

BIOPROSPECTING AND BIOPIRACY: REMOVING GHOSTS

Sophia Espinosa Coloma*

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* Professor of Law, Universidad San Francisco de Quito School of Law, Educator.
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ABSTRACT

Fears around bioprospecting have brought as a result that many multi-diverse countries have lost opportunities for innovation and industry development. Therefore, it is essential that biodiverse rich countries work on eliminating the ghosts surrounding bioprospecting. In this regard, it is important to make a clear distinction between bioprospecting and biopiracy. Furthermore, it is fundamental to highlight the benefits and value of bioprospecting for innovation and the generation of new products in fields such as health, food, cosmetics, biotechnology, etc. In this way, biodiversity rich would be able to promote bioprospecting as a key element for innovation and development.

Keywords: bioprospecting, biopiracy, innovation, CBD, multi-diverse countries, biodiversity rich countries, north-south debate.

生物探勘與生物剽竊—幽靈退散

Sophia Espinosa Coloma*

摘 要

本文以厄瓜多為例討論生物探勘與生物剽竊的互動問題，並闡述生物探勘的正面意義，及釐清剽竊保護的疑慮。

關鍵字：生物探勘，生物剽竊，生物多樣性，專利

* 厄瓜多基多聖弗朗西斯大學法學教授
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I. Introduction

Biodiversity prospecting or “bioprospecting” refers to the process of looking for potentially valuable genetic resources and biochemical compounds in nature.¹ Thus, bioprospecting is a practice that occurs in many fields such as medicine, agriculture, cosmetics, food, and biotechnology. Following this approach, we can affirm that bioprospecting has been practiced since the beginning of the mankind.

Around the world, some indigenous communities have discovered plants’ medicinal uses for the treatment of illness and health. For instance, considering the use of herbs in traditional medicine to treat gynecological conditions, “a compendium of Chinese material medical has about 228 preparations described with applications related to fertility control; 97 as emmenagogues, 60 contraindicated in pregnancy, 44 as uterine stimulants and 27 as abortifacients.”² In Ecuador, the use of *Cinchona* has been broadly extended for the local and foreign use for the treatment of malaria. In the Ecuadorian case, indigenous communities used to extract the quinine from the *Cinchona* bark in order to obtain the compound to treat malaria.

Ecuadorian indigenous communities use not only plants for the treatment of illness, but also animals. One example is the case of the *Epipedobates tricolor* frog, which is an endemic species from Ecuador and the north of Peru. Indigenous people can extract a strong analgesic from this frog. This compound is a strong “painkiller in the category of opium derivatives. It has no side effects

¹ See Thomas Eisner, *Chemical Prospecting: A Proposal for Action*, in *ECOLOGY, ETHICS AND ECONOMICS: THE BROKEN CIRCLE* 196, 196-202 (F. Herbert Bormann & Stephen R. Kellert eds., 1991).

² A. Adebiyi et al., *Uterine Stimulating Effects of Crude Latex of *Carica Papaya* L.*, in *ETHNOBIOLOGY AND BIOCULTURAL DIVERSITY: PROCEEDINGS OF THE SEVENTH INTERNATIONAL CONGRESS OF ETHNOBIOLOGY* 299, 299 (John R. Stepp et al. eds., 2002).

and promotes alertness.”³

In addition, some of the plants that have been used in traditional medicine by indigenous communities in the tropics, including Ecuador, are represented in the chart below⁴:

Plant common name	Plant Family	Vegetal Specie	Medical Use	Compound
Arbol de corcho (Cork Tree)	Solanaceae	Duboisia spp.	Antispasmodic	Buscapine
Cafe (Coffee)	Rubiaceae	Coffea spp.	Analgesic	Caffeine
Coca	Erythroxylaceae	Erythroxylum coca	Analgesic	Cocaine
Opium	Papaveraceae	Papaver somniferum	Analgesic and Antitussive	Codeine
Opium	Papaveraceae	Papaver somniferum	Analgesic	Corfina
Nuez Vomica (Pecan nut)	Loganiaceae	Strychnos nuxvomica	Insecticide	Strychnine
Opium	Papaveraceae	Papaver somniferum	Antitussive	Noscapine
Cascarilla	Rubiaceae	Chinchona pubescens	Anti-malaria and Antipyretic	Quinine
Indo-iyaboku	Apocynaceae	Rauwolfia serpentina	Hypotensive and tranquilizer	Reserpina
Tea	Theaceae	Camellia sinensis	Bronchodilator diuretic and stimulant	Teofilina
Ulmaria	Rosaceae	Filipendula ulmaria	Pain and inflammation reliever	Aspirin
Chamico	Solanaceae	Datura stramonium	Motor illness	Scopolamine
Ipecacuanha	Rubiaceae	Psychotria ipecacuanha	Induce vomit	Ipecacuanha
Jaborandi	Rutaceae	Pilocarpus jaborandi	Reduce the intra-ocular pressure	Pilocarpine

³ Esther Almeida, *Traditional Knowledge: An Analysis of the Current International Debate Applied to the Ecuadorian Amazon Context*, in HUMAN RIGHTS AND INTELLECTUAL PROPERTY RIGHTS: TENSION AND CONVERGENCES 209, 222 (Mpasi Sinjela ed., 2007).

