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

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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 megadiversity 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 neighboring 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*, Cucurbitaceae), 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 24676 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 fueled 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 these 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 biotrade 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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References

- Fowler, C. 2002. Sharing agriculture's genetic bounty. *Science* 297: 157.
- Galarza, Y. 2004. Principal legal instruments for the management of biodiversity. In: Ibisch, P.L. & G. Mérida (eds.) (2004): *Biodiversity: the richness of Bolivia. State of knowledge and conservation*. Ministerio de Desarrollo Sostenible y Planificación / Editorial FAN, Santa Cruz. 494-508.

- Ibisch, P.L. 1998. Bolivia is a megadiversity country and a developing country. In: Barthlott, W. & M. Winiger (eds.): Biodiversity - a challenge for development research and policy. Springer-Verlag, Berlin. 213-241.
- Ibisch, P.L. 2004. About the conservation status of species. In: Ibisch, P.L. & G. Mérida (eds.) (2004): Biodiversity: the richness of Bolivia. State of knowledge and conservation. Ministerio de Desarrollo Sostenible y Planificación / Editorial FAN, Santa Cruz. 278-287.
- Ibisch, P.L. 2005. Biodiversity conservation in Bolivia - history, trends and challenges. In: Romero, A. & S.E. West (eds.): Environment issues in Latin America and the Caribbean. Springer, Dordrecht. 55-71.
- Ibisch, P.L., M. Olivera, N. Araujo, I. Morales & G. Mérida 2004. Capacities in biodiversity conservation science. In: Ibisch, P.L. & G. Mérida (eds.) (2004): Biodiversity: the richness of Bolivia. State of knowledge and conservation. Ministerio de Desarrollo Sostenible y Planificación / Editorial FAN, Santa Cruz. 539-548.
- MDSP (Ministerio de Desarrollo Sostenible y Planificación) 1997. Implementación del Convenio sobre Diversidad Biológica. Primer informe nacional de Bolivia, La Paz, Bolivia (Jan. 1997, governmental document accessible under the webpage of the Convention on Biological Diversity: <http://www.biodiv.org/doc/world/bo/bo-nr-01-es.pdf>).
- Mérida, G., M. Oliveira & P.L. Ibisch (2005): National Biodiversity Strategy of Bolivia. Executive Summary. Editorial FAN, Santa Cruz.
- Mérida, G. 2004. Current model for biodiversity management: conditions and factors of unsustainability. In: Ibisch, P.L. & G. Mérida (eds.) (2004): Biodiversity: the richness of Bolivia. State of knowledge and conservation. Ministerio de Desarrollo Sostenible y Planificación / Editorial FAN, Santa Cruz. 472-494.
- Pethiyagoda, R. 2004. Biodiversity law has some unintended effects. Nature 429: 129.
- TULUM (TULUM Ltd. Strategy and Enterprise Development) 2005. Annual report 2004, Caslano (accessed online on November 8: http://www.tulum-consult.com/downloads/050810_Annual_Report_2004_TAB.pdf).

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