the intended effects rather than the currently applied restriction-driven one. Any initiative willing to respect the necessity of benefit-sharing with the country of origin and individual or group stakeholders involved in the development of a genetic resource, should be rewarded and not punished by

demanding high transaction costs. Among others, this means that the regulation standards should be lowered, especially for small-scale parties, according to the dimension of the potential benefits.

Worldwide it could be a good idea to investigate the applicability of fair-trade mechanisms and good-practice certificates, such as the one awarded by Forest Stewardship Council (FSC), to the use of genetic resources.

Hopefully, a turning-point of the application of the Bolivian ABS regulations has been reached, as the first contract has been signed (Swiss-supported example of potato development, see above). However, it is questionable if it represents a good model case, hence, transaction costs have been covered in the framework of Swiss-Bolivian development cooperation. Currently, it is still difficult to imagine that commercial returns from benefit-sharing become significant when compared with the total of current conservation and development budgets spent by governmental and non-governmental actors (compare Pethiyagoda 2004). Or to say it with even clearer words: the problems related to the degradation and loss of Bolivian biodiversity are rapidly increasing, and the battle won't be won in the field of ABS …

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Potential ABS Compliance Mechanisms for Academic Research in Canada

KELLY BANNISTER[1]
Faculty of Law and School of Environmental Studies of Victoria University, Canada

1 Introduction

Effective national and international access and benefit-sharing (ABS) regimes must explicitly address the complexity and inter-relatedness of ethical, legal and political considerations in scientific research involving genetic resources and associated traditional knowledge[2]. How and at what level should new ABS law and policy be developed and implemented to facilitate compliance by the academic research community[3]?

University scientists are key intermediaries between several different actors. Ethnobotanists, for example, stand at the interface between the *sources* of genetic resources and related traditional knowledge (e.g., indigenous or local communities embodying traditional lifestyles) and the downstream *users* (e.g., universities, governments, industry and civil society in general).[4] Their science takes place at the complex interface of ethics and law, governed by institutional research polices that must incorporate evolving sets of ethical and legal standards at the international, national, and local levels. Existing university research policies, funding bodies and related governance structures, therefore, should be examined for their potential to incorporate and support ABS objectives and to facilitate compliance with these by the academic research community.

This paper evaluates potential ABS compliance mechanisms for academic research in a Canadian context. Given that each country will have its own institutional structures and policies, which will likely differ from what is described here, the following analysis should be viewed as but one example. Similar analyses should be encouraged within other countries.

2 Target policy areas

In ethnobotanical research there are obvious links between genetic resources and traditional knowledge. Other types of academic research involving genetic resources may or may not *directly* use traditional knowledge, but often there still are Indigenous stakes in the research based on either similar or competing

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2 There is no single agreed definition of "traditional knowledge". In this paper, it refers generally to the knowledge, beliefs, innovations, and practices based on customary uses and associated cultural practices and traditions of Indigenous peoples, usually transmitted through oral tradition and first-hand observation (CBD 1992, LAIRD 2002).

3 The academic research community refers broadly to university faculty and graduate students who conduct research, and university administrations that develop and oversee research policies.

4 Ethnobotany is the study of inter-relationships between humans and plants, often involving Indigenous peoples and their traditional plant knowledge and resources.

traditional uses of the same species, or claims to a given geographical area (e.g., traditional territory) where genetic resources may be collected. Given the inextricable connection between biological diversity and traditional knowledge that is evident in most indigenous worldviews, it would be prudent (at least within Canada) to assume there are indigenous cultural interests or even rights in much research involving genetic resources, on ethical, legal and/or political grounds. Likewise, while some biodiversity research is overtly commercial in nature (e.g., commercial bioprospecting), often the goals of academic research are non-commercial. However, all publically-available data has potential to flow into the private sector and be available for commercial purposes, and the bioprospecting industry in particular relies heavily on secondary sources (e.g., publications, databases) for leads. Therefore (directly or indirectly; intentionally or not) research involving genetic resources and associated traditional knowledge facilitates resource and knowledge appropriation and commodification, even when the researchers' intentions are purely academic.

The specific application of university policies to research on genetic resources and associated traditional knowledge is influenced by factors such as whether or not indigenous peoples are *directly* involved, whether the research is national or international in scope, and whether the research is expected to lead to commercial products. Two types of university research policies that may have particular relevance to research involving genetic resources and traditional knowledge are: (i) national and institutional human research ethics policies, and (ii) institutional intellectual property (IP) ownership policies. Outside of the university structure, additional target areas to examine for supporting ABS policy goals include: (iii) ethical codes of professional associations and academic societies, and (iv) community research protocols. The merits and challenges of these target policy areas are briefly outlined below.

2.1 Human research ethics policies

2.1.1 Existing structures

Within Canada, all university research that involves humans (e.g., experiments, interviews, surveys) must equal or surpass a national ethics standard called the *Tri-Council Policy Statement for Research Involving Humans*[5], developed in 1998 and administered through the three federal academic granting councils.[6] Compliance with the national ethics standard is mandatory for all universities receiving funding from the granting councils. Implementation of the policy is at the institutional level, through university research ethics boards (REBs) that review and approve or reject all proposals for research involving humans.[7] Most institutions and their REBs make a significant effort to educate researchers about ethical considerations in research and assist them in addressing any shortcomings in their proposals. There is considerable incentive for compliance at individual and institutional levels; depending on the source and severity of non-compliance, federal funding support could be withdrawn from a specific project or an entire university.

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5 Policy available at http://www.pre.ethics.gc.ca/english/policystatement/policystatement.cfm

6 The three granting councils are the Social Sciences and Humanities Research Council (SSHRC), the Natural Sciences and Engineering Research Council (NSERC) and the Canadian Institutes for Health Research (CIHR).

7 REBs are typically comprised of university faculty and community members serving in a volunteer capacity, with administrative support provided by the university.

Prior informed consent (PIC) (referred to as "free and informed consent" within Canadian research ethics policies) is a key principle of university ethics requirements at the national and institutional levels. In principle, PIC is conceptualised as an *ongoing* process that begins before research is initiated and extends throughout the research process.[8] However, in practice, evidence of PIC typically follows a contractual model, i.e., a consent form signed by individual participants or designated representatives of organizations at the onset of research. Existing policy regarding collective PIC (which applies to some research involving traditional knowledge) is recognized as seriously inadequate and is currently under revision at the national level.[9] Community-level processes for obtaining individual and collective consent from Indigenous peoples (e.g., taking into account customary laws and community protocols) are being given serious consideration in new PIC policy development, as are conceptions of benefits, harms, risks, responsibilities, and Indigenous rights to participate in research. The role of newly emerging community-level REBs (e.g., tribal ethics committees) for reviewing research involving specific indigenous groups and their associated cultural knowledge and traditional resources is also being given due attention.

2.1.2 Applications to ABS

In cases where traditional knowledge is provided directly by indigenous peoples for biodiversity research, ABS policy requirements would overlap with those of the existing national human research ethics policy (e.g., PIC requirements, due acknowledgement of source, sharing of benefits). That is, the "human research ethics" aspects of ABS would fall under the jurisdiction of the *Tri-Council Policy Statement*. An important limitation of the existing policy is that only research that *directly* involves indigenous peoples (e.g., gathering traditional knowledge through interviews, surveys) falls within the realm of human research ethics; research involving secondary sources of traditional knowledge (e.g., published literature, databases) does not.

Conceivably in future, a national *ABS Policy Statement* (separate but parallel to that for human research ethics) could be developed by the three granting councils, likely in collaboration with other federal government ministries (e.g., Environment Canada, Industry Canada, Heritage Canada, Parks Canada). Like human research ethics, an overarching national ABS policy could serve as the minimum standard for all university research involving genetic resources and associated traditional knowledge (ideally whether traditional knowledge was from primary or secondary sources), and compliance could be a mandatory prerequisite to qualify for federal funding.

Individual universities could expand their current research ethics policies and review processes to incorporate ABS requirements, or alternatively, regional review boards (for groups of universities) could be established to provide research review services. Thus, individual research proposals would be

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[8] The *Tri-Council Policy Statement* says "consent must be freely given and may be withdrawn at any time" (Section 2, Article 2.2, Paragraph 1), which is interpreted by most institutional REBs as meaning research participants can withdraw their participation from the research at any time. This may also include withdrawing their contributions.

[9] The *Tri-Council Policy Statement* does include a section on research involving Aboriginal peoples (Section 6) but it was not developed with the participation of Aboriginal representatives and so is in abeyance until appropriate consultation has been undertaken. Currently, a major undertaking to develop new guidelines for research involving Aboriginal health is underway by a twelve person national Aboriginal Ethics Working Group (comprised of a majority of Aboriginal Elders and scholars with some non-Aboriginal scientists and philosophers), coordinated by CIHR's Institute for Aboriginal Peoples Health. These guidelines will be used as the basis for future revisions to Section 6 of the *Tri-Council Policy Statement* (CIHR 2005).

approved or rejected by institutional or regional REBs, and researcher awareness would be increased by the educative approach that most universities take in helping researchers to revise non-compliant research proposals.

Benefits of this proposal would include building on national and institutional structures that are already in place rather than creating new frameworks, as the latter would require significant time and cost. Incorporating ABS issues related to research involving traditional knowledge into human ethics research processes would increase awareness of the complexity in biodiversity research (i.e., issues involving competing rights and responsibilities of researchers, institutions, nation states, indigenous peoples and so on), which could influence wider policy development on PIC and benefit-sharing.

Challenges would include the need to educate REBs on new ABS policy and the potential of over-burdening REBs with heavier workloads as these are typically voluntary positions held by full-time faculty and community members.

2.2 Intellectual property ownership policies

2.2.1 Existing structures

In contrast with the national research ethics requirement, which is intended to be implemented consistently across all publicly funded Canadian universities, there is no over-arching IP policy for universities. Each university independently determines its own IP ownership policies, in accordance with Canadian and international law. In general terms, IP ownership policies of most universities may be categorised as "institution as owner" or "inventor as owner". That is, while the researcher is recognized as the creator or inventor, some universities insist on transfer of ownership rights if intellectual property protection (such as a patent) is sought or if an invention is licensed or commercialized.[10] Other universities simply require a sharing of any revenues as compensation for the infrastructure that they have invested in the research and/or commercialization process. Agreements among inventors and between institutions to specify inventorship, ownership, commercial rights and profit sharing are typically contractual in nature, facilitated in-house by university technology transfer offices.

2.2.2 Applications to ABS

Universities in Canada could directly incorporate IP aspects of national ABS policy into their institutional IP ownership policies. Inventive and commercial rights of indigenous communities, the nation state and other appropriate entities could be explicitly recognised through contractual agreements with researchers and their sponsoring institutions, using existing (or modified versions) of contract templates.

Benefits would include building on institutional structures that are already in place (e.g., administrative assistance, contract templates, in-house legal and business expertise) and increasing the institutional awareness of the complexity (i.e., issues involving competing rights and responsibilities of researchers, institutions, Nation states, Indigenous peoples and so on), in research involving genetic resources and associated traditional knowledge.

[10] Copyright tends to be the exception and is more often vested in the creator, unless the work was commissioned by the university.