⁴ See Monserrat Rios et al., *Plantas Útiles del Ecuador: Uso y Abuso*, in CONOCIMIENTO TRADICIONAL Y PLANTAS ÚTILES DEL ECUADOR: SABERES Y PRÁCTICAS 7, 15 (Abya-Yala et al. eds., 2008).

Plant common name	Plant Family	Vegetal Specie	Medical Use	Compound
Ma huang	Ephedraceae	Ephedra sinica	Reduce the nasal congestion	Seudoefredina
Vinca rosa de Madagascar (Madagascar Rose)	Apocynaceae	Catharanthus roseus	Treatment of Hodgking disease	Vinblastina

Therefore, the use of biodiversity for medical and agricultural applications shows that bioprospecting has occurred around the world since antiquity.⁵

In contemporary times, bioprospecting has acquired significant value for many industries that work on the development of new products. The pharmaceutical, biotechnology, agriculture-food, and cosmetic industries see biodiversity as a valuable source of resources, and they consider bioprospecting to be a mechanism useful to identify those resources. For instance, “[i]n the United States, some 25 percent of prescriptions are filled with drugs whose active ingredients are extracted or derived from plants. Sales of these plant based drugs amounted to some \$ 4.5 billion in 1980 and an estimated \$ 15.5 billion in 1990.”⁶ This fact has arisen in a controversial debate between the use and access to biological resources. This controversy is deeply influenced by the North

⁵ See Corliss Karasov, *Who Reaps the Benefits of Biodiversity?*, 109 (12) ENVIRONMENTAL HEALTH PERSPECTIVES A582, A582 (2001), available at <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1240518/pdf/ehp0109-a00582.pdf> (“Bioprospecting had been shaping global cultures for centuries before a world trade organization came into being. A quick tour of almost any garden, farm field, or medicine cabinet should serve as a reminder that the global economy has in part been built on products of bioprospecting. According to Joshua Rosenthal, deputy director of the Division of International Training and Research at the NIH Fogarty International Center, more than 50% of the most prescribed medicines in the United States contain compounds derived from natural products. And an even larger percentage of the world’s people rely on natural products for their primary medicinal needs.”)

⁶ WALTER V. REID ET AL., *BIODIVERSITY PROSPECTING: USING GENETIC RESOURCES FOR SUSTAINABLE DEVELOPMENT* 7 (1993).

and South debate. On the other hand, it also shows the value of bioprospecting for innovation and industry development.

Considering innovation as a key element of development, it is important for multi-diverse countries to settle the basis to promote the construction of a technology oriented society that can make an efficient use of resources, while reassuring better economic conditions for its people. Promoting research and development is a complex process that has to work with different elements in order to create the conditions for an innovation environment. In this regard, bioprospecting becomes an important piece within the R&D process. Therefore, it is crucial for biodiversity rich countries to remove the ghosts surrounding bioprospecting. In this article, we will establish what bioprospecting is and its differences with biopiracy. We then conclude that bioprospecting should be considered as the cornerstone to promote innovation.

II. Fears around Bioprospecting and the Convention of Biological Diversity

A. Biological Resources

Traditionally biological resources were considered a “common heritage of mankind,” which means in a broader sense that “the natural resources and vital life-support services belong to all mankind rather than to any one country.”⁷ Consequently, these resources can be considered goods that are commonly owned by the whole human race, but not by any specific group. To this respect, John Stuart Mill suggested that “the Earth itself, its forest and water above and below the surface. These are the inheritance of the human race, and there must

⁷ GARETH PORTER & JANET WELSH BROWN, GLOBAL ENVIRONMENTAL POLITICS 13 (2d ed. 1995).

be regulations for the common enjoyment of it.”⁸ This perception meant that biological resources were considered public goods, and consequently, freely accessible.

For this reason, many pharmaceutical companies and botanic gardens collected significant samples from bio-rich countries for experimental and commercial purposes. As a result, the benefits from exploitation of biological resources were hoarded by third parties instead of being used for the benefit of the countries where the biological resources were found. For instance, “as recently as the 1980s, the plant rosy periwinkle (*Catharanthus roseus*) gave rise to two important drugs, vinblastine and vincristine, which are used to treat Hodgkin’s disease and childhood leukemia, respectively. Together, the two drugs, manufactured primarily by Eli Lilly, net \$100 million dollars annually, yet the source countries have never received a penny in royalties or other compensation.”⁹

⁸ JOHN STUART MILL, *PRINCIPLES OF POLITICAL ECONOMY WITH SOME OF THEIR APPLICATIONS TO SOCIAL PHILOSOPHY* 70 (William J. Ashley ed., 7th ed 1909).

⁹ See Karasov, *supra* note 5. The rosy periwinkle case is an excellent example of “how difficult it can be to disentangle proprietary claims originating in folk traditions.” At the beginning this case arose a significant controversy because the rosy periwinkle was alleged to be a native species of Madagascar. Therefore, it was alleged that “Madagascar was unfairly denied revenues from drugs whose discovery depend on its biodiversity and ethnomedical traditions.” However, after revising the facts, it was stated that the *Catharanthus roseus* “is a resolutely cosmopolitan species now cultivated on six continents and thoroughly integrated into the folk healing traditions of countries as distant from one another as England, Pakistan, Vietnam, and Dominica ... Far from being endangered species, *Catharanthus roseus* is regarded, at least in the state of Florida, as an aggressive exotic that gardeners should banish from their gardens.” In addition, “according to the scientists working at Eli Lilly, the literature available to them identified the rosy periwinkle as a folk treatment for diabetes, not as a cancer medicine. ... Instead, scientists came upon alkaloids that proved effective as agents for treating cancer. This discovery coupled with innovative extraction techniques, led to the development of vincristine and vinblastine, drugs that have helped doctors achieve remission rates of 90 percent or more in cases of childhood lymphocytic leukemia.” Therefore, it is arguable to affirm that Madagascar had legitimate rights to participate from the profits. For further discussion, see MICHAEL F.

This kind of episode aggravated the historical friction between biologically rich countries in the South and technologically rich countries in the North. From this point of view, since colonialism, biodiversity rich countries or mega-diverse hotspots have been the principal suppliers of raw material to industrialized countries that own the technology to process and transform bioresources into final products. Therefore, this posture suggests that countries in the South have been exploited by developed countries in the North.

If we translate the North-South debate to the access and management of biological resources, we would find that southern countries feel outraged over the supposed misappropriation by northern countries of plant material and traditional knowledge for agricultural and pharmaceutical purposes. Global conditions show that countries in the South are the principal source of biodiversity. Therefore, they become undeniable fonts of genetic resources for bioprospecting and product development.¹⁰

On the other hand, northern countries are the ones that hold the technology and the knowledge necessary to economically exploit these resources. Consequently, the knowledge, technology, and market systems maintained by these countries allow them to concentrate the financial wealth. In addition, this economic expansion occurred without consideration for the conservation of the

BROWN, WHO OWNS NATIVE CULTURE? 135-38 (2003).

¹⁰ See Susette Biber-Klemm & Danuta Szymura Berglas, *Problems and Goals, in RIGHTS TO PLANT GENETIC RESOURCES AND TRADITIONAL KNOWLEDGE: BASIC ISSUES AND PERSPECTIVES* 3, 6 (Biber-Klemm et al eds., 2006) (“Biodiversity is distributed unevenly over the globe. Generally speaking, there is more diversity in warmer and wetter climates than in cooler and drier ones.”); see also EDWARD O. WILSON, *THE DIVERSITY OF LIFE* 260 (1992) (“Seventy percent of the world’s biodiversity is found in only 12 mega-diverse countries - Colombia, Ecuador, Peru, Brazil, Zaire, Madagascar, China, India, Malaysia, Indonesia, Australia and Mexico- which, with the exception of Australia are all developing, non-Western nations. A wealth of biodiversity is also found in many other countries; for instance, South Africa contains the most biological diversity in plant species.”).

environment; therefore, in some cases over-exploitation of natural resources was the motor for the economic growth of industrialized nations.¹¹

This scheme of production without consideration for the sustainability management of biological resources; combined with the inequities derived from the lack of compensation to local communities, which were the holders of traditional knowledge, brought a need to change this model. As a result, the international community reassessed the parameters of access to biological resources and biodiversity management.

B. Convention of Biological Diversity

Thus, in 1992 the Convention of Biological Diversity (hereinafter CBD) was signed. This new international legal framework states as an objectives “the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources, including by appropriate access to genetic resources and by appropriate transfer of relevant technologies, taking into account all rights over those resources and to technologies, and by appropriate funding.”¹² In order to effect adequate compensation for access to genetic resources and traditional

¹¹ See CHIDI OGUAMANAM, *INTERNATIONAL LAW AND INDIGENOUS KNOWLEDGE: INTELLECTUAL PROPERTY, PLANT BIODIVERSITY, AND TRADITIONAL MEDICINE* 54 (Chidi Oguamanam ed., 2d ed. 2006). (“An industrial approach to natural resources facilitates overharvesting and consumption of natural resources, thereby posing a major threat to biodiversity. The global consumption pattern of biodiversity components supports this fact. Only 25 per cent of the global population controls the technologies and 85 percent of the global financial wealth needed for the deployment and consumption of natural resources. These consist mainly of the industrialized countries of the North. The tropical countries (including China) have 75 percent of the world’s population and only 15 per cent of the global financial wealth. Collectively, people in developing countries use 20 per cent of industrial energy and less of most other materials that contribute to their standard of living, and include among their members only 6 percent of world scientists and engineers, according to the United Nations and the World Bank.”).

