Oral presentation

The Nagoya Protocol: implications for classical biological control of invasive plant species

Hariet L. Hinz[1]*, Philip Weyl[1], Djami Djeddour[2], David Smith[2]

[1]*CABI, Delémont, Switzerland; h.hinz@cabi.org*
[2]*CABI, Egham, United Kingdom*

Abstract

The Nagoya Protocol is a supplementary agreement to the Convention on Biological Diversity (CBD) with the aim to provide a legal framework for the *Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization* (ABS). The Protocol is impacting our work when searching for, collecting and studying natural enemies in their native range as potential biological control agents for invasive weeds. Some countries, for example most of Europe, are not restricting access to their genetic resources. However, in other countries the situation has proven more complicated. Presented herein is an overview of the challenges CABI has encountered and the measures that have been implemented to overcome these. We emphasize the importance to exercise due diligence when it comes to ABS to guarantee that classical biological control remains a viable tool for invasive plant management.

Keywords: Access and Benefit Sharing (ABS), Best Practices, Convention on Biological Diversity (CBD), India, Turkey

Introduction

The Convention on Biological Diversity (CBD), which entered into force on 29 December 1993, had as one of its objectives the fair and equitable sharing of the benefits arising out of the utilization of genetic resources. The Nagoya Protocol is a supplementary agreement to the CBD with the aim to provide a legal framework and transparent conditions for the *Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization* (ABS). The Protocol entered into force on 12 October 2014 and, as of 16 July 2019, there are 117 countries party to it. The necessity for such a framework was born out of the increasing prospecting by commercial companies from industrialized countries to find bio-active compounds, typically in biodiversity-rich but low-income countries without any or adequate sharing of resulting benefits. Although CABI fully supports the underlying reasoning for such a framework, we were concerned about the potential negative consequences, especially with respect to the exchange of natural enemies for use in classical biological control, which prompted respective recommendations to be made (Cock et al. 2010).

In the following, we give an overview of the steps CABI took to react to the Nagoya Protocol, our experiences thus far in different countries with special emphasize on India and Turkey, and an outline of remaining challenges and potential solutions.

CABI's Best Practice

CABI is both a provider and a user of genetic resources and often acts as an intermediary between

provider and user countries. As a user, CABI accesses and collects genetic resources (natural enemies) to develop biological control solutions for basic and applied research, for diagnosis and identification of pests and diseases, and to conserve and store genetic resources in our microbial collection as reference material and for later use or, potentially, to transfer to third parties. In 2016, CABI developed a policy and, subsequently, Best Practice for Access and Benefit Sharing Compliance as guidance for staff and as a basis to seek approval from its member countries on its actions regarding ABS (https://www.cabi.org/news-and-media/2018/conserving-and-using-genetic-resources-as-part-of-cabi-s-commitment-to-the-nagoya-protocol/). A designated person, Dr. David Smith, was appointed to act as the point of contact for ABS issues within the organization. Each CABI Center assigned an ABS Champion, and all staff were informed about the implications of the Nagoya Protocol and CABI's Best Practice. Projects in which genetic resources are accessed are captured in a central database with details on the provider country, the type of material collected, location, date, use etc. In addition, any contact with National Focal Points (NFP) or Competent National Authorities (CNA) is documented centrally. We have also developed a template Material Transfer Agreement (MTA), which is being adapted on a case by case basis and which now accompanies all our shipments of biocontrol agents to third parties. Thus far, CABI has not established a template for mutually agreed terms (MAT) or prior informed consent (PIC) as country requirements differ.

Our experiences thus far

Overall, CABI has contacted the NFPs and/or CNAs in 30 countries thus far. Most European countries are not restricting access to their genetic resources. However, some countries, such as France, have introduced ABS legislation that distinguishes between commercial and non-commercial use of genetic resources. A relatively simple declaration including the sharing of non-monetary benefits needs to be filled out and sent to the CNA for non-commercial use, while an authorization is necessary in the case of commercial use (https://absch.cbd.int/countries/FR). Following the definition of "utilization of genetic resources," only the analyses on the "genetic and/or biochemical composition of genetic resources" falls under the scope of the French national legislation, not the study of the biology, host range and impact of a potential agent. Other European countries, such as Serbia, are currently still preparing legislation.