Development of an overarching national ABS policy statement could provide a useful framework for standardizing university IP ownership policies across the country. At present, a significant challenge would involve dealing with the diversity in IP ownership policies of Canadian institutions. For example, institutions that require transfer of ownership rights from inventor to institution as a pre-requisite to intellectual property protection, licensing, and commercialization may not provide a flexible enough negotiating environment to accommodate the interests of all stakeholders, particularly when the traditional knowledge of Indigenous peoples is involved. In fact, this situation raises a potential conflict between researchers' obligations to Indigenous participants in research under national human research ethics policy and researcher's obligations to their sponsoring institutions under their institutional IP ownership policies.[11] The mandate of many university technology transfer offices includes education of researchers through seminars, printed and electronic information materials, and meetings, so educative outreach opportunities to discuss ABS policies and issues more broadly with university scientists also exist.

2.3 Extra-institutional Codes of Ethics and Research Guidelines

2.3.1 Existing structures

In addition to their institutional research ethics requirements, many scientists are obliged through voluntary membership to abide by the ethical research standards of national or international professional associations and academic societies. Professional associations (e.g., medicine, engineering, law, education) tend to have enforceable mechanisms for disciplinary action of members while academic societies (e.g., anthropology, archaeology, sociology, ethnobiology, pharmacognosy, chemistry, biology) take a more educative approach to ethical research practices, with compliance largely relying on the integrity of researchers, peer pressure, and concerns about reputation. Some societies use formal Codes of Ethics to articulate their ethical standards[12], while others use guidelines, position papers, or resolutions to set out expectations for their members.[13] Most of these ethical standards are considered "living documents", thus are subject to periodic revision as ethical and legal considerations in research evolve.

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[11] For further discussion see Bannister (2005).

[12] Ethical standards specified in *Codes of Ethics* include those of the American Anthropological Association (http://www.aaanet.org/committees/ethics/ethics.htm), International Society for Ethnobiology (http://guallart.anthro.uga.edu/ISE/soceth.html), Society for Economic Botany (http://www.econbot.org/ethics/), Society for Conservation Biology (www.conbio.org/2004/MembersMeeting/Ethics_Statement_2004_07.pdf), Society for Environmental Toxicology and Chemistry (http://www.setac.org/htdocs/who_code.html), American Institute of Chemists (http://www.theaic.org/DesktopDefault.aspx?tabid=46), and American Chemical Society (http://www.chemistry.org/portal/a/c/s/1/acsdisplay.html?DOC=membership\conduct.html).

[13] For example, the American Society for Pharmacognosy has adopted membership *Guidelines for Interactions with Source Countries* (see Journal of Natural Products 1997, 60, 654-655), which consider issues related to consent, compensation, conservation, and the rights of Indigenous communities. A technical report on medicinal chemistry prepared by the International Union of Pure and Applied Chemistry (http://www.iupac.org/reports/1996/6812andrews/index.html) considers issues such as access, benefit-sharing and intellectual property rights in relation to use of biodiversity for natural products development. Position statements of the American Folklore Society on ethics and human subjects (http://www.afsnet.org/aboutAFS/ethics.cfm) outline specific responsibilities to protect the welfare of participants in ethnographic research. The International Chemical Society has adopted conservation and reciprocity-based principles embodied in its *Göteborg Resolution* (http://www.chemecol.org/society/about.htm).

2.3.2 Applications to ABS

Relevant professional associations and academic societies could be strongly encouraged to incorporate the underlying principles of ABS into the ethical requirements for their members and to establish best practices within their disciplines. Given the significant uncertainty that unresolved ethical and legal issues have created for research involving genetic resources and traditional knowledge (e.g., Ethnobotany), more explicit and consistent guidance on principles and practices for ABS would likely be welcomed by most organizations and their members.

Benefits of targeting associations and societies would include high visibility and educative opportunities for generating awareness of ABS issues, and the ability to reach groups of individuals who fall outside the institutional structures discussed previously.

2.4 Community research protocols

A relatively new phenomenon in Canada and many other countries (e.g., Australia, U.S.A.) is the emergence of local research protocols developed by Indigenous groups or research organizations that work closely with Indigenous groups. These protocols tend to specify local expectations about access to and use of traditional knowledge as well as other conditions for research, based on a combination of customary laws, traditional practices, and practical realities of contemporary life. They vary widely in content and format but principles such as mutual respect, due credit, and fair sharing of benefits are common features.[14]

Community research protocols are increasingly being used to define relationships between Indigenous communities and outside researchers, in some cases as a defensive response to the imposition of extractive research, and in other cases as a way to actively encourage applied research and community economic development opportunities. Assuming new ABS policy was developed with appropriate participation of Indigenous groups and collaborating research organisations (and therefore had their support in principle), these groups could be encouraged to incorporate ABS standards into their research protocols, thereby strengthening local-national policy links by generating further awareness and consistency in policies among users and providers of genetic resources/traditional knowledge. In the Canadian context, community research protocols hold significant potential as an empowerment tool for Indigenous groups.

[14] Some examples are the Code of Ethics for Researchers Conducting Research Concerning the Ktunaxa Nation (Canada), the 'Namgis First Nation Guidelines for Visiting Researchers/Access to Information (Canada), Tl'azt'en Nation Guidelines for Research in Tl'azt'en Territory (Canada), Protocols and Principles for Conducting Research in a Nuu-Chah-nulth Context (Canada), Principles and Guidelines for Researchers Conducting Research With and/or Among Mi'kmaq People developed by the Mi'kmaq Ethics Watch (Canada), Traditional Knowledge Research Guidelines: A Guide for Researchers in the Yukon prepared by the Council of Yukon First Nations (Canada), Guidelines for Respecting Cultural Knowledge published by the Alaska Native Knowledge Network and adopted by the Assembly of Alaska Native Educators (Alaska, U.S.A.), and Guidelines for Ethical Research in Indigenous Studies developed by the Australian Institute of Aboriginal and Torres Strait Islander Studies (Australia).

3 ABS as a catalyst for integrated policy evolution

There is an obvious need for an over-arching national ABS policy that is tailored to Canadian needs and yet is consistent with an international ABS regime. The substance of such a policy has yet to be determined through appropriate national dialogue within Canada (currently in progress but still in early stages), but it will have to explicitly address ethical, legal and political dimensions of research involving genetic resources, particularly when research also involves traditional knowledge.

This paper addresses one possible framework for implementation of a national ABS policy, i.e., entrenching ABS policy into well-established university review processes (or establishing parallel processes) that have built-in compliance mechanisms. This is proposed as a partial strategy to facilitate compliance by the academic research community, including university researchers, students and administrations. Beyond these institutional structures, ABS policy foreseeably could also be incorporated into the ethical standards of relevant professional and academic organizations, as well as local research protocols developed at the community level. Assuming the substance of a national ABS policy is developed collaboratively and with these diverse interests in mind (a formidable task!), the academic research community and Indigenous groups alike would likely welcome the increased certainty in expectations about ABS that such a standard would offer.

There is an additional and significant advantage in bringing ABS policy into the proximity of university research policy. It would serve as a useful context for addressing potential conflicts between research ethics and IP ownership policies in commercially oriented research that involves both genetic resources and traditional knowledge. This could provide the necessary catalyst for a more integrated approach to co-evolution of university research ethics and IP ownership policies in Canada, which should encourage research partnerships (whether for-profit or not-for-profit) by leading to more uniformly ethical and equitable treatment of all interests in the research, and therefore greater certainty and acceptability in research endeavours supported by public institutions.

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ABS and Research in Switzerland: The Development of a Tool for the Implementation of the Bonn Guidelines by Academic Research[1]

SUSETTE BIBER-KLEMM[2]
Faculty of Law of Basel University, Switzerland

1 Abstract

In terms of the three goals of the Convention on Biological Diversity (CBD), a priority for Switzerland is the (voluntary) implementation of the Bonn Guidelines (BGL) at national level. Thus, the Swiss Agency for the Environment, Forests and Landscape (SAEFL) has commissioned the Swiss Academy of Sciences (SCNAT) to develop a tool to facilitate the implementation by the Swiss academic community (i.e. the universities and universities of applied sciences) of the principles of the CBD on access and benefit-sharing and the Bonn Guidelines, and to analyse in detail the ways that their implementation can be encouraged and promoted.

The method and process involved in the development of the manual, the criteria for the definition of its content, the factors influencing its presentation and the difficulties and open questions encountered are described below. An overview of the structure and content of the brochure "Access and benefit-sharing; Good practice for academic research on genetic resources" is provided and conclusions are drawn with regard to the ongoing negotiations of an international ABS-regime.

2 Introduction

2.1 Mandate

In terms of the three goals of the CBD, the (voluntary) implementation of the Bonn Guidelines at national level is one of the priorities of Switzerland.

Thus, based on the assumption that, when carrying out basic and applied research, academic institutions are regularly involved in the collection and prospecting of biological/genetic resources, in 2003, the ABS focal point of the Swiss Agency for the Environment, Forests and Landscape (SAEFL) asked the Swiss Academy for Sciences (SCNAT) to create instruments for informing members of the academic community about the ABS system and to encourage and assist its implementation by researchers involved in projects that use such resources originating from outside of Switzerland.

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[1] The project for the compilation of the ABS manual for academic research was sponsored by the Swiss Agency for Environment, Forests and Landscape (SAEFL). The content of this paper is in the sole responsibility of the author.

[2] Dr.iur, MAE; University of Basel, Faculty of Law, Maiengasse 51, CH-4056 Basel. For contacts regarding the brochure and further information: Susette.Biber-Klemm@unibas.ch.

2.2 Goals

SAEFL's mandate specified the following general objectives for the instruments to be developed: to familiarize the relevant members of the academic community with the CBD's ABS system; to inform the institutions and individuals involved in a clear, simple and effective way of the steps necessary to fulfil the obligations of the CBD and the recommendations of the Bonn Guidelines.

The process was to include the following steps: 1) The conduct of a national survey for the identification of the relevant research institutions; 2) The definition of the requirements and means for the promotion of the application of the BGL by the relevant institutes and researchers; 3) Raising of the awareness of the Swiss academic community to the issue of access and benefit-sharing by creating and distributing information documents and organizing workshops.

3 Method

From the outset, the intention was to develop the specified products by means of an interdisciplinary, participative and interactive process. This meant that members of the relevant academic communities were to be actively involved. The objective of this exercise was to learn as much as possible about the specific needs, viewpoints and research methods of the disciplines involved so as to be able to adapt the manual accordingly. This process also enabled us to learn about issues and concerns faced by the researchers, to discuss possible solutions and, as a result, to further the acceptance of the ABS system. Ultimately, the idea was that the representatives of the academic community could act as multiplicators of the message.

This approach is also reflected in the organizational structure of the project and in the chosen procedure which involved the relevant members of the academic community at various crossroads in the project process.

3.1 Organizational structure

The organizational structure encompassed: 1) the project team; 2) a steering group; and 3) an ad-hoc advisory committee.

The project team – which was responsible for the implementation of the mandate – consisted of three individuals representing the disciplines of law and ethics, biology, economics and political science.

The steering group is composed of the secretaries of SC-NAT's platforms, i.e. the Swiss Biodiversity Forum and the Forum on Genetic Research, and the secretary of the Swiss Commission on Research Partnerships with Developing Countries of the Council of the Swiss Academic Communities. The members of the steering group cooperated in the process of the development of the tool, in particular through their input on the specific needs and viewpoints of the platforms. They also informed and consulted the members of their platforms on the process. This provided valuable information, and also had a multiplicatory effect.