¹² Convention of Biological Diversity art. 1, June. 5, 1992, U.N.T.S.

knowledge, the CBD recognizes the sovereign rights of States over their natural resources, the authority to determine access to genetic resources rests with the national governments and is subject to national legislation.”¹³

This change produced significant modifications in the management of bioresources and biodiversity. This is because for the first time, bioprospectors have an obligation to compensate source countries and indigenous communities that contributed their traditional knowledge. Thus, property-right mechanism over biological resources has been created, and the doctrine “common heritage of mankind” has been overturned.

Nevertheless, it has been overturned only in this field, because access to crop genetic resources for foods and agricultures still maintains the doctrine of “common heritage of mankind”, given the global concern about food security. Thus, the FAO (“Food and Agricultural Organization”) Commission and International Undertaking affirmed a resolution establishing that “plant genetic resources are a heritage of mankind and consequently be available without restriction.”¹⁴

After the CBD came into force in 1993, it was perceived by the international community as a tool to calibrate the conditions of access to genetic resources. Thus, it facilitates access to genetic resources and at the same time promotes biodiversity conservation. In addition, through the establishment of the principles of benefit and sharing, life conditions in the source countries and indigenous communities could be improved.

In reference to the previous situation and the new conditions after the es-

¹³ CBD art. 15.1 .

¹⁴ International Undertaking on Plant Genetic Resources art. 1, FAO CONFERENCE, 22nd Sess., U.N. Doc. C/83/REP (Nov. 23, 1983), *available at* http://www.fao.org/views-archive/docs/Resolution_8_83.pdf.

establishment of the CBD, Richard S. Cahoon, vice president of the Cornell Research Foundation and associate director of patents and technology marketing at Cornell University in Ithaca, New York, says that:

*This meant that there was no law or moral obligation requiring a company that collected biological material from another country to pay for access to that material, ... What has changed is that we've begun to recognize property rights in all biota. We also recognize how bioprospecting can be used to encourage economic development and conservation in Third World countries.*¹⁵

Nevertheless, despite the recognition of national sovereignty over natural resources and the establishment of the principles of access, benefit, and sharing, the South is still skeptical about facilitating access to genetic resources. As a result, without adequate mechanisms to implement the CBD, the sovereignty that was considered one of the biggest achievements of this Convention could work against the objectives of this instrument. A “brute nationalism”¹⁶ adopted by the South resulted in a system in which sovereignty was used to restrict access and not to facilitate it. The CBD empowers the countries of origin to control the conditions and terms of access to genetic resources. Nevertheless, in some cases, the lack of experience drafting contracts for access to genetic resources and the absence of laws have caused bioprospecting projects to be postponed.

For example, in August 2008, the Global Institute for BioExploration (GIBEX) and Universidad San Francisco de Quito made their formal presentation to the Ministry of Environment of Ecuador in order to obtain authorization

¹⁵ See Karasov, *supra* note 5, at A587.

¹⁶ It is the term used by Vogel while explaining the position of the South countries during the negotiations of the CBD.

to start a bioprospecting project in the following Ecuadorian regions: Maquipucuna, Choco–Andean; Tiputini, Amazonas; and Gaias, Galapagos. The objective of this project was to screen biological resources in order to find active compounds that could be used in the medical field. According to the terms of the proposal, all screening was going to take place in Ecuador; therefore, no sample of biological resources was going to be taken out of the country. In addition, any intellectual property right derived from the project was going to be assigned to Ecuador. Nevertheless, the government stated that there was no local regulation to govern the project.¹⁷ Nowadays, Ecuador has a regulation regarding access, benefit and sharing, but despite the fact that now the procedure for accessing to genetic resources is clear, there are still many grounds to work on in order to promote innovation through the access to genetic resources.

III. Bioprospecting Is Not Biopiracy

A. Misappropriation Approach

The fears around bioprospecting have made that some members of ecological organizations still believe that bioprospecting is merely a justification to misappropriate biological resources that belong to southern countries. To this respect in Ecuador, Elizabeth Bravo, the President of the Institute of Ecologists Studies of the Third World, confuses the terms bioprospecting and biopiracy. Thus, she states that the only goal of bioprospecting is the commercialization of products, and therefore, its objective is to obtain revenue.¹⁸ Consequently,

¹⁷ Taken from personal notes took in Ecuador, August 2008, at the Offices of the Ministry of Environment. In this meeting, Professor Manuel Baldeon from Universidad San Francisco de Quito and Professor Elvira de Mejia from University of Illinois, Urbana-Champaign made the presentation of the project.

¹⁸ See generally Elizabeth Bravo, *La Bioprospeccion en el Ecuador*, in BIODIVERSIDAD, BIOPROSPECCION Y BIOSEGURIDAD 131 (Ana Maria Varea ed., 1997), available at <http://repository.unm.edu/bitstream/handle/1928/10512/Biodiversidad;jsessionid=>

it is just a mechanism to loot biological resources and traditional knowledge from the third world. She concludes that “these facts not only constitutes a violation of the Constitutional rights but also is a mechanism to privatize the life and the traditional knowledge that has been elaborated and used in a collective way.”¹⁹ Furthermore, regarding the benefit and sharing, Bravo has stated that the Access Benefit and Sharing (ABS) is only a way to legalize the biopiracy.²⁰

This kind of statement reflects the lack of knowledge and the irrational nationalism that exist on the topic of management of biological resources. First, if it is true that the final objective of bioprospecting is to obtain a product susceptible to commercialization, then its intrinsic purpose is to enhance human welfare. To this respect, David Kingston, a professor of bioorganic and natural products chemistry at Virginia Polytechnic Institute and State University in Blacksburg, sees bioprospecting as a win-win situation for bioprospectors, public health, and source countries when treaties are equitable. “The host country has nothing to lose ... Bioprospecting is not solely driven by interest in money,” he says. The hope that cures to cancer, AIDS, and other diseases are hidden in some endangered habitat still fuels enthusiasm for bioprospecting. Kingston believes we can’t afford to stop looking at natural products. “No chemist could ever dream up the chemistry of Taxol,” he says, referring to the drug for fighting breast and other cancers that is derived from the bark of the Pacific yew tree (*Taxus*).²¹

Moreover, it is fundamental to distinguish bioprospecting from biopi-

DA078AB3A3E46F594B2EBCF710C160CA?sequence=1.

¹⁹ *Id.*

²⁰ See generally Elizabeth Bravo, *Biopiratería o “Buen Vivir”*. *El caso de Ecuador*, 107 ESPECIAL 69 (2009), available at http://www.biopirateria.org/download/documentos/investigacion/biopirateria-casos/biopirateria-o-buen-vivir_Ecuador_EBRAVO_.pdf.

²¹ See Karasov, *supra* note 5, at A587.

racy. Biopiracy and bioprospecting are two completely different concepts, but sometimes they are associated and confused. As we stated before, bioprospecting has a positive connotation because it focuses on the search for genetic resources for their elaboration into final products that improve life conditions. Thus, even if it is true that in some ways bioprospecting has an economic and commercial purpose, in its beginning, the principal objective is searching for chemical compounds with useful characteristics.

On the other hand, biopiracy is defined by Dr. Vandana Shiva “as a process by which the rights of indigenous cultures to their genetic resources and associated traditional knowledge are replaced by monopoly rights of those who exploit these resources.”²² Others assert that biopiracy “refers to the use of intellectual property laws (patents, plant breeder’s rights) to gain exclusively monopoly control over genetic resources that are based on the knowledge and innovation of farmers and indigenous peoples.”²³

Thus, biopiracy is understood as a misappropriation of genetic resources and traditional knowledge associated through the use of intellectual property rights. According to this perception, intellectual property regimens encourage biopiracy.²⁴ Nonetheless, it is an arguable point, in that sense according to WIPO, “existing IP laws have been successfully used to protect against some forms of misuse and misappropriation of TK, including through the laws of patents, trademarks, geographical indications, industrial designs, and trade

²² VANDANA SHIVA, *BIOPIRACY: THE PLUNDER OF NATURE AND KNOWLEDGE* 31 (1997).

²³ RURAL ADVANCEMENT FOUNDATION INTERNATIONAL (RAFI), 1996 *BIOPIRACY UPDATE US PATENTS CLAIM EXCLUSIVELY MONOPOLY CONTROL OF FOOD CROP, MEDICINAL PLANTS, SOIL MICROBES AND TRADITIONAL KNOWLEDGE FROM THE SOUTH* (1996), available at <http://www.etcgroup.org/sites/www.etcgroup.org/files/publication/460/01/raficom51biopupdate96.pdf>.

²⁴ See generally Charles R. McManis, *Fitting Traditional Knowledge Protection and Biopiracy Claims into the Existing Intellectual Property and Unfair Competition Framework*, in *INTELLECTUAL PROPERTY AND BIOLOGICAL RESOURCES* 425 (Burton Ong ed., 2004).

secrets.”²⁵ Biopiracy can be cataloged within the tort of misappropriation because it involves an unfair invasion of other’s property that causes a prejudice. Carol McHugh analyzing the Board of Trade v. Dow Jones & Co.²⁶ case makes an interesting point about misappropriation:

In evaluating misappropriation claims, courts generally require the plaintiff to prove both that it has suffered injury in the marketplace and that the defendant, a direct competitor, has been unjustly enriched through the wrongful appropriation. The competitive injury requirement, however, has been relaxed as misappropriation has evolved as part of the common law tort of unfair competition. ... This new test is a departure from traditional misappropriation law, especially in its support for the originators of intellectual property. Traditionally, some courts have defined the concept of competitive injury narrowly, making it very difficult for misappropriation plaintiffs to prevail. The Dow Jones court eliminated competitive injury from its analysis and instead stressed a balancing approach. This approach removed the inflexibility from the Illinois misappropriation doctrine. Rather than treating the type of competition between the parties as determinative, the court focused on the unjust enrichment that would have resulted to the CBT if it were allowed to use the Dow Jones index with impunity. This focus emphasized the broader principle underlying the misappropriation doctrine: that property of commercial value should be protected from another’s unauthorized use for profit. ... The Dow Jones decision correctly recognized that the misappropriation doctrine must be flexible enough to provide courts a panoply of resources

²⁵ WORLD INTELLECTUAL PROPERTY ORGANIZATION, INTELLECTUAL PROPERTY AND TRADITIONAL KNOWLEDGE 17 (2011), http://www.wipo.int/edocs/pubdocs/en/tk/920/wipo_pub_920.pdf.

²⁶ Bd. of Trade of the City of Chicago v. Dow Jones & Co., 108 Ill. App. 3d 681, 439 N.E.2d 526 (1982).

*to facilitate the eradication of enterprise piracy from the marketplace.*²⁷

As a consequence, if we follow this approach, in some cases biopiracy can be considered as a case of misappropriation. First of all, genetic resources and traditional knowledge sometimes are valuable assets within the market. Second, there is an economic detriment that genetic resources owners and traditional knowledge holders suffer because they do not receive a fair compensation for the use of these assets. Third, there is a possibility that genetic resources and traditional knowledge can be appropriated by a third party in a wrongful way, which means without consent and an equitable benefit-sharing (CBD). Then, we can say that biopiracy can be one of misappropriation faces.

Therefore, understanding biopiracy as an unfair appropriation of bio-resources and traditional knowledge, it is without any doubt a practice that should be eliminated. For this reason, it is important to develop a strong legal framework in which the principles of access and benefit-sharing can be applied in an effective way. Only, with a strong, clear and enforceable framework that effectively enforces the CBD we will achieve reasonable protection for bioresources and traditional knowledge.

B. Bioprospecting Approach

Biopiracy sullies the legitimacy of bioprospecting. However, it is important to distinguish when the supposed biopiracy takes place and under which conditions. It is relevant because the circumstances and parameters for the management of biological resources significantly changed after the CBD. For this reason, all the acts that occurred under the old approach, the “common

²⁷ Carol McHugh, *Separating Commercial Parroting from Pirating: Board of Trade v. Dow Jones & Co.*, 33 DEPAUL L. REV. 595, 612 (1984), <http://via.library.depaul.edu/cgi/viewcontent.cgi?article=2248&context=law-review>.

heritage of the mankind,” are difficult to reproach, because they were committed under the rules of that time. To this respect, James S. Miller from the Missouri Botanical Garden stated that “it’s unfair to label the rosy periwinkle discoveries or any other bioprospecting done before the CBD was signed as biopiracy. It was ... just the normal way of doing things. There wasn’t anything malicious or malevolent about it.”²⁸

Furthermore, bioprospecting after the CBD provides an opportunity to strengthen the national economy, to improve the life of the traditional knowledge holders, to contribute with the promotion of science and inventions, and to conserve biodiversity under a sustainability approach. It is true that all these benefits from the CBD sound unreal and difficult to achieve. Enforcing and applying the CBD involves a difficult and complex challenge that requires the cooperation of the international community, the local governments, and the indigenous people.

However, the first step is to eliminate the fear that exists regarding bioprospecting. First, we have to clarify that bioprospecting is not biopiracy. Therefore, the major part of bioprospecting projects have as a main purpose to research and find helpful compounds to be used for the treatment of medical diseases, nutrition, and cosmetology. Thus, the main goal of bioprospecting is to enhance the human wellness and to become a key element of innovation. However, in order to maximize the benefits of bioprospecting, it is important that the contracts governing access to genetic resources and the prior informed consent agreements²⁹ be signed under a fair and reasonable basis. For this rea-

²⁸ See KARASOV, *supra* note 5, at A586.

²⁹ Prior informed consent agreements are those contracts that have to be subscribed by the indigenous communities that are contributing to the research with their traditional knowledge. It is a way to ensure that they receive the equitable remuneration if their knowledge is used to make a final product, or to recognize their participation an collaboration if any right has to be granted.

son, it is important to have a clear and effective regulation and to educate government officers and indigenous people about the issues and legal implications that surround these instruments. In addition, the regulation should not be complex or difficult; they should look for the needs of the stakeholders in order to accurately facilitate access.