For countries outside of Europe, the situation is usually more complicated. Some NFP's did not respond at all, were hard to reach or there was a high turnover of the people responsible, making it difficult to obtain definite answers. In general, it proved to be advantageous to have local collaborators support negotiations with the NFP or CNA. However, some of our local collaborators were hesitant to contact the NFP or did not think it was necessary. In some projects where pressure was high to make progress, collaborative agreements between institutions were sometimes advocated by local collaborators as the path of least resistance. However, CABI has a global reputation to uphold and therefore a duty to engage with official protocols, regardless of how protracted and bureaucratic they may be. Some NFP's had requirements that were difficult or even impossible to meet (e.g., identifying material in-country despite a lack of respective taxonomic expertise or leaving a set of voucher specimens in-country when there were no facilities available to accept them). For countries that have only signed the CBD and have no NFP or CNA (e.g., Georgia, Greece, Russia), we try to exercise due diligence by working as much as possible with local collaborators with which we share monetary and/or non-monetary benefits.

CABI was able to sign a collaborative agreement for specific projects with India (details given below), and our collaborators in Argentina (FuEDEI) were able to obtain collection and export permits from the Ministry of Environment in Paraguay. We have also submitted our Best Practice to national authorities of 12 countries for recognition, but there has been little precedent set, and few countries have processes in place for this. Thus far, Ghana has signed a Memorandum of Understanding (MoU) with CABI that contains most points of our Best Practice, and we are in discussion with the Swiss CNA to get our Best Practice officially recognized. The following sections provide more detailed accounts of our experiences in two countries, India and Turkey.

India

India was one of the first countries to adopt comprehensive legislation to regulate access to their genetic resources. The National Biodiversity Authority (NBA) was established in 2003 by the central government to implement India's Biological Diversity Act (2002). The NBA is a statutory body which facilitates, regulates and advises the central government on issues of conservation, sustainable use of biological resources and access and benefit sharing from these resources. Furthermore, the NBA delivers its mandate through a structure made up of the authority, secretariat, state biodiversity boards, local biodiversity management committees and expert committees. It was a response to what was perceived as exploitative use of India's biodiversity by bio-prospectors and was largely triggered by the CBD and discussions on ABS. The intent was that all matters relating to access by foreign individuals, institutions or companies, or transfer of results of research to any foreigner would be dealt with by the NBA.

There are two options for the export of biological material from India that are sanctioned by the NBA: (1) apply directly to the NBA for a fee, filling out the relevant forms available online either as a foreign organization or as an Indian researcher wanting to send the biological material to a researcher abroad (http://nbaindia.org/content/26/59/1/forms.html). This option requires prior knowledge of the scientific name, provenance and number of specimens to be exported as well as central government approval of an MTA. There is a condition that 0.1% of the monetary gain (if any) should be shared with the NBA as per the "Access and Benefit Sharing" guidelines. For a prospective biocontrol project in its scoping phase, this prescriptive approach is not feasible.

The alternate option (2) is to have a collaborative project with a research organization in India, with an objective on bilateral exchange of biological material. Here the collaborative project should be approved by the authority under whom the organization is working. In this option, there is no need to obtain an approval from the NBA; however, it is nonetheless vital for the information on any approved collaborative project to be conveyed to the NBA, by the competent authority, in the prerequisite format, with copies of approved collaborative agreements/MoUs/workplans attached, and accompanying notifications of exploratory activities and any novel species collected.

CABI has had a long and successful association with India; India is a CABI member country and in 1998, CABI established an overarching MoU for collaboration with the Indian Council of Agricultural Research (ICAR) through its national bureaus. This umbrella agreement, and subsequent bureau-specific MoUs, facilitated close research partnerships to be implemented through joint workplans. One significant area of collaboration has been on biological control; CABI's Commonwealth Institute of Biological Control (CIBC), Indian Station, was established in 1957, and marked the beginning of organized and systematic biological control research in India. Many successful weed biocontrol releases have been made, e.g., *Neochetina bruchi* Hustache and *N. eichhorniae* Warner for the control of water hyacinth in the 1980s, but it has been over a decade since the last introduction. Recently the Indian Council of Agricultural Research organized the First International Conference on Biological Control in Bengaluru, India and invited bureaucrats and senior officials to participate and reflect on the merits of biocontrol as well as draw attention to the challenges faced by modern-day practitioners.

Despite CABI's long and positive historical relationship with ICAR, biocontrol project activities and the associated exchange of genetic resources came under critical review with the appointment of several new senior managerial staff. The institutional bureaucratic and administrative processes required to receive clearance and endorsement from the relevant government ministries and the Department of Agricultural Research and Education (DARE, the government's nodal agency for international cooperation in the area of agricultural research and education) resulted in a three-year hiatus in the export of organisms from India.

In late 2017, after many iterations, a comprehensive MoU concerning scientific and technical cooperation between the ICAR and CABI was signed. A year later, a three-year collaborative workplan (2018–2020) for three biocontrol initiatives using natural enemies from India was approved by DARE. Individual collaborative workplans with the relevant ICAR institutes had to be outlined for each

project. While these projects can now resume, albeit subject to the necessary and potentially lengthy protocols of export facilitation, the sustainability and applicability of these research collaborations for small biocontrol initiatives with limited funding is questionable. The growing expectation for international collaborations, particularly those involving the export of biological material, to have substantial financial contributions, mutual training opportunities through exchange visits, as well as in-country research components are unfortunately often incompatible with the modest realities of biocontrol funding.

In summary, the Indian system is burdened by entrenched bureaucratic procedures, to which Indian national researchers are also subjected, that lead to inevitable delays and constraints given the seasonality of biocontrol agent prospection. CABI's international presence and historical reputation has undoubtedly been advantageous, and personal relationships cannot be underestimated when it comes to championing individual causes. Fundamentally, however, a respect and adherence to the country's legislation is key to maintaining diplomatic, long-term relations. Recent discussions with the NBA have been positive and may herald a more pragmatic and easily reproducible pathway for mutual exchange of natural enemies in the future. CABI visited the NBA in 2018 and was told that there is now a four-step process starting with an online application (http://nbaindia.org/), consultation with relevant states (that is carried out by the NBA), the setting up of an agreement (i.e., Mutually Agreed Terms) with no monetary benefits to share until a commercial product arises, and the final step of monitoring and reporting requirements. CABI has yet to test this process.

Turkey

The CABI Center in Switzerland has been collaborating with Turkish researchers and institutions since the 1990s on various biocontrol projects. Collaboration was based on MoUs and specific research agreements, including funding, but also non-monetary benefits such as hosting of visiting scientists, joint publications, training etc. At that time, the export of material was facilitated by the fact that the Dean of Ege University, one of our main collaborators, knew the Minister of Agriculture personally. However, from approximately 2012 onward, several entomologists (non-CABI staff) were arrested and fined because they did not have the proper permits. Even for Turkish scientists it became necessary to obtain collection permits prior to any field work. Permits for foreign scientists required at least three months, needed to indicate the exact timing and location and be in the Turkish language. Since this was not very practical for surveys, which are very weather dependent, we started concentrating our surveys in surrounding countries where access was easier to obtain (e.g., Armenia, Georgia). In parallel, we continued our efforts to work in Turkey, for instance by trying to approach the Turkish authorities at the diplomatic/political level via the Foreign Agricultural Service through the USDA ARS, but this was not successful. Although Turkey is not a party to the Nagoya Protocol, it does have an NFP, whom we contacted multiple times (because the person responsible repeatedly changed) directly or via our local collaborator. In June 2016, we received the information that collected material cannot be removed from the country and that all activities (including identification) must be done in Turkey. We therefore stopped all of our activities in Turkey in relation to classical biological weed control. Similar to India, the irony is that Turkey has profited from biocontrol in the past by releasing parasitoids against insect pests in citrus plantations (Erkiliç and Demirbaş 2007) and has recently imported and released the parasitoid *Torymus sinensis* Kamijo from Italy for control of the invasive Oriental chestnut gall wasp, *Dryocosmus kuriphilus* Yasumatsu (K. Ipekdal, pers. comm.). Current information on the website of the Ministry of Food, Agriculture and Livestock, General Directorate of Agricultural Research and Policies, Turkey (TAGEM), says that "In order to send samples abroad for studies that cannot be conducted in Turkey, a permission from TAGEM is needed." This does seem to leave a door open for export of material, but CABI has not yet tried this potential option.

