



**The Convention on Biological Diversity, Indigenous Peoples and
Conservation of Biodiversity**

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by

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The Convention on Biological Diversity, Indigenous Peoples and Conservation of Biodiversity

1. INTRODUCTION

The Earth's biodiversity is not equally distributed across the globe. Three quarters of the planet's biological resources are found in developing countries.¹ Moreover, the majority of the world's remaining biodiversity is concentrated in areas inhabited by indigenous and local communities.² These communities hold a wealth of indigenous/traditional³ knowledge over biodiversity that is critical to fields such as pharmaceuticals and biotechnology. This includes knowledge of current, previous and potential use of plants and animals, knowledge about the preparation, processing or storage of species, knowledge of formulations involving more than one ingredient, *et cetera*.⁴ Scientific breakthroughs in areas such as agriculture, pharmacology, biomedicine, and genetic have been linked either directly or indirectly to indigenous/traditional knowledge of biodiversity.⁵ Twenty-five percent of all

prescription drugs, for example, come from rainforest plants, with 75 percent of these having been gathered from information provided by indigenous peoples.⁶ Indigenous knowledge increases the chances of developing at least one marketable pharmaceutical from a thousand plant samples from 22 to 78 percent,⁷ and the efficacy of screening plants for medicinal properties by more than 400 percent.⁸

For historical reasons, this traditional knowledge has been generally regarded by Western intellectual property laws as information in the 'public domain,' that is, freely available for anyone to use.⁹ This has led to the appropriation of several forms of traditional knowledge under intellectual property rights by researchers and commercial enterprises, predominantly from developed countries, without any compensation to the knowledge holders,¹⁰ a phenomenon which has come to be known as 'biopiracy.' Furthermore, it has also contributed to the environmentally-unsustainable exploitation of tropical forests' biodiversity.¹¹ Recent advances in

Traditional Medicine (Toronto: University of Toronto Press, 2006) at 5.

⁶ *Ibid.* at 6.

⁷ Curtis M. Horton, "Protecting Biological Diversity and Cultural Diversity Under Intellectual Property Law" (1995) 10 *Journal of Environmental Law and Litigation* 1 at 5.

⁸ Michael Balick, "Ethnobotany and Identification of Therapeutic Agents from the Rainforests," in P.J. Chadwick and J. Marsh, eds., *Bioactive Compounds from Plants* (New York: John Wiley and Sons, 1990) at 22-39.

⁹ Carlos M. Correa, "Traditional Knowledge and Intellectual Property: Issues and Options Surrounding the Protection of Traditional Knowledge," online:

<<http://www.quno.org/geneva/pdf/economic/Discussion/Traditional-Knowledge-IP-English.pdf>>

¹⁰ *Ibid.*

¹¹ See for example the case of the *Pilocarpus jaborandi* in Brazil.

¹ Chidi Oguamanam, "Local Knowledge as Trapped Knowledge" (2008) 11 *The Journal of World Intellectual Property* 29 at 39.

² Benjamin J. Richardson, "Indigenous Peoples, International Law and Sustainability" (2001) 10 *RECIEL* 1 at 8.

³ Though 'indigenous knowledge' is considered a subset of 'traditional knowledge,' for the purposes of this paper, both terms shall be used interchangeably.

⁴ Tania Bubela et al, "Respecting, Promoting, and Protecting Traditional Knowledge: A Comparative Case Study of Brazil, Kenya, and Northern Canada," online: <http://www.theinnovationpartnership.org/data/ieg/documents/cases/TIP_TK_Case_Study.pdf>

⁵ Chidi Oguamanam, *International Law and Indigenous Knowledge: Intellectual Property, Plant Biodiversity, and*

the fields of agriculture, pharmaceuticals and biotechnology have renewed and significantly increased the interest in plant-based genetic resources originating in the developing world¹² and associated traditional knowledge, giving rise to calls for the legal protection of such knowledge and the sharing of benefits derived from its exploitation. Thus, the pressures over indigenous and local communities are enormous, both from domestic and international perspectives. We are speaking of some of the world's most marginalized groups, from a social, political and economic standpoint – comprising approximately 5 percent of the global population¹³ –, holding over 70 percent¹⁴ of the Earth's biological resources and the priceless knowledge associated with it. It is David against the Goliath.

Global concern over what has been termed a 'global biodiversity crisis' led to the Convention on Biological Diversity (CBD), which opened for signature at the Earth Summit in Rio de Janeiro in 1992. The Convention is an international treaty signed by 192 parties¹⁵ with three main objectives: (i) the conservation and (ii) sustainable use of biodiversity and the (iii) fair and equitable sharing of benefits from utilization of genetic resources. The CBD sets overall goals, policies and general obligations; however, the responsibility for achieving its goals rests largely with the countries themselves. Thus, the treaty

imposes few specific obligations and few well-defined targets, leaving much latitude with regard to how states may achieve its goals.¹⁶ As a result, a number of countries, including Brazil, have enacted national laws establishing access and benefit-sharing (ABS) measures.