The advisory group is composed of representatives of relevant disciplines such as systematic biology, phytopharmacology, zoology, tropical medicine, biotechnology, microbiology, food and development

economics, experimental biology, ethnopharmacology, agriculture, while at the same time representing the relevant institutions and research programmes.[3]

3.2 Stages of the Project

The basis of the entire procedure was – naturally – a thorough analysis of the CBD regulations on ABS and of the Bonn Guidelines from the perspective of academic research.[4]

To begin, university institutes that work with biological material from third countries were *identified* with the support of the three sister academies – the inventory included institutes working not only in the area of the natural sciences, but also the social, medical and engineering sciences. The main goal of the *survey* itself was to obtain an overview of the types of research that involve access situations, the genetic resources involved and to learn about the experiences of the researchers. Furthermore, the level of their knowledge of the ABS system was to be documented and analysed and their needs and requirements identified.

At the same time, existing codes of conduct, ethical guidelines, and similar products originating specifically from the academic community were consulted, in particular with a view to examining the interface between academic research and the ABS system, the elements incorporated, their mode of presentation and the elements likely to be subject to benefit-sharing.

In the next stage of the process, the projects referred to in the survey were analysed on the basis of the disciplines involved and the resources accessed. Specific projects were selected from this inventory and subject to a more rigorous analysis through the examination of detailed project descriptions and the holding of semi-formalized interviews with the researchers. This process gave rise to the five case studies which are included as examples of ABS situations in the manual. It also generated elements for a generalized definition of research steps, enabled the identification and analysis of "typical" ABS situations and the identification of their interface with the steps in the ABS procedure in accordance with the BGL.

Based on this information and suggestions that arose in course of the survey, the requirements and wishes of the researchers were analysed and the *concept* for the manual and the tools to be included were defined.[5]

Several drafts of the manual were produced. The drafts were *evaluated* at several stages by both members of the academic community and representatives of the provider countries [6]

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[3] Universities and universities of applied science, technology transfer units, botanical gardens, industry, non - governmental organizations, Swiss administrative agencies (Swiss Agency for Development and Cooperation, State Secretariat for Economic Affairs); Indo-Swiss collaboration in the area of biotechnology, Swiss Centre for International Agriculture, Network for International Development and Cooperation (all Swiss Federal Institute of Technology); National Centre of Competence in Research (NCCR) North-South.

[4] In terms of the benefits to be shared, in particular, quite a lot of information is included in the CBD itself, such as: the exchange of information relevant to the conservation and sustainable use of biological diversity, including the exchange of results of technical, scientific and socio-economic research; information on training and surveying programmes, specialized knowledge, indigenous and traditional knowledge in itself and in combination with other technologies; technical and scientific cooperation, including the training of personnel and exchange of experts; enabling of effective participation in biotechnological research activities by the parties that provide the genetic resources.

The final draft is currently (November 2005) being proof-read; publication is expected for the end of 2005/early 2006.

In terms of informing and raising awareness among the relevant stakeholders (researchers, project leaders, directors of research institutes, sponsors, technology transfer units), the experience with the development of the tool clearly showed that, even if the development of the tool succeeds in its aim of providing information, for the implementation of the ABS system to be successful within the academic community, support measures that complement the manual are also important and necessary.

The impression we were given was that we must sell a product that nobody really wants. Thus, we are currently involved in the careful development of a concept for this complementary process. The aim here is to reach as many involved stakeholders at the lowest possible financial cost.

4 Specific Results: Survey and Evaluation

4.1 Survey

4.1.1 Content

The survey comprised two questionnaires: one concerning the research institutes and to be completed by their directors and a second one for each project.

The aim of the questionnaire concerning the research institute was to enable the compilation of an inventory of the research on biological resources being carried out at the respective institutes. The following elements were asked about in the surveys concerning the institutes:

- Type of institute, affiliation, department, discipline
- Number of projects involving biological resources and/or traditional knowledge
- Research field (agriculture to zoology)
- Plans for more research on biological resources abroad
- Difficulties encountered and projects terminated or abandoned due to difficulties in/with the providing country

The questionnaire on the individual projects concerned:

- The actual research being carried out, i.e. the type of research (basic, research and development, valorisation, research areas and objectives, and resources involved:
- The location, i.e. in the field, in collection; and origin of the resources, i.e. country involved.
- The way that contacts and partnerships were initiated, i.e. what was the objective and content of negotiations, what were the conditions in the providing country, whether formal or informal contracts were concluded and whether any benefit-sharing occurred.
- The difficulties encountered and types of support desired.

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[5] The elements were: basic information; case studies; ABS steps and requirements; checklists; annexes with glossary, sources, contacts.

[6] Draft 1: Team, Steering Group, Mexico, Advisory Group; Draft 2: Team, Steering Group; Draft 3; Team, Steering Group, Ivory Coast, Advisory Group.

- The level of information already available to the researchers on the CBD and the BGL.

4.1.2 Preliminary Results

175 institutions were contacted, including universities, universities of applied sciences (both natural and social sciences), museums and collections. We obtained responses from 73 institutes; 54 of which reported projects involving biological/genetic resources from abroad. These 54 institutes provided descriptions of 87 concrete projects.[7]

The (preliminary) analysis generated the following results which may be of primary interest:

- Most of the projects involving ABS situations were undertaken in the (natural) sciences: 89 % of the described projects were scientific, only 3 % were purely social scientific and 8 % involved a combination of social and natural sciences.
- A considerable amount of the research described was basic research (59 %). Almost one quarter of the projects were taxonomic (systematic, inventorization) (23 %) or a combination of taxonomic research with traditional knowledge (6 %). None of the projects described led to the development of a marketable product. (We are aware of the existence of at least one such project, however the institute in question did not respond to our questionnaire).
- About 20 % of the projects worked with traditional knowledge (TK).

17 projects referred to the difficulties they encountered. However, not all of the problems were connected with the ABS system, but concerned, for example, CITES control for the exportation out of and – also – importation into Switzerland of endangered species of wild fauna and flora. With regard to potential ABS-Situations, researchers encountered difficulties with the (administrative) procedures involved in procuring the necessary permits, brought about, for example, by an unstable political situation, unclear legal conditions and/or unreliable administrative procedures. Problems involving the sharing and storage of samples and co-authorship (which was non-existent) were also described. Some projects were abandoned or had to be altered because of these difficulties. In some cases, reference was made to the fact that certain types of projects were no longer planned in specific areas due to the insurmountable bureaucratic problems.

The researchers who responded to the questionnaire selected the following support instruments (in order of priority): sample contracts; advice on the negotiations of the contracts, codes of conduct and explanation of the BGL, checklists. There was an urgent call for the avoidance of further bureaucracy.

4.2 Results of the Evaluation

4.2.1 North

The attitude of the scientists to ABS depended on their discipline. Experience in cooperation with Third World countries and the actual aim of the research could also be influencing factors. Thus, the representatives of anthropology, but also of tropical medicine were mainly interested in what the ABS system exactly means for their research and how best to integrate it.

The systematic researchers who were used to open access situations were more intrigued. They fear that greater bureaucracy will make it impossible to carry out their research which actually helps countries to fulfil their obligation under the CBD to carry out an inventory of their biodiversity and is also enshrined in the Global Taxonomy Initiative.

Thus, a considerable number of the projects described were classified as North-South projects, i.e. projects intended to support the provider countries. It would appear that the implications of ABS were not clear to the researchers in these cases. However, the existence of a real cooperative research partnership[8] was not apparent in all cases.

Some considered that the ABS system was not applicable to the resources they work with. The arguments put forward included, for example, that the resources were found in the public domain, to which everyone has access, or were purchased on the market. Other "myths" encountered included the beliefs that that if there is no ABS legislation in a country, access is free and that if the results of the research are published and put in the public domain and there is no patenting or commercial use, the research is not subject to the ABS system. Yet another argument proposed is that basic research does not yield any economic benefit and is, therefore, of no relevance to the ABS system. A few respondents admitted, however, that they consciously decided to operate in a grey area because they wanted to avoid difficulties and burdensome procedures. One of the key arguments presented was that the ABS regulation itself prevents the implementation of the conservation goals of the CBD because it hinders the research necessary to achieve this objective (and was followed by the – extreme but logical – conclusion that the system should therefore be abolished or limited to cases involving economic benefit).

The following criteria for the content and presentation of the instrument to be developed emerged from the discussions in the evaluation process: the ABS system should be formulated in terms of clear rules and concrete step-by step instructions on its implementation provided; the content should be restricted to the absolute minimum (BGL) with the obligatory and voluntary elements clearly indicated; the tool should include a categorization of sample cases (based on the importance/significance of the ABS situation) and present models for the corresponding agreements.

4.2.2 South

The draft manual was evaluated with representatives of providing countries on two occasions. One of the earliest versions was presented to representatives of university research, members of the ecological administration and representatives of a local community at a workshop in Mexico in 2004. As sensible points of the access to resources the following emerged

1) Local communities should be involved and, importantly, they and the general public should be informed of possible win-win situations arising from bioprospecting. The latter was discussed in the context of preventing the "cumbersome rent-seeking behaviour of the communities". (Francisco Chapela, Coordinator, Project of Biodiversity Conservation by Indigenous Communities (COINBIO): Access to Biologi-

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[7] We did not mention the confidentiality of the information. This might have been a hindrance to answer the questionnaire (openly). Furthermore, we assume that due to their lack of knowledge about the ABS system, many institutes and researchers did not feel that the questionnaire applied to them.

[8] As described, for example in Swiss Commission for Research Partnership with Developing Countries (KFPE), 2003 "Guidelines for Research in Partnership with Developing Countries" (www.kfpe.ch)

cal Resources and Benefit-Sharing: The experience of ERA and UZACHI¸ power point presentation, on file with author)

2) The importance of the capacity-building and support of stakeholders from the providing country in the negotiation of contracts of cooperation was highlighted, in particular on IPRs, in cases involving local research and industry. (Dr. Alejandro Alagón, Instituto de Biotecnología, UNAM, Cuernavaca, Mor.; An ABS Mexican-German experience; power point presentation, on file with author). Also stressed was the importance of establishing common (ethical) grounds, guidelines, and rules for the cooperation.

3) It was also clearly stated, however, that in order for the providing countries to benefit from technology transfer, the previous very restrictive legislation would have to be replaced by regulations that allowed for easier access, in particular for research, and research and development (Fernandez, J.C., Instituto Nacional de Ecologia. Mexican experiences in the regulation of genetic resources: social and economic dimensions; power point presentation, on file with author). The manual was welcomed as providing a transparent basis for both parties in achieving this objective.

The second workshop was held at the SCNAT's Swiss Centre for Scientific Research on the Ivory Coast. It was organized in collaboration with the local research team. Representatives from academia, the administration, industry, of several West-African countries (Benin, Senegal, Burkina Faso, Ivory Coast) discussed in working groups the application of the ABS system to selected case studies and also evaluated the practicability of the manual. The workshop concluded, *inter alia*, that the manual could provide a starting point for the establishment of mutual trust between researchers from the South and the North, and offers a way of guaranteeing the protection of genetic resources, their sustainable use and valorization. One of the insights from the workshop was that given the strongly decentralized nature of the systems in African countries, the ABS requirements are also important for local researchers. The workshop recommendations were: 1) The initiation of an awareness-raising campaign of researchers from both the South and the North; 2) The operationalization of the ABS focal point; 3) The development of a strategic plan for the access to genetic resources; 4) The adaptation of the manual to other areas, in particular valorization and development cooperation; 5) Ensuring that the conservation of the resources is acknowledged as a priority for all involved stakeholders (*République de Côte d'Ivoire, Minstère de la Recherche Scientificque: Rapport de synthèse de l'atelier sous-régional sur "l'Access aux resources génétiques et le partage equitable des avantages tires de leur exploitation. Adiopodoumé, Côte d'Ivoire, du 22-24 août 2005*).

4.3 Development of the manual

The analysis of the survey and of the evaluation led to conclusions with respect to the criteria to be taken into account in the development of the tool: the need to generate further acceptance and motivate researchers to implement the rules became apparent as the pre-eminent goal of the tool and of the subsequent awareness-raising process.

4.3.1 Criteria

Based on this, the following criteria were defined for the publication:

- The information should be provided in an accessible and "inviting" way so as to motivate the researchers to read the brochure.

- Easy access should be provided to the information of specific interest.
- Researchers should be motivated to implement the system.
- Simple and clear-cut information should be provided on a step by step basis.
- The minimum obligations should be included and clearly specified.
- Examples and case studies should be presented.

However, when confronted with the realities of the ABS system, these requirements proved something of an exercise in “tightrope walking”:

1) It became apparent that the topic of ABS is highly sensitive in a number of respects; firstly, in terms of the interests involved, i.e. the interests of the researchers vs. the objectives of the system, but also in terms of the political debate (on national and international level) between “provider” and “recipient” countries.

2) The provision of “clear-cut recipes” and directions for the use of the system was difficult in two respects: firstly, different types of research work with genetic resources (and the associated traditional knowledge) from abroad; and, secondly, each access situation and each country is different. Likewise, the (understandable) call for the swift, prompt and efficient issuing of permits can only be responded to with the instruction – where possible – to enter into negotiations with countries and partners with whom past experience is known to have been positive.

3) The fact that the some of the key terms (access, genetic resources) are not defined on the international level (access) or not defined in a way that allows their operationalization (genetic resources) represented another significant difficulty.

Topics that require further discussion include the idea of the categorization of access situations, the proposal of sample contracts and, of course, the issue of specific conditions for basic research in connection with the taxonomy initiative and the integration of the customs in exchange of samples, exchange of vouchers in basic, systematic and taxonomic research.

4.4 Result

The process for the development of the manual resulted in the incorporation of the following elements and the key messages:

- Introduction: Motivation
- Basics: information on the CBD and BGL; the important messages of both being shared responsibilities
- Case studies with an analysis of the corresponding ABS elements and indication of elements to be included in contracts
- The definition of the steps of academic research, as far as possible applicable to all types of research and formulated in the form of a step by step overview on how to proceed
- A description of the implications and responsibilities of both users and providers
- In particular, examples of academic benefits to be shared
- Additional useful information in checklists, glossary, and indication of sources and contacts.

4.5 Conclusions and Outlook

The experience gained in the development of the manual allows us to draw the following conclusions regarding the ABS system and academic research:

The dilemma for providing countries regarding access to genetic resources for academic research is obvious: a problem exists in controlling the use made of the resources. This problem of control may be relevant even before the stage of a patentable invention is reached. The crucial stages in the process of academic research are, of course, the transition from basic to applied research and then on to research and development. Thus, providing countries may be reluctant to grant facilitated access for basic academic research. This problem may be heightened by the fact that it may be difficult for the providing countries, i.e. the agencies involved, to evaluate and decide on possible uses (purely scientific vs. commercial potential) of the resources to be investigated.

To find a solution to these problems, i.e. a compromise between the control interests of the providing countries and the interests of researchers, (including researchers in the providing countries themselves), in terms of access to resources for scientific purposes, it is crucial, that science and the interests of scientific – and in particular basic – research are integrated into the ongoing political processes.

With regard to the implementation of the ABS system in scientific research, it is necessary to raise awareness among both researchers (researchers, project leaders, directors of institutes, sponsors, technology transfer unites) and providers (ABS focal points, government agencies, partner institutions) of the obligations associated with the ABS system. Furthermore, it is important to insist that both users and providers take account of their responsibilities.

Is research being stifled by Brazilian laws regarding genetic resources and biodiversity protection?

GREGÓRIO CECCANTINI
University of São Paulo, Institute for Biological Sciences, Brazil

Since its adhesion to the Convention on Biological Diversity (CBD) in 1998, Brazil has striven to implement it. To do so, laws, regulations and even public entities were created to establish criteria and to control the use of the biodiversity. In this discourse, one intended to present and to discuss some of the regulations as well as to analyze how this regulation interferes in the scientific research on biodiversity.

Using the humanistic declaration of Louis Pasteur, one may argue that biodiversity is Humanity's patrimony and that it should be used on behalf of all. However, this does not seem to be the understanding of some governments, especially the Brazilian government, which has established severe legislations in relation to the scientific research, even those of basic feature. Apparently, the concern with biopiracy and with the detention of rights in relation to possible products (drugs, genes, processes) derived from biodiversity has been the aim of the legislation that does not take into consideration the interests of the basic scientific research, which contributes both for the generation of human resources and for the advancement of the knowledge's frontier deprived of immediate economic purposes.

In the last decades, researchers have raised the concern with the maintenance of the biodiversity and this concern reached the entire society and governmental organizations. Several types of arguments were used to demonstrate the importance of biodiversity for society and some of them had economic nature. For example, the possibilities of developing products, drugs, new cultivars and varieties of plants with economic purposes. Probably, what is currently observed is an overvaluation of these possibilities, and even traditional communities and governments have expectancies in relation to the perspective for benefit-sharing.

Thus, one may say that the scientific community is partly responsible for difficulties found in the present moment in relation to research limitations imposed by laws on the licensing for studies on biodiversity and development. Scientists opened the Pandora's box themselves. Concerned about deforesting and about degfradation of natural ecosystems, scientists sometimes exaggerate the value of biodiversity and the richness of ecosystems in the effort of creating parks or reserves without thinking about the consequences these acts could bring.

Thus, the public power of many countries with biological megadiversity (Brazil, Bolivia, Ecuador and others), due to the pressure of societies including the scientific society, created procedures and restrictions for researches and use of the biodiversity. It seems that the scientific community has not been sufficiently subtle to make clear for the legislation makers that basic research is different from applied research, which is aimed at the development of products and may generate economic resources.

On the other hand, the action of the real pirates, who assume the traditional knowledge, smuggle animals and plants and make use of the biodiversity, justify the existence of such procedures.

Legislation in Brazil

In the specific case of Brazil, an entity called as CGEN (Genetic Heritage Management Council) associated to the Ministry of Environment was created in 2001 to control and to legislate the use of the genetic and cultural heritage related to biodiversity. Currently, the CGEN has a wider and heterogeneous representation in governmental sectors (ministries, autarchies, justice, defense), scientific sectors (institutes and scientific societies), industrial sectors (federations) and NGOs associated to the traditional knowledge or to indigenous populations. This extremely wide composition, if on the one hand makes decision quitrent quite plural, on the other decreases the representation weight of the scientific community.

Through resolutions of this Council, a legislation that regulates and limits the use of the genetic heritage by Brazilian research institutions was created (Provisional Act 2181-16, August 23rd, 2001; Decree 3945, September 28th, 2001). Firstly, this legislation was strongly rejected, generated many doubts in the national and international scientific community in relation to the freedom of exchanging material from biological scientific collections, once the scientific community itself was not prepared and well-informed to deal with the several biological materials in relation to the genetic access. In the months and years following the publication of the legislation, a great distrust from the international scientific community was observed in relation to the concession of loans to Brazilian researchers and collections of materials belonging to their origin country. There were doubts on whether or not the materials would be returned and on what the new legislation was actually restricting. This brought incommensurable damages to researches due to the denial of loans, delay on the conclusion of researches and to the cease on the exchange of materials so traditional in the Biological Sciences for centuries.

Another negative effect was the increment of bureaucracy, with the necessity of registering and controlling biological collections as trustees of the biodiversity as well as the necessity of submitting each research project to be judged by the CGEN. In the beginning, the documentation flow was confused, governmental agencies were not used to the new regulations and the growing demand congested the council's meetings. Finally, the increased bureaucracy caused two types of harmful results for researches: civil disobedience by those who do not execute or ignore the law and delays by those who do execute it.

The situation is better now than it was in 2001-2002, once the procedures to submit and to evaluate projects are better known. Advancements are verified in the interpretation of which projects actually must be target of a critical analysis in relation to the rights on biodiversity and traditional knowledge, once it deals about bioprospection with economical purposes; therefore they must be object of contract and liability commitment for the sharing of benefits. Notwithstanding, the situation is not ideal yet because all projects involving genetic access have to be submitted to the CGEN's authorization and judgment process, even those only involving basic research in morphology or systematics, contradicting article 11 (L) of "Bonn Guidelines" (2002). The scientific community longs for the total allowance with no previous consent of all basic research developed in research institutions with no bioprospection purposes.

On the other hand, still with a controlling motivation, another agency also associated to the Ministry of Environment, the IBAMA (The Brazilian Institute of Renewable Natural Resources and Environment), responsible for many conservation units in the country and for permissions for collecting plants and animals presented regulation proposals both for biological collections and for the collect of biological material. These proposals, still under discussion, are extremely narrowing, bureaucratize and interfere on the

functioning of biological collections with more than 200 years of good services rendered to the biodiversity survey and conservation. The reception of the scientific community was the worst as possible, once the feeling was of restricting activities by an authoritarian control motivation.

Error of focus

The main question that should be analyzed in the Brazilian legislation in relation to the access to genetic resources and in relation to the collect and conservation of biological collections is that both present a severe myopia that generates focus and target errors. The focus is totally aimed at research institutions, mostly from the public power and at their researchers, with predominantly basic research motivation, while it should be focused at private companies, in researches aimed at the bioprospection and at people working out of the systems and institutions. The public research institutions and competent researchers have fixed addresses and ask for permission, reason why they are easy target for legislation restrictions. Those who do not ask for permission work without being disturbed.

The result is the worst as possible: many competent researchers work beyond the law, with no permission; the scientific community is enraged with the public institutions that should care for the biodiversity; research projects are delayed or being devoid of their main characteristics due to collect restrictions; researchers choose for researching groups of plants or animals of lesser interest in order to avoid materials from conservation units or associated to the traditional knowledge and finally, the true pirates still work unpunished and ignoring any type of inspection and punishment.

Scientific development and biodiversity conservation

Another important aspect is directly related to the scientific productivity of the institutions. There is a contradiction between governmental agencies of research furtherance and biodiversity management. In the last decades, research furtherance agencies in Brazil such as CAPES, CNPq and FAPESP have successfully performed a great effort in order to reduce the time for the production of qualified human resources (MS and PhD professors), to increase their quality and quantity, reducing deadlines for the conclusion of courses and financial aids for projects. It is alarming noticing that a research permission (IBMA and CGEN) may take as long as 18 months to be released while a Master of Science dissertation receives financial resources for 24 months only. Thus, a group of governmental agencies attempts to increase the technical-scientific qualification of professionals by increasing pressure on results (theses, publications, patents), claiming the formation of more MS and PhD professional from post-graduation programs in a shorter period of time while other agencies impair or make this effort difficult. This situation cannot be considered as coherent or productive for a country.

Finally, the incoherence of what is executing the present legislation and what is its original motivation attracts attention. What is the justification of the biological conservation? Why should we preserve biodiversity? What are the objectives of preserving? Many are the arguments that justify the financial resources applied to this purpose. Some of them are worth of emphasis: it is an ethic duty with future generations that deserve inheriting the biological and cultural patrimony we have today; life has intrinsic value that already justifies its preservation; but one also should remember that there may be an useful purpose in the biodiversity conservation that come to be a source of resources yet unknown such as food, remedies

and countless other products, however, these products will only be developed with basic and applied researches. If research is restricted, one of the arguments that were used to support the necessity of preserving parks and reserves will be violated.

According to the legend, with the opening of the Pandora's box, all diseases of the mankind were released; however, the box was closed in time so that only one think was left: hope. At least hope remains in relation to the Brazilian legislation and the other megadiverse countries, so that laws will serve to generate scientific development, sustainable growth and biodiversity conservation rather than technological delay and dependence, more economic and social inequality and environmental devastation.

ProBenefit: Process-oriented development for a fair benefit-sharing model for the use of biological resources in the Amazon lowland of Ecuador[1]

CHRISTIANE PLOETZ
VDI Technology Centre Corporation, Düsseldorf, Germany

Background of the Project

- Implementation of the goals of the Convention on Biological Diversity (CBD).

Objectives of the Project

- Development and implementation of consensual processes and procedures for attaining a fair sharing on the use of biological resources and the associated traditional knowledge in accordance with the fundamental objectives of the CBD.

Expected benefits of the project:

- A model agreement on the use of biological resources according to the goals of the CBD and the derivation of rules for future access & Benefit-sharing projects,
- Development of alternative sources of income by discovering new phytopharmaca,
- Capacity-building and contributing to rural development,
- Transfer of technology and methods for the search for plants with potential medical effects,
- Support in the appreciation and maintenance of indigenous knowledge
- Incentives for the conservation and sustainable use of biodiversity.

Introduction

The Convention on Biological Diversity (CBD) adopted at the Earth Summit of Rio de Janeiro in 1992 regulated access to biological resources. The Convention was signed by nearly all UN Member States, including Ecuador and Germany. By promoting ProBenefit the Federal German Ministry for Education and Research (BMBF) is making a contribution to implementing this international agreement.

The goal of ProBenefit is to develop a suitable procedure for equitable benefit-sharing for the use of biological resources and the associated indigenous knowledge in line with the principles of the CBD. To this end the project partners, together with the Ecuadorian government, the local Indian organisations and other relevant groups in society, as well as interested non-governmental organisations, will explore new models for the sustainable use of biodiversity in the Ecuadorian Amazon region.

[1] Funded by the German Federal Ministry for Education and Research (BMBF)

The project also intends to develop guidelines for a cooperation model on the basis of a concrete example. These guidelines aim to improve the understanding between the various scientific disciplines and to involve all actors engaged in the sustainable use of biological diversity.

The interdisciplinary team of ProBenefit consists in the the Institute for Biodiversity - Network e.V., the Institute of International Public and European Law, Dept. of International Economic and Environmental Law of the University of Goettingen, the Albrecht-von-Haller-Institute for Plant Sciences of the University of Goettingen, and Future Technologies Consulting of the VDI Technology Centre in Duesseldorf. In order to operationalize the project, the medium-sized company Dr. Willmar Schwabe GmbH & Co KG also participates in the project. Their intention is to search for plants for the production of plant extracts in the Ecuadorian Amazon region.

Motivation of the project

The Convention on Biological Diversity confirms the sovereign rights of the states over their biological resources and has thus contributed to the protection and sustainable use of these resources. However, this international agreement needs to be set out in concrete terms by national and regional legislation. The Andean Pact took an important step in this direction with its Decision 391.

In order to develop processes for achieving equitable benefit-sharing for the access to biological resources in the Amazon region of Ecuador, the project partners aim at intensive cooperation between the host country, the local communities, the pharmaceutical firms and the various disciplines participating in the ProBenefit Project. They plan to pursue a transparent, integrative and interdisciplinary mode of work.

Such an interdisciplinary and integrative approach can be considered a novelty in this field of German research funding. Earlier projects only dealt with sub-aspects of the thematic complex of access and benefit-sharing, such as for instance exploring the biosphere, or legal and technical issues. ProBenefit aims at achieving a better integration of the various disciplines and closely interlinking the modes of work and investigation methods of the actively involved actors.

Objectives of the project

The basic objective of ProBenefit is to develop a process that allows for

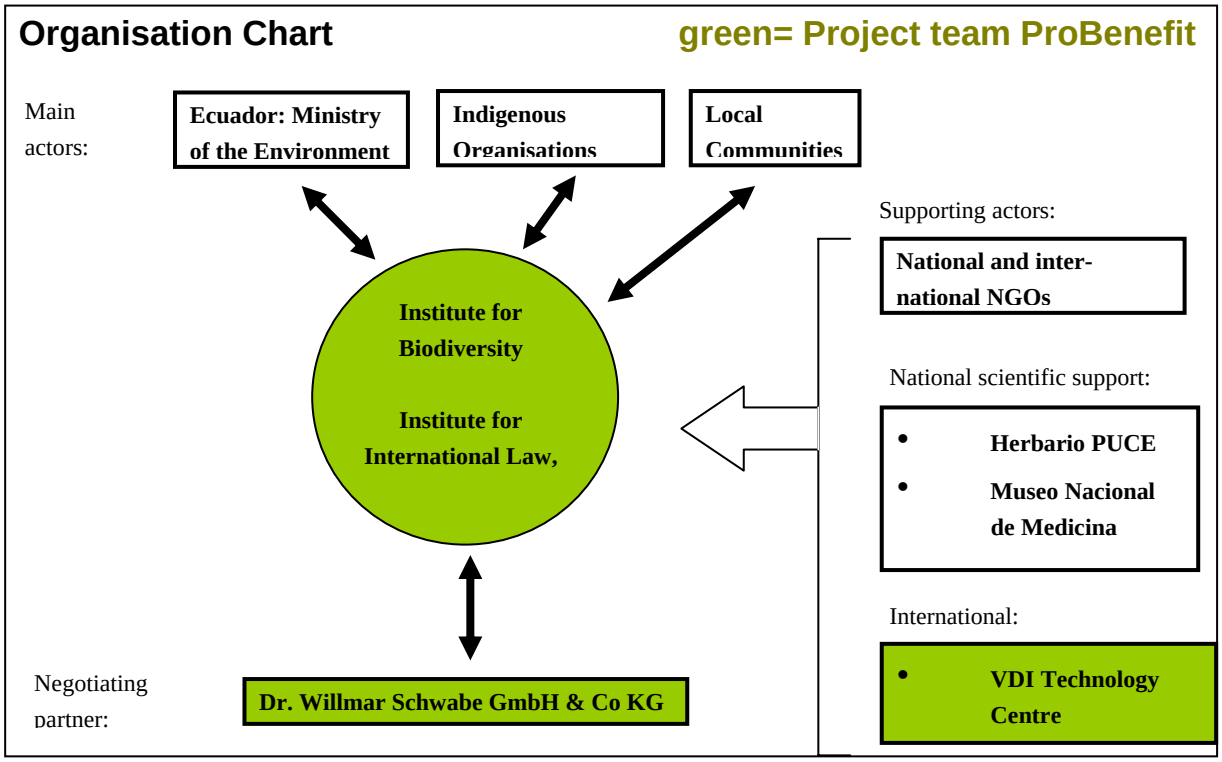
completing a model agreement on equitable benefit-sharing for the use of the natural resources in Ecuador's Amazon region,
exploring the potential for using medicinal plants, and
developing possibilities for the sustainable use of these plants.

It is explicitly emphasised that all botanical or pharmaceutical investigations take second place to the superordinate goal of first creating the bases for a transparent and participative agreement on the use of the biological resources.

In addition the various interests and working modes of all participants will be investigated systematically to derive the necessary prerequisites and success factors for future projects of this kind.

Project participants

Scientists from Germany and Ecuador will collaborate in the project. The project activities will include selecting Ecuadorian partners.



The German project participants and their tasks:

INSTITUT FÜR BIODIVERSITÄT - NETZWERK E.V. (IBN) [INSTITUTE FOR BIODIVERSITY]

- Moderating a participatory process for an equitable and transparent agreement on the use of biological resources and indigenous knowledge,
- Ethnological monitoring of the botanical examination and classification of vegetation structures in the second phase of the project.

INSTITUTE OF INTERNATIONAL PUBLIC AND EUROPEAN LAW, DEPT. OF INTERNATIONAL ECONOMIC AND ENVIRONMENTAL LAW OF THE UNIVERSITY OF GÖTTINGEN

- Examination of the national and international legal bases,
- Legal contribution to the development of a cooperation model that takes into account the requirements of national and international legislation and special legal aspects resulting from the use of biodiversity,

- Derivation of generalisable rules and transfer to the development of an institutional framework that can be used for similar projects in the future**.**

FUTURE TECHNOLOGIES CONSULTING OF THE VDI TECHNOLOGY CENTRE

- Internal coordination and documentation of the project,
- Launching of the interdisciplinary process,
- PR work in Germany,
- Supporting the project advisory counsel (organisation of advisory counsel council meetings etc.).

ALBRECHT-VON-HALLER-INSTITUTE FOR PLANT SCIENCES OF THE UNIVERSITY OF GÖTTINGEN

- Classification and documentation of the species of interest for pharmacological use,
- Analysis of the ecological conditions for the propagation and cultivation of the target species.

DR. WILLMAR SCHWABE GMBH & CO KG

- Negotiating partner for a possible agreement on the use of biological resources and indigenous knowledge,
- Analysis of plant samples to produce extracts with pharmacological or nutrient-supplementing effects in the second phase of the project,
- Technical and scientific cooperation (for example selection and financing of an
- Ecuadorian student for a doctorate).

Time schedule

The project has a planned term of about 5 years. It consists of two consecutive project phases:

Phase 1: Entry into a model agreement with all actors representing relevant interests in the spirit of the CBD on access to natural resources in a part of the Ecuadorian Amazon region.

Phase 2: Ethno-botanical and pharmacological investigations for the possible production of a plant extract with documented medical effect.

ProBenefit started in June 2003. Evaluation steps and milestones are planned to review the project objectives.

Financing

The project is being financed by the Federal German Ministry for Education and Research (BMBF) in its programme "Biosphere Research – InTEgrative and Application-Oriented Model Projects (BioTeam)"

First Results

During the first phase of the project, the following activities were carried out:

A socio-political analysis of potential stakeholders was carried out,

Over 40 organisations and groups from the Ecuadorian government, indigenous groups and organizations, local communities, NGOs and scientific institutions were contacted and informed about the project,

A project region for further analysis has been selected: the Biosphere Reserve Gran Sumaco at the Eastern slope of the Andes.

Several scenario workshops were carried out to develop visions of future options for access and benefit-sharing in Ecuador,

The legal framework in Ecuador concerning ABS was analyzed, especially the access procedure as required by the Decision 391 of the Andean Community and the Ecuadorian Draft Proposal for its implementation. Both require that the applicant asking for access to genetic resources carries out a consultation process with the indigenous community if traditional knowledge is involved. The scope and design of the process are left to the applicant.

A workshop with indigenous representatives was carried out to explore their views on a fair and transparent consultation process. One of the major needs they expressed was the need for more information about ABS, about the legal situation and their opportunities to participate in the process,

A collaboration contract with the regional indigenous organization FONAKIN has been signed to develop cooperatively the consultation process.

One important lesson learned from the first activities of the project is that information about ABS and the opportunities and potential for the stakeholders to participate in the process is a vital precondition for fair and transparent negotiations. This process can be demanding with respect to time and resources.

Access and Benefit-Sharing (ABS) Policies and Laws and the Issue of Basic Research: Some Brief Comments

MANUEL RUIZ MULLER
Peruvian Society for Environmental Law, Peru

Scientists who work in identifying and classifying biodiversity are the most concerned by the impacts ABS policies and laws are having (or are starting to have) on their activities. More paper work, longer and more complicated procedures, difficulties identifying the national ABS authority and conditions and requirements which are sometimes very difficult to meet, are among some of the difficulties confronted. This is particularly troublesome in cases where research is undertaken with no commercial or industrial interest but, rather, for the sake of enhancing and improving scientific knowledge in biodiversity.

Although the line between basic research and applied and more commercially oriented research is rather blurred, it is possible in most cases to identify activities which are purely scientific and "non for profit" in their essence. If results of these activities are used in a commercially oriented manner, this is an aspect that has to be addressed given the inequities that may arise if no consideration is given to commercial or industrial benefits which are being generated. In any case, the message is that basic research should not be affected but, rather, stimulated.

In principle, non commercial research (basic research) should be subject to a certain set of legal rules and principles and commercial oriented research or commercial applications of research results should be subject to a different, maybe complementary, set of rules.

In the case of ABS regulations in the Andean Region (Decision 391 of the Andean Community on a Common Regime on Access to Genetic Resources) applicable to Venezuela, Colombia, Ecuador, Bolivia and Peru, these distinctions have not been made and negative impacts are already being felt. What is rather paradoxical in the case of the Andean region is that although the scientific community have voiced their concerns, clearly basic research is still being undertaken which either means that a) Decision 391 is being applied (though documented evidence shows the contrary, at least in Colombia, Ecuador and Peru), b) research is being undertaken following other rules and regulations or c) scientists are simply not taking notice of the existing regulatory framework.

In accordance with Decision 391, all ABS activities are subject to a similar set of rules – including basic, non commercial research. This generally acts as a disincentive to taxonomic activities and projects targeted at studying biodiversity components from a more pure, scientific, academic approach.

It is also true that more and more private interests tend to participate (in one way or another) in supporting research in biodiversity and that this may lead to pressures towards finding commercial or industrial applications following immediately from the more basic research undertaken. Complex projects and collaborative arrangements among national and international institutions establish the conditions for research. This is not the problem. The problem is finding mechanisms of distinguishing among phases in the research process and regulating these phases according to their specific objectives and features. Clearly, Decision 391 does not contribute to this end.

Furthermore, bioinformatics, a powerful tool in itself, is also complicating policy and regulatory approaches to ABS given the nature of informational products (derived from biodiversity and its components) and their implications on ABS. The traditional paradigm for bioprospecting is being affected by bioinformatics (and genomics, proteomics, etc.) and, surprisingly, limited attention is being given to these new technologies in the context of ABS discussions at the national and international levels.

Recommendations

1. Some definition of what basic research is should be used as a standard. Basic research may be defined (in the area of biodiversity) as: any type of research which seeks to identify and classify specimens and their components and which has no commercial nor industrial application foreseen at the time of research activities.

2. All public policies and laws seeking to regulate ABS should include facilitated procedures in cases where basic research (and basic research only) is to be undertaken.

3. These policies and laws should stress that good faith of proponents is presumed. If this good faith presumption is breached, very specific sanctions and penalties should be clearly stipulated.

4. If at any time during the basic research project there are talks, discussions or possibilities of changing the purpose and basic research objectives of the project with a third party, this should be informed to the national authority expeditiously.

5. Commercial and industrial applications should not be prohibited – even if they eventually derive from basic research activities. Simply, these should be subjected to a different set of rules and obligations.

6. Publications and databases where basic research results are incorporated should include a notice that calls all users (e.g. other scientists) of data and information accessed to ensure they follow country of origin ABS policies and laws in cases where users may seek to apply this data and information to commercial and industrial objectives.

7. ABS policies and regulations should not only regular in terms of controlling ABS activities per se, but should establish incentive measures to promote and stimulate basic research activities.

Prol. Arenales Nº 437 – Lima 27 – Perú Telf. (511) 422 2720 – 441 9171 Fax (511)442 4365

E-mail: postmast@spda.org.pe Web page: http://www.spda.org.pe

Miembro de la Unión Mundial para la Naturaleza UICN

BMBF funding criteria for biodiversity research in developing countries

LOTHAR QUINTERN
DLR-PT Projectmanagement organisation of the German Federal Ministry of Education and Research

1 BMBF project funding as a contribution to international initiatives

Besides nationally oriented projects, international co-operation projects are funded by the German Federal Ministry of Education and Research (BMBF) within the programmes *BIOLOG, BioTeam, Mata Atlântica and GBIF-D* (see: *www.biolog-online.info*). The intention of this application-oriented research funding is to contribute to the so called international "2010 biodiversity target" of the CBD. In Germany, these programmes are embedded in the BMBF umbrella programme "*Research for Sustainability*" (*www.fona.de/eng/index.php*). In the international context the intention is to contribute to the goals and working plans which are outlined within the international Global Change programme for biodiversity research – DIVERSITAS. GBIF-D (i.e. GBIF-Germany) contributes to the international Global Biodiversity Information Facility (GBIF). Innovative monitoring programmes support GTOS and other structures with the goal to organise a global wide observation network.

1.1 Application-oriented research

What does „application-oriented research" mean? Various definitions exist. In the case of the BMBF projects it means that the scientific projects are not directly profit-oriented. The projects which are mainly multidisciplinary consortia should yield scientific results which have to be useful for the transfer into practice for nature conservation and/or its sustainable use. This transfer into practice should be possible, either within the running time of the funding period, or within the running time of the individual funding programme which may last up to 9 years. Using other classifications which do exist for biodiversity research, this kind of science may also be called basic research with a top down given thematic approach.

The funding strategy aims to achieve the following goals:

- Capacity building for all involved partners
- Participatory approach
- Networking
- Exchange of knowledge
- Application-orientation

1.2 Preconditions for successful projects

Various points are important: The overarching precondition for successful cooperative research with developing / megadiverse (donor) countries is to build up transparent structures, thus creating an atmosphere of trustfulness. Several levels have to be included into this process: The governmental, the regional and the local level as well as the cooperating scientists. Without this common sense the cooperation may suffer under various problems. To achieve this mutual understanding of co-operation there should be an intensive and continuous dialogue between the involved stakeholders. This sounds plausible and simple, but

in practice this is a very time consuming and challenging task which as yet has only been successful in a few cases.

1.3 Obligations for the researchers funded by BMBF / PT

Within the contract of funding, various points are mentioned which are obligatory rules which have to be fulfilled by the researcher team. These points aim to regulate a common understanding for the modalities of information exchange and the CBD guidelines. The individual points mentioned within such a funding contract are as follows:

- All project reports have to be written in English (abstracts additionally in French within the francophone countries).
- Within complex projects including various disciplines a synthesis report has to be written which has to be offered to all stakeholders which are relevant within the given context.
- Scientific publications have to be written in cooperation with all involved partners.
- Full transparency of data exchange. This may be achieved by a common data base with data access for all participants on the basis of a data protocol. This can be exemplified by the BIOTA-projects (see www.biota-africa.org). Data access and data input are also possible for external users.
- Acceptance of the guidelines which are formulated within the CBD.

1.4 Challenges for biodiversity research in developing / megadiverse countries

The rules and guidelines which have been outlined for some projects of the BMBF funding may sound plausible and simple. But in reality one has to consider the individual frame conditions which are important for the various co-operating countries. As mentioned above, it is important that all levels of involved stakeholders have to participate within the dialogue between Germany and the co-operating countries. In the case of the BMBF funding, this may also include the German government or at least the German funding agency, and the corresponding counterpart institution. In fact, this dialogue has been proven to be very helpful.

The current situation of biodiversity is quite alarming. This is paired with biopiracy fears of many countries and institutions which lead to restrictions even for research projects which are intended to support the cooperating country in their efforts to safeguard biodiversity and to utilise natural resources sustainably. It can be concluded that it is important to recognise that application oriented projects and programmes on biodiversity research are conform with the CBD. These projects support the aims of the international community to achieve the 2010 target and thereby supporting the developing / megadiverse countries.

The German Research Foundation (Deutsche Forschungsgemeinschaft, DFG) and its Committee on Biodiversity Research and Benefit-Sharing

SUSANNE REYES-KNOCHE
German Research Foundation (DFG), Bonn

The German Research Foundation and its mission

The German Research Foundation (Deutsche Forschungsgemeinschaft, DFG) is a self-governing organisation of German science and research. That means that only investigator-initiated research is funded (bottom-up-approach) and the funding is granted solely on the basis of proposals. There is no restriction concerning the subject of the proposal. All proposals are assessed by honorary peer reviewers and the decisions are based on solely scientific criteria.

The DFG is registered as an association under private law and funded by the federal government and by the states.

The mission of the DFG is:

- to serve all branches of science and the humanities by
  - funding projects devoted to basic research
  - facilitating cooperation among researchers on a national and an international scale
- to advise parliaments and public authorities on scientific issues
- particular attention is devoted to young researchers

Characteristics of DFG-funding

The most important characteristics of DFG-funding are listed below:

- Grants are given for individual projects (constitute about 40% of all funds) and coordinated collaborative research programmes.
- Grants are only given for basic research and for a time span up to twelve years, depending on the programmes.
- Only supplementary funding is provided (the core project funding must come from the budget of the host institution).
- Grants are normally awarded to the project leader; he or she carries the full responsibility for the project.
- In principle only scientists working at a German research institution can apply for grants (exception: fellowships) - applicants must hold a PhD-degree.

Funding of German projects in developing countries:

It is important to recognize that only scientists working at German research institutions can apply for projects. The counterparts in the host country are cooperation partners. The projects are funded according to the rules and regulations already mentioned above. Funding may cover all expenses necessary to conduct the project in a foreign country.
A special type of funding exists for the counterpart: monetary resources for project specific equipment for the host institution, personnel costs and other items (DFG/BMZ-programme). Additionally, there are special grants to initiate or prepare cooperation projects.

DFG-funded projects in the field of Biodiversity and Ecology carried out in developing countries leaded to the following experiences:

- Scientists normally have long-standing co-operations with their counterparts.
- Bureaucratic hurdles tend to increase. Scientists have to spend more and more time on obtaining research permits and, if necessary, export licenses.
- Even when all necessary permits are obtained, export and especially import (into Germany) of biological material is reported to become increasingly difficult and time-consuming.
- The majority of scientists and referees are not aware of the CBD regulations.

The Committee on Biodiversity Research and Benefit-Sharing

In 2002, the DFG has set up a committee on biodiversity research and benefit-sharing consisting of some 20 scientists from the natural sciences, especially from the area of taxonomy and systematic research as well as the humanities. The committee is engaged in a constant exchange of views with agencies competent in the biodiversity field, especially concerning the developments related to the CBD and its implementation.

The main tasks of the committee are:

- to safeguard the continued and long-term realization of Biodiversity-related projects of basic research, in particular regarding access to genetic resources in developing countries,
- to assist and to provide guidance for researchers and research projects in planning, managing and undertaking biodiversity-related basic research abroad and
- to support those research projects in exploring and using the potential for a mutually beneficial cooperation with their counterparts, entities and stakeholders abroad

The work program includes:

- an assessment of projects and experiences with the view of identifying best practices,
- the drafting of a guide on biodiversity related issues in biological research abroad and
- the exchange of experiences among existing and future projects.

4 Results of the workshop

Background

Against the background of the negotiations of the international regime on access to genetic resources and benefit-sharing the workshop aimed to identify ways and means for facilitating biodiversity research and conservation while safeguarding ABS provisions.

The CBD underlines in Articles 9 and 12 that biodiversity research and measures for ex situ conservation should be promoted to fulfil the three objectives of the CBD. This basic concern is also laid down in the Bonn Guidelines on Access to Genetic Resources and Fair and Equitable Sharing of the Benefits Arising out of their Utilization, adopted by the Conference of the Parties in 2002 and in the International Treaty on Plant Genetic Resources for Food and Agriculture (l.c. Art. 5.1(e), 6.2(b), Art. 15). One of the objectives of the Bonn Guidelines is to contribute to the conservation and sustainable use of biological diversity (paragraph 11 a). Paragraph 16 (b, viii) of the guidelines specifies that special terms and conditions should be established to facilitate taxonomic research for non-commercial purposes. Concerning a prior informed consent system, Paragraph 34 states that specific needs of taxonomic and systematic research should be taken into consideration.

The workshop addressed two user groups of genetic resources: botanic gardens representing ex-situ collections and academic research institutions. Both play an important role in implementing the CBD: being a base for the conservation of biodiversity and research on the one hand (according to Art. 8, 9, 12, 13 CBD) and being obliged, on the other hand, to scientific cooperation and sharing of benefits resulting from the research with countries providing genetic resources (according to Art. 15.6 and 15.7 CBD). Other user groups with a major role in the implementation of access and benefit-sharing provisions with regard to genetic resources, as ex situ collections of genetic resources for food and agriculture (gene banks), as well as rules governing the transfer of these resources were not subject of this workshop.

More than 2000 botanic gardens around the world cultivate around one third of the known species of higher plants and are visited by several millions of people every year. This is the base for their main tasks of research, education, building public awareness and ex situ as well as in-situ conservation projects. Capacity building by the botanic garden community strengthens these efforts. This work of botanic gardens is depending on access to genetic resources and exchange of plant material between the gardens.

Major basic research contributions made by academic research institutions to the implementation of the CBD include

- biodiversity research, especially taxonomy, the science of describing and identifying organisms as the very base for biodiversity conservation
- surveys and inventories of biodiversity and its distribution
- conservation assessments, including red listing

Furthermore, basic research is the driving force behind the development of new uses and new benefits. Such research and the necessary access to genetic resources should therefore be strongly advocated and simplified.

Existing approaches to Access and Benefit-Sharing (ABS) implementation

Addressing a regime on ABS, the following activities of botanic gardens and academic research institutions are of major relevance:

- Instruments developed by botanic gardens that help to document transparently the transfer of plant genetic resources, such as the International Plant Exchange Network (IPEN) and the Principles on Access to Genetic Resources and Benefit-Sharing
- Partnership arrangements between botanic gardens and basic research institutions in user and provider countries provide an important mechanism to implement the benefit-sharing provisions of the CBD
- Not only research institutions, but also correspondent funding agencies are in the process of developing policies on ABS, strategies and instruments to promote its implementation

Problems identified

On both sides, in the provider as well as the recipient countries, the following problems have been identified:

- Examples of national legislation in South America showed that current conditions for basic research and conservation are especially restrictive in some megadiverse countries.
- The current ABS regulations in some countries neither achieve to protect the countries of origin from “biopiracy”, nor do they stimulate novel bioprospecting activities or innovative uses of genetic resources.
- Reasons for the non-application of innovative projects (including use of genetic resources and sharing of the benefits arising out of the use) are related to a combination of high transaction costs and a lack of investment security for interested parties.
- In many countries, national strategies for ABS have not yet been developed, or a lack of infrastructure leads to failure in implementation.
- Over-restrictive ABS regulations have created extra levels of bureaucracy that impede basic research, sustainable use, and research on economic use and attached benefits.
- Distrust associated with the commercial sectors is affecting CBD implementation by the non-commercial research community.
- On the side of the recipient countries and the research community there is still a lack of information on and awareness of ABS.
- Funding institutions, research institutions and science publishers are still frequently lacking ABS policies.
- There is an urgent need for more practical examples of effective ABS implementation.

Recommendations

Botanic Gardens and basic research institutions are already implementing the CBD in various ways. But to make use of there full potential as catalysers and mediators of the convention, following recommendations can be made:

Documentation systems

- A thorough system of documentation is an important mechanism to facilitate benefit-sharing, ensure that mutually agreed terms are honoured, and prevent misappropriation.
- National policies / governments should take account of sectoral codes of conduct adopted by botanic gardens and research institutions, such as the botanic garden's International Plant Exchange Network, the Principles on Access to Genetic Resources and Benefit-Sharing and MOSAICC (International Code of Conduct concerning microorganisms) The promotion of these codes at an international level can help to build trust, facilitate relevant research and increase the chances of development of economic use and attached benefits.

Relation to commercial research:

- A clear differentiation between commercial and non-commercial users of genetic resources would help to facilitate access for basic research and clarify responsibilities and benefit-sharing expectations for such research.
- Some definition of what basic research is should be used as a standard. Basic research in the area of biodiversity may be defined as: any type of biodiversity research (from taxonomy to ecology), which has no reasonably foreseeable commercial or industrial application.
- Commercial and industrial applications should not be prohibited even if they eventually arise from basic research activities. Simply, these should be subjected to a separate procedure, i.e. a new PIC and MAT.
- A clear definition of 'commercialisation', to be agreed and set out in permits and agreements, would also allow researchers to know when they would need to obtain new PIC and MAT, in the event that an opportunity for a commercial or industrial application should arise.
- It is essential that applied science is facilitated and access to genetic resources is simplified to increase the generation of benefits. Facilitation rather than restriction of access should be the guiding principle when drawing up regulations and procedures to such access..

National ABS frameworks

- A clear national legal framework is a necessary condition for successful implementation of ABS. The designation of a competent/coordinating national authority facilitates and coordinates access and gives orientation and guidance for all actors and stakeholders at the national level (see Bonn Guidelines)
- ABS Focal Points, with the involvement of stakeholder groups, could be encouraged to develop new facilitating mechanisms to reduce bureaucracy and simplify access procedures and ABS implementation.

- ABS policies and laws should not only regulate in terms of controlling ABS activities per se, but should promote and stimulate collaborative basic research activities. Proactive ABS strategies and incentive-driven approaches (e.g. best-practice-certificates) should be preferred.
- ABS Focal Points and authorities should seek to inform and involve other relevant national authorities and politicians as well as scientists, users and local communities on ABS policy and implementation issues.
- Umbrella organisations of botanic gardens, herbaria and academic research institutions should be supported by the governments to enhance the process of ABS implementation.
- Botanic gardens and academic research institutions in provider and recipient countries should be encouraged by national authorities to develop further long-term partnerships as a way to ensure collaborative research and benefit-sharing.

It is hoped that the recommendations of this workshop will be considered in the negotiations of the International Regime on ABS.

Implementing the Bonn Guidelines by specific User Groups:

Ways and means for facilitating biodiversity research and conservation while safeguarding ABS provisions

to be held from November 8 - 10, 2005

convened by the German Federal Agency for Nature Conservation

held at the Botanic Gardens of the University of Bonn

Programme

Chairman: Bert van den Wollenberg, BGCI Netherlands

Tuesday, November 8 th

13.00 **Registration at Clemensruh Palace, Garden Hall**

14.00 **Welcome**
Nicola Breier, Federal Ministry of Environment, Nature Conservation and Nuclear Safety
Wilhelm Barthlott, Nees-Institute and Botanic Gardens, University of Bonn

14.15 **Introduction to the workshop, objectives**
Ute Feit , Federal Agency for Nature Conservation

14.30 **ABS, the Bonn Guidelines and the negotiation of an international regime**
Olivier Jalbert, Deputy Executive Secretary of the CBD Secretariat, Montreal

15.00 *Coffee break*

15.30 **Presentation of the results of the study "Users of Genetic Resources in Germany"**
Carmen Richerzhagen, University of Bonn

16.00 **Presentation of the German national ABS Website**
Ann-Kathrin Buchs, University of Göttingen

Specific User Group I: Botanic Gardens

16.15 **Role of botanic gardens in implementing the CBD and their link to ABS**
Andreas Gröger, Botanic Garden of Munich

16.45 *Coffee break*

17.00 **The botanic garden's International Plant Exchange Network (IPEN): A Code of Conduct and its implementation**
T. Helminger, Arboretum Kirchberg, Luxembourg

17.20 **Realisation of IPEN in botanic gardens: practical issues, possibilities and limits**
Wolfram Lobin, Bonn Botanic Gardens

17.40 **Discussion**

Wednesday, November 9 th

09.00 **Guided Tour at Bonn Botanic Gardens**

10.30 **The Principles on Access to Genetic Ressources and Benefit-Sharing and implementation by Royal Botanic Gardens, Kew**
Kate Davis, Royal Botanic Gardens of Kew, UK

11.00 *Coffee break*

11.30 **Statements by representatives from biodiversity rich countries: What do resource countries expect from non-commercial users like botanic gardens?**
Tania Sampaio, Rio de Janeiro Botanic Garden, Brazil
Sebsebe Demissew, National Herbarium of Ethiopia

12.30 **Discussion**

13.00 *Lunch*

Specific User Group II: Academic Research

14.00 **Drugs from the Sea – Sponges (Porifera) and the CBD**
Franz Brümmer, University of Stuttgart

14.30 **ABS regulations in Bolivia: consequences for research and conservation**
Pierre Ibisch, University of Applied Sciences, Eberswalde

15.00 *Coffee break*

15.30 **Mechanism for Compliance with ABS by the Academic Research Community**
Kelly Bannister, University of Victoria, Canada

16.00 **ABS and Research in Switzerland: tools for academic research**
Susette Biber-Klemm, University of Basel, Switzerland

16.30 **Experiences of Biodiversity Researchers with national ABS law in Brazil**
Gregorio Ceccantini, University of São Paulo, Brazil

17.00 **Discussion**

19.00 **Reception**
Venue: President Hotel, Clemens-August-Str. 32-34

Thursday, November 10 th

09.00 **The long way to legal access permits, a german project on ABS in Equador: ProBenefit**
Christiane Ploetz, VDI Technology Centre Corporation, Düsseldorf

09.30 **ABS legal frameworks and their impacts on research in Peru and Latin America**
Manuel Ruiz Muller, Peruvian Society for Environmental Law, Peru

10.00 **Funding criteria for biodiversity research in developing countries**
Lothar Quintern, DLR –PT Projectmanagement organisation of the Federal Ministry of Education and Research, Bonn

10.30 **Statement of the German Research Foundation on ABS**
Susanne Reyes-Knoche, German Research Foundation (DFG), Bonn

11.00 *Coffee break*

11.30 **Discussion**

13.00 **End of the Workshop**

List of Participants

International Workshop on Access and Benefit-Sharing
of Genetic Resources
November 8-10, 2005, in Bonn, Germany

Nr.	Name	Address	Contact
1.	Bannister, Kelly Dr.	Faculty of Law and School of Environmental Studies of Victoria University, Canada Post Box 3060, Victoria, British Columbia, V8W 3R4 Canada	Tel. +1-250-246-9722 Fax Email kel@uvic.ca
2.	Barthlott, Wilhelm Prof.	Botanische Gärten der Universität Bonn Meckenheimer Allee 171 53115 Bonn	Tel. 0228/73-2526 Fax 0228/73-3120 Email barthlott@uni-bonn.de
3.	Biber-Klemm, Susette Dr.	Faculty of Law of Basel University Maiengasse 51 4056 Basel Switzerland	Tel. +41-61 267 28 71 Fax +41-61 267 12 58 Email Susette.Biber-Klemm@unibas.ch
4.	Breier, Nicola	Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit Robert-Schumann-Platz 53175 Bonn	Tel. 0049-228-3052619 Fax 0049-228-3052684 Email nicola.breier@bmu.bund.de
5.	Brümmer, Franz Prof.	Biologisches Institut der Universität Stuttgart Pfaffenwaldring 57 70569 Stuttgart	Tel. +49-711-6855083 Fax +49-711-6855096 Email franz.bruemmer@bio.uni-stuttgart.de
6.	Buchs, Ann-Kathrin	Institut für Agrarökonomie der Universität Göttingen Platz der Göttinger Sieben 5 37073 Göttingen	Tel. Fax Email akbuchs@web.de
7.	Ceccantini, Gregório Prof.	University of São Paulo, Institute for Biological Sciences Rua do Matão, 277 05508-090 São Paulo Brazil	Tel. (005511) 3091-7949 Fax (005511) 3091-7547 Email gregorio@ib.usp.br

8.	Collin, Claire	Federal Public Service Health, Food Chain Security and Environment EUROSTATION bloc II - Place Victor Horta, 40 bte 10 1060 Brussels Belgium	Tel. +32-2-5249623 Fax +32-2-5249600 Email claire.collin@health.fgov.be
9.	Davis, Kate	Royal Botanic Gardens, Kew Richmond Surrey TW9 3AE United Kingdom	Tel. ++44-20-8332-5705 Fax ++44-20-8332-5757 Email k.davis@rbgkew.org.uk
10.	Delmas, Maite	Museum National d'Histoire Naturelle Jardin des Plantes 57 rue Cuvier 75005 PARIS France	Tel. Fax Email delmas@mnhn.fr
11.	Demissew, Sebsebe Prof.	Addis Ababa University, National Herbarium of Ethiopia Ethiopia	Tel. 251-1-232654 Fax 251-1-552350 Email sebsebed@bio.aau.edu.et
12.	Denich, Manfred Dr.	Zentrum für Entwicklungsforschung der Universität Bonn Walter-Flex-Str. 3 53113 Bonn	Tel. +49 (0) 228 / 73-1864 Fax Email m.denich@uni-bonn.de
13.	Diallo, Saliou	Swiss Agency for the Environment, Forests and Landscape (SAEFL) Switzerland	Tel. 41 (0)31 322 93 9 Fax 41 (0)31 324 79 7 Email saliou.diallo@buwal.admin.
14.	Feit, Ute	Bundesamt für Naturschutz, Insel Vilm 18581 Putbus	Tel. 038301/86131 Fax 038301/86150 Email ute.feit@bfn-vilm.de
15.	Freund, Wolfram Dr.	Zoologisches Forschungsinstitut und Museum Alexander Koenig Adenauer Allee 160 53113 Bonn	Tel. 0228-9122-299 Fax 0228-9122-299 Email W.Freund.ZFMK@uni-bonn.de
16.	Gatzweiler, Franz Dr.	Zentrum für Entwicklungsforschung der Universität Bonn Walter-Flex-Str. 3 53113 Bonn	Tel. Fax Email fgatz@uni-bonn.de

17.	Gröger, Andreas Dr.	Botanischer Garten München-Nymphenburg Menzinger Straße 61-65 80638 München	Tel. 089/17861-320 Fax 089/17861-324 Email groeger@botanik.biologie.uni-muenchen.de
18.	Haas, Fabian Dr.	Staatliches Museum für Naturkunde Stuttgart Rosenstein 1 70191 Stuttgart	Tel. +49-711-8936172 Fax +49-711-8936100 Email hass.smns@naturkundemuseum-bw.de
19.	Helminger, Thierry	Arboretum Kirchberg Musée National d'Histoire Naturelle de Luxembourg 25, rue Münster 2160 Luxembourg	Tel. +352 46 22 40201 Fax +352 46 3848 Email thelminger@mnhn.lu
20.	Hindorf, Holger Dr.	Landwirtschaftliche Fakultät, Institut für Pflanzenkrankheiten Nussallee 9 D-53115 Bonn	Tel. 0049 - 228 73 - 2450 Fax Email h.hindorf@uni-bonn.de
21.	Holm-Müller, Karin Prof.	Institut für Agrarpolitik der Universität Bonn Nussallee 21 53115 Bonn	Tel. +49-228-732333 Fax Email holm-mueller@agp.uni-bonn.de
22.	Ibisch, Pierre Prof.	University of Applied Sciences Eberswalde Alfred-Moeller-Str. 1 16225 Eberswalde	Tel. ++49-3334-65 479 Fax ++49-3334-65 428 Email pibisch@fh-eberswalde.de
23.	Jalbert, Olivier	Secretariat of the Convention on Biological Diversity (CBD) 413 St. Jacques Street, Suite 800 Montreal, Quebec H2Y 1N9 Canada	Tel. 1 514 287 7057 Fax 1 514 288 65 Email olivier.jalbert@biodiv.org
24.	Klingenstein, Frank	Bundesamt für Naturschutz Konstantinstraße 110 53179 Bonn	Tel. 0228/8491264 Fax Email frank.klingenstein@bfn.de
25.	Lobin, Wolfram Dr.	Botanische Gärten der Universität Bonn Meckenheimer Allee 171 53115 Bonn	Tel. 0228/73-5961 Fax 0228/73-9058 Email lobin@uni-bonn.de

26.	Löhne, Cornelia	Botanische Gärten der Universität Bonn Meckenheimer Allee 171 53115 Bonn	Tel. 0228-733347 Fax 0228-731690 Email biogart@uni-bonn.de
27.	Louafi, Sélim	Institut du Développement Durable et des Relations Internationales (IDDRI) 6, rue du General Clergerie 75116 Paris France	Tel. +33 4 67 45 78 41 Fax +33 4 67 45 78 37 Email louafi@iddri.org
28.	Lücker, Hubert Prof.	Verband Deutscher Zoodirektoren e.V. Strasse des Friedens 17 a 01328 Dresden	Tel. +49-351-2688822 Fax +49-351-2688822 Email hhluecker@yahoo.de
29.	Mutke, Jens Dr.	Nees-Institut für Biodiversität der Pflanzen der Universität Bonn Meckenheimer Allee 170 53115 Bonn	Tel. Fax Email
30.	Oikawa, Junko Dr.	Botanic Gardens Conservation International, Regional Office Japan Meckenheimer Allee 171 53115 Bonn	Tel. Fax Email junko.oikawa@bgci.org
31.	Ploetz, Christiane	VDI Technologiezentrum GmbH Graf-Recke-Str. 84 40239 Düsseldorf	Tel. ++49-211-6214-503 Fax ++49-211-6214-139 Email info@probenefit.de benefit.de
32.	Quintern, L. Dr.	Deutsches Zentrum für Luft- und Raumfahrt, Projektträger beim BMBF Godersberger Allee 117 53175 Bonn	Tel. 0228/8199626 Fax Email
33.	Reyes-Knoche, Susanne Dr.	Platz der Göttinger Sieben 5 37073 Göttingen	Tel. +49-551-394765 Fax +49-551-394767 Email sreyes@gwdg.de
34.	Richerzhagen, Carmen	Institut für Agrarpolitik der Universität Bonn Nussallee 21 53115 Bonn	Tel. +49-228/73-2324 Fax +49-228/73-5923 Email richerzhagen@agp.uni-bonn.de

35.	Roudna, Milena	Ministry of the Environment of Czech Republic Vrsovicka 65 100 10 Prague 10 Czech Republic	Tel. +420 267122769 Fax +420 267311949 Email Milena_Roudna@env.cz
36.	Ruiz Muller, Manuel	Peruvian Society for Environmental Law Prolongación Arenales 437 San Isidro Lima Peru	Tel. +51-1-4217330 Fax +51-1-4424365 Email mruiz@SPDA.org.pe
37.	Sampaio Pereira, Tania Dr.	Instituto de Pesquisas Jardim Botânico do Rio de Janeiro Rua Pacheco Leão, 915 22.460-030 Rio de Janeiro Brazil	Tel. Fax Email tpereira@jbrj.gov.br
38.	Sharrock, Suzanne	Botanic Gardens Conservation International 199 Kew Road, Descanso House Richmond Surrey TW9 3BW United Kingdom	Tel. +44-2083325941 Fax +44-2083325956 Email suzanne.sharrock@bgci.org
39.	Stevens, Albert-Dieter Dr.	Botanischer Garten und Botanisches Museum der FU Berlin Königin-Luise-Straße 6-8 14191 Berlin	Tel. 030/83850-222 o. -224 Fax 030/83850-239 Email ad.stevens@bgbm.org
40.	van den Wollenberg, Bert Dr.	BGCI-Office in The Netherlands c/o Utrecht University Botanic Gardens P.O Box 80162 3508 TD Utrecht Netherlands	Tel. +3130/253-2876 Fax +3130/253-5177 Email l.j.w.vandenwollenberg@bio.uu.nl
41.	Voigt, Herbert	Botanischer Garten der Universität Münster Schlossgarten 3 48149 Münster	Tel. 0251/83-23827 Fax 0251/832-3823 / 3800 Email voigth@uni-muenster.de
42.	von den Driesch, Marliese	Botanische Gärten der Universität Bonn Meckenheimer Allee 171 53115 Bonn	Tel. 0228/73-9055 Fax 0228/73-1690 Email biogart@uni-bonn.de

43.	von Houwald, Edelgard	Bundesministerium für Verbraucherschutz, Ernährung und Landwirtschaft PF 14 02 70 53107 Bonn	Tel. 01888 529 3616 Fax 01888 529 3425 Email Edelgard.von-Houwald@BMVEL.BUND.DE