Challenges and recommendations

The implementation of the Nagoya Protocol currently poses numerous challenges to the discipline

of classical biocontrol, especially in relation to countries outside of Europe. Where legislation exists, it is often convoluted and/or complicated and comes with a heavy administrative burden. Sometimes requirements are very difficult or impossible to fulfill, since they were put in place by staff without any biological or science background. In addition, the NFPs and CNAs responsible for the CBD and the Nagoya Protocol are typically situated in the ministry of the environment or related fields, while previously the responsibility for export permits was typically situated in the ministry of agriculture. This, combined with a frequent change in staff, does not make the task of obtaining correct information any easier. In some countries, different administrative levels (local, provincial, national), which may differ in their requirements and/or their understanding, are involved in the decision process (see Silvestri et al., 2019, these Proceedings). Finally, we believe that some difficulties are politically motivated and are thus hard to overcome. For the above reasons, timelines to obtain permission to access genetic resources can be very long (several months to years), which can delay project work considerably if surveys can only be conducted at specific times of the year. In addition, many smaller organizations (but even universities) are lacking the personnel and resources to fight their way through the administrative jungle. This harbors the danger that people might decide to ignore Nagoya altogether or find a way around it.

Another difficulty is that many countries are still trying to decide whether they should become party to the Nagoya Protocol. Of those that are party, many are still drafting legislation (only 61 of 116 parties have legislation or administrative measures listed on the Access and Benefit-Sharing Clearing-House [ABSCH] website; https://absch.cbd.int/). This is the case for China where the Ministry of Ecology and Environment (MEE) has been tasked with leading the development of ABS legislation. However, this process will take at least one to two years. For this interim period, it was recommended to CABI to establish a collaborative research contract with its main national partner (the Institute of Plant Protection under the Chinese Academy of Agricultural Sciences), which—after some additional steps—should allow for the export of material (F. Zhang, pers. comm.). CABI has yet to try this process.

Another strategy is to choose countries for surveys where legislation already exists, access is easier or that are not a party to the Nagoya Protocol. However, this will lead to the isolation of precisely the countries that were meant to be protected by the establishment of the Nagoya Protocol (Deplazes-Zemp et al. 2018). For microbial biocontrol it may be feasible to use samples from collections that were acquired prior to 12 October 2014.

Our experience has shown that it is always advisable to work with local collaborators for whom it is usually easier and more effective to contact or meet the NFP and/or CNA, and which might be better informed about recent decisions and developments. Good, long-term personal relationships within the country in question are certainly advantageous and should be fostered, e.g., through truly collaborative projects, joint meetings and publications, the exchange of scientists and students etc.—basically all features of the non-monetary benefits that are commonly practiced within non-commercial biocontrol initiatives (Cock et al. 2010; Mason et al. 2017). Countries also need to be made aware that they could profit (or may have already) from the free exchange of genetic resources to control invasive pests and diseases, and that biocontrol is not a one-way road.

We also recommend following existing best practices (e.g., Mason et al. 2017; Smith et al. 2018), or developing one's own to follow, to guarantee a certain standard in accessing genetic resources. This should facilitate avoiding bad practices and the building of trust with provider countries. Example best practices can be found on https://absch.cbd.int/. In the meantime, the country profiles on the ABSCH website (https://absch.cbd.int/countries) have become a reliable and very useful information resource for checking current country requirements. The website also allows registered users to set up personalized email alerts when new country records are published.

In conclusion, ABS and the Nagoya Protocol are here to stay. We therefore need to be prepared, proactive and patient and exercise due diligence to guarantee that classical biological control remains a viable tool for invasive plant management. Importantly, we need to find mechanisms to share experiences to facilitate the implementation of

practical and implemented national processes that meet scientific and societal needs while delivering the fair and equitable sharing of benefits that the CBD and Nagoya Protocol were designed to deliver.

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