Second issue that is relevant to this topic is the fact that bioprospecting does not imply an over-exploitation of nature. On the contrary, bioprospecting involves a good opportunity to obtain resources for the conservation of nature. Bioprospecting does not necessarily require the use of large samples of bioresources because it generally focuses on genetic material (however, it is important not to overexploit the resource). Thus, bioprospectors can use small quantities to do their screening and research. This small use of biological resources does not constitute a threat to the environmental equilibrium. However, if the bioprospecting brings favorable resources, the results can be used for the creation of final products, and the country of origin would receive a fair remuneration that should be used to conserve nature.³⁰

Another fear regarding bioprospecting is the possibility that traditional knowledge may be misappropriated, limited, or threatened. This fear raises the possibility that bioprospectors could obtain intellectual property rights to tradi-

³⁰ See PETER G. PAN, BIOPROSPECTING ISSUES AND POLICY CONSIDERATION 4 (2006), available at <http://lrbhawaii.org/reports/legrpts/lrb/rpts06/biocon.pdf> (“Bioprospecting involves searching for, identifying, and collecting appropriate biospecimens. In addition, bioprospecting uses various cutting-edge technologies to process and develop genetic material from these specimens that exhibit characteristics desirable in a commercial product. It is the genetic material, not the biospecimen itself that is of interest. Generally then, it would be inefficient, irresponsible, and unnecessary for bioprospectors to collect massive volumes of plants or animals for processing. Consequently, it is a misconception that bioprospecting decimates an organism’s population to near extinction and denudes entire rainforests like wholesale strip-mining for gold. Bioprospecting firms or their partners or clients generally need only a few specimens to extract the genetic material they need.”).

ditional knowledge without recognizing the substantial participation of traditional knowledge holders. In addition, in the case that those intellectual property rights were acquired by bioprospectors in the jurisdiction in which traditional knowledge holders live; then, indigenous people would not be able to continue using and applying their own traditional knowledge in their territory. This problem could bring a limitation of traditional knowledge and practices that can undermine indigenous people's culture. Therefore, in order to avoid any possibility of biopiracy, it is fundamental to have a consistent legal framework and legal instruments to secure the rights of indigenous communities. Thus, intellectual property rights can be used as a mechanism of protection of traditional knowledge; however it is important to define the most convenient type to safeguard the interest of indigenous people.³¹

Indigenous people are not opposed to bioprospecting or to the adoption and practice of the principles of access, benefit, and sharing stated in the CBD. However, they have clearly stated that to continue with the application of these principles, it is important that their culture and traditions be respected. Indigenous communities are willing to share their knowledge to contribute to the good of humanity, but they do not want to be abused or exploited. Thus, during the discussion of the CBD, indigenous people manifested their concern and conditions regarding to the objectives of the CBD.

[K]nowledge is not merely a commodity to be traded like any other in the market place. Our knowledge of biodiversity is indivisible from our entities and our laws, institutions, value systems and cosmovisions as Indigenous Peoples. For generations, our peoples have been and continue to be custodians of nature upon which we all depend. We are therefore fully committed to the first two objectives of the Convention, that is, the conservation and sustainable

³¹ *Id.* at 17-21.

use of biodiversity. However, any discussion of the third objective that of access and benefit sharing, must recognize our fundamental rights to control our own knowledge, our right to be free, prior informed consent as peoples, and our collective land and territorial security.³²

Traditional knowledge can be very valuable for bioprospecting, because it can save time and costs, which constitutes an aggregate value for researchers. This fact puts indigenous communities in a good position to negotiate. However, it is important that bioprospectors consider that the terms of negotiation are not limited to the economic issue, because there are social, cultural, and spiritual values that also have to be considered. In addition, it is also important that indigenous communities have a more realistic idea of the percentage and value that traditional knowledge represents. The significant contribution of traditional knowledge, especially in the drug discovery field, is well evidenced.³³

As a consequence, the value of traditional knowledge associated with biological resources is not only a patrimony for indigenous people but also for the entire human race. Therefore, the global community should take the same position regarding biodiversity in the case of traditional knowledge. Thus, it

³² Statement of the International Indigenous Forum on Biodiversity at the Ad Hoc Open-Ended Working Group on Access and Benefit Sharing, CBD, Oct. 22-26, 2001, Bonn, Germany, reprinted in TEBTEBBA Briefing Paper No.8.