Given that the majority of the world's remaining biodiversity is concentrated in areas inhabited by indigenous and local communities,¹⁷ the goal of this paper is to examine the importance of drafting and implementing ABS policies that are sensitive to indigenous values, interests and concerns and that effectively acknowledge and include indigenous groups as important stakeholders. It argues that failure to do so prevents the Convention's goals from being successfully achieved.

2. THE CONVENTION ON BIOLOGICAL DIVERSITY

The 'Earth Summit' was an unprecedented United Nations Conference both in terms of size, as well as, scope of concerns. Held in Rio de Janeiro, Brazil, in 1992, it brought together an impressive number of governments and non-governmental organizations to discuss the principle of sustainable development and to find ways to halt the depletion and degradation of global natural resources and pollution of the planet. By then it had become clear that the extinction rate of species in the rainforests and other major habitats was far greater than it had been prior to the industrial revolution.¹⁸ The current rate is estimated to be as high as ten thousand to

¹² Oguamanam, *supra* note 5 at 4.

¹³ The Office of the United Nations High Commissioner for Human Rights estimates that there are 300 million indigenous people worldwide. See "Indigenous Peoples and the United Nations System: An Overview," online: <<http://www.ohchr.org/Documents/Publications/GuideIPleaflet1en.pdf>>

¹⁴ Oguamanam, *supra* note 1 at 31.

¹⁵ The United States has signed but not ratified the treaty.

¹⁶ Ikechi Mgbeoji, *Global Biopiracy: Patents, Plants, and Indigenous Knowledge* (Vancouver: UBC Press, 2006) at 76.

¹⁷ Richardson, *supra* note 2 at 8.

¹⁸ Oguamanam, *supra* note 5 at 41.

forty thousand species a year, or a hundred species a day and four species an hour.¹⁹ This means that species have been disappearing at *50-100 times the natural rate* and this is predicted to rise dramatically.²⁰ Ikechi Mgbeoji notes that this extraordinary rate of biodiversity loss is a function of a complex web of causes primarily originating from a globalization of the Western concept of development.²¹ It implicates both North and South alike, as both poverty and excessive consumption by affluent populations place damaging stress on the environment. For instance, demand for soya and tapioca in the Netherlands is said to be responsible for the degradation of a tropical area as large as its own territory.²² The Summit marked the opening for signature of the Convention on Biological Diversity, a legally-binding international treaty for the conservation and sustainable use of biodiversity, and the fair and equitable sharing of benefits from utilization of genetic resources. The Convention constitutes an elaborate framework for balancing the objectives of biodiversity conservation in the South with the sharing of benefits arising from the use of the South's biological resources by the North.²³

¹⁹ Paul M. Wood, *Biodiversity and Democracy: Rethinking Society and Nature* (Vancouver: UBC Press, 2000) at ix.

²⁰ Convention on Biological Diversity, "Sustaining Life on Earth," online: <<http://www.cbd.int/convention/guide.shtml?id=changing>>

²¹ Mgbeoji, *supra* note 16 at 65.

²² Vandana Shiva, *Biodiversity Conservation: Social and Ecological Perspectives* (London and Penang, Malaysia: World Rainforest Movement / Zed Books, 1990) at 33-4 (citing a 1988 Study by IUCN).

²³ Kristin Rosendal, "Balancing Access and Benefit Sharing and Legal Protection of Innovations from Bioprospecting: Impacts on Conservation of Biodiversity" (2006) 15 *The Journal of Environment & Development* at 428.

The *net* flow of biological resources has always followed the South-North pattern. Kloppenburg and Kleinman describe the North as a rich but "gene-poor" recipient of the genetic materials from the poor but "gene-rich" countries of the South.²⁴ For instance, three quarters of the world's biological resources are found in the global South.²⁵ Tropical rainforests harbour between *50 and 90 percent* of all species, even though they cover only *7 percent* of the Earth's land surface.²⁶ One square kilometre of Amazon rain forest, for instance, can contain over 75,000 types of trees and 150,000 species of higher plants.²⁷ History provides an abundance of examples of 'exotic' crops, fruits, and spices introduced from Africa, Asia and Central/South America into countries of the North. Of the twenty major food crops, for example, none originated in North America or Australia and only two – rye and oat – originated in the Euro-Siberian area.²⁸ By contrast, the "the world's less developed nations...have contributed the plant genetic material that

²⁴ Chika Onwueke, "Ideology of the Commons and Property Rights: Who Owns Plant Genetic Resources and the Associated Traditional Knowledge?" in P. Phillips and C. Onwueke, eds., *Accessing and Sharing the Benefits of the Genomics Revolution* (Dordrecht: Springer, 2007) at 31 (citing J Kloppenburg and DL Kleinman, "The Plant Germplasm Controversy" (1987) 37 *BioScience* 190).