³³ See NIRMAL SENGUPTA, ECONOMIC STUDIES OF INDIGENOUS AND TRADITIONAL KNOWLEDGE 213 (2007) (“An evaluation study for the US Congress (1993) concludes that the success by NCI [(National Cancer Institute)] could have been doubled, if had they taken into account the knowledge of medicinal folk to target testable species. Therefore, successful search processes are based on some ground truth of finding a probability of favorable outcome. Otherwise, scientists of Novartis and Merck could not have traveled in the wilderness of the Amazon and Costa Rica forest in search of unique phytochemicals which cannot be imagined to synthesize in the laboratory of combinatorial chemistry. Therefore, one finds enough evidence that the value of benefits of bioprospecting may be quite significant and that local’s information in the search process can significantly enhance the strike rate of a hit.”).

should be considered a common concern of mankind, because it has evolved with biodiversity through the time, space, and change. Consequently, bioprospecting should be used as a practice to enhance the moral, spiritual, and economic value of traditional knowledge in order to constitute an incentive for new generations of indigenous people to continue and maintain their traditions.

IV. Conclusions

In conclusion, bioprospecting is a legitimate practice that should be promoted under fair and reasonable parameters. It is impossible to negate all the benefits that bioprospecting brings to the human race, especially in the food security and human health fields. However, it is important to establish adequate legal mechanisms to allow bioprospecting within a sustainable and fair framework. In addition, it is important to value bioprospecting with regard to both its economic value and its social value. That would encourage a system wherein all the legal instruments created to facilitate the access, benefit, and sharing would not consider bioresources and traditional knowledge through only an economic lens, but as holistic concepts, representing the needs and aspirations of all the parties involved.³⁴

Legal mechanisms should be focused on facilitate access. Therefore, the inclusion of the principles of ABS and prior informed consent are fundamental

³⁴ See PADMASHREE GEHL SAMPATH, REGULATING BIOPROSPECTING: INSTITUTIONS FOR DRUG RESEARCH, ACCESS, AND BENEFIT-SHARING 5 (2005) (“The bioprospecting perspective expresses optimism that through bioprospecting, all three objectives of the CBD –sustainable use, conservation of biological resources, and benefit-sharing- can be met. In this perspective, bioprospecting is seen a venue of revenue generation from potentially valuable traditional knowledge and genetic resources situated in the South. In the presence of well-designed laws and contracts, bioprospecting presents a win-win situation where benefits generated can be used for a range of purposes - improvement to livelihoods of indigenous and local communities, biodiversity conservation programs and biotechnological capacity building.”).

for an adequate protection of TK and genetic resources. However, it is important that the regulation that would be developed to regulate these principles will facilitate access to TK and genetic resources. Extremely complex systems, as the one we have in Ecuador, discourage the development of research and development, fact that only harm the country of origin or TK holders. It is crucial to develop a simplified process for accessing to genetic resources and traditional knowledge, in which the researchers have to deal only with the national authority and not with all the other stakeholders. The national authority should be in charge of the negotiation with the other parties, then bioprospectors do not have to face the difficulties of dealing with institutions or communities that have a different background that can bring obstacles in the negotiation. Training indigenous communities and governmental authorities in issues regarding access to genetic resources and traditional knowledge will facilitate the development of bioprospecting projects or projects that involve the use and application of TK/GR. The training will enhance the negotiation capacity of the different stakeholders as well as it will allow indigenous people to understand the other side of this topic. In addition, the government should work on incentives to motivate bioprospectors to come to Ecuador and develop strategic partnerships with the country. For example, tax exemptions can be a mechanism to attract investors and researchers.

Finally, in order to use bioprospecting as a mechanism to encourage innovation, we need to work beyond the access, benefit and sharing. In this regard, it is necessary that biodiversity and bioprospecting become a strategic resource, not only in the law but also in the practice. In this way political support is crucial, since it will contribute to biodiversity management and to develop strong intellectual property systems to protect the products of innovation. Moreover, biodiversity rich countries should see bioprospecting as the cornerstone for innovation; therefore, they should work in different schemes

and proposals to facilitate access to genetic resources and promote technology transfer. In this regard, it is crucial to develop creative agreements, concepts, educational campaigns to teach the community about the advantages and pros of bioprospecting, and marketing strategies to allow bioprospectors to take knowledge of the country, its resources and the advantages that the country provides. For instance, the ICBG Project is a role model, because it incorporates diverse mechanisms for the protection of traditional knowledge. In this project, prior informed consent was required for access to genetic resources and traditional knowledge. Agreements containing the principles of access and benefit-sharing were also signed by the parties, and existing intellectual property rights as patents were used to protect traditional knowledge and guarantee fair compensation to traditional knowledge holders.³⁵

Furthermore, the construction of strategic alliances between the academia, civil society, indigenous communities and private organizations is important in order to develop true technology incubators. A project conceived for the public interest, but considering the needs, rights and interest of the different stakeholders is the only way to promote development and to build an industry around genetic resources that can benefit the entire society.

³⁵ See Walter H. Lewis & Veena Ramani, *Ethics and Practice in Ethnobiology: Analysis of the International Cooperative Biodiversity Group Project in Peru*, in BIODIVERSITY AND THE LAW 400-10, (Charles McManis ed., 2007).

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