²⁵ Oguamanam, *supra* note 1.

²⁶ Jeffrey A. McNeely et al., *Conserving the World's Biological Diversity* (Washington, DC: IUCN, 1990) at 22-3.

²⁷ Secretariat of the Convention on Biological Diversity, "Message of the Executive Secretary: Technical Workshop on Protected Areas in the Amazon," online <<http://www.cbd.int/doc/speech/2008/sp-2008-07-14-pa-en.pdf>>

²⁸ Klaus Bosselman, "Plants and Politics: The International Legal Regime Concerning Biotechnology and Biodiversity" (1995) 7 *Colorado Journal of International Environmental Law and Policy* 111 at 116.

has provided the base for fully 95.7 percent of the global food production.”²⁹

Today, though developing nations remain the large providers of genetic resources, benefits resulting from this flow are greatly skewed in favour of developed countries. This is the result of what realists refer to as ‘power politics.’³⁰ Industrialized nations control both the technology, as well as, about 85 percent of the global financial wealth needed for the deployment and consumption of natural resources.³¹ By corollary, the South, which comprises 75 percent of the world’s population, detains only 15 percent of the global financial wealth. In the words of Mostafa Tolba, former executive director of the United Nations Environmental Programme, there was a need to strike “a balance...between the legitimate rights of germ plasm owners and technology owners, recognizing the needs of both.”³² As a result, the CBD was largely formulated as a compromise between access to technology and access to genetic resources.³³

A major contribution of the Convention to the jurisprudence of plant resources conservation was the fact that it put to rest Northern claims that global biodiversity constituted a Common Heritage of Mankind (CHM). The CBD unequivocally reaffirms “that States have sovereign rights over their own biological resources.”³⁴ As per Article 3:

“States have, in accordance with the Charter of the United Nations and the principles of international law, the sovereign right to exploit their own resources pursuant to their own environmental policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction.”

Article 15 (1) further stresses that:

“Recognizing 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.”

The confirmation, under international law, that States have sovereign rights over their biological resources is an important victory for developing nations and, to some extent, indigenous communities.

2.1 *The Bonn Guidelines*

The CBD sets *overall* goals, policies and general obligations, imposing few well-defined targets or specific obligations upon its Parties. Responsibility for achieving the Convention’s goals rests largely with the countries themselves, which have much latitude with respect to which national laws, policies and regulations it establishes in order to achieve the Convention’s objectives.³⁵

It was not until seven years after the CBD had come into effect that the Conference of the Parties established the Ad Hoc Open-ended Working Group on Access and Benefit-Sharing with the mandate to develop guidelines to assist Parties with the implementation of the access and

²⁹ Onwueke, *supra* note 24 at 31.

³⁰ *Realism* is a school of thought of International Relations. See, for example, Hans J. Morgenthau, *Politics Among Nations: The Struggle for Power and Peace*, 5th ed. (New York: Alfred A. Knopf, 1978).

³¹ Jeffrey A. McNeely et al, *supra* note 26 at 47.

³² Rosendal, *supra* note 23 at 432.

³³ *Ibid.* at 433.

³⁴ See the Preamble, Article 3 and Article 15 of the Convention on Biological Diversity.

³⁵ Mgbeoji, *supra* note 16 at 76.

benefit-sharing provisions of the Convention. The result was the 'Bonn Guidelines on Access to Genetic Resources and Fair and Equitable Sharing of Benefits Arising out of Their Utilization,' which were finally adopted in April 2002. The Guidelines are meant to assist Parties, Governments and other stakeholders when establishing legislative, administrative or policy measures in access and benefit-sharing or when negotiating contractual arrangements for access to genetic resources and benefit-sharing.³⁶ It must be stressed that even though the Bonn Guidelines have been adopted by some 180 countries, they are **not** legally-binding.

Only a limited number of nations, mostly from the global South, have moved thus far to implement the Bonn Guidelines at the national level. This is highly significant because it really is at the national levels that: (i) Access and Benefit-Sharing (ABS) policies are designed and implemented; and (ii) meaningful impacts can be made with respect to biodiversity conservation.

2.2 Indigenous People and the Convention on Biological Diversity

The CBD represents the most authoritative international instrument yet that recognizes: (i) the traditional knowledge of indigenous /local communities;³⁷ and (ii) these communities' importance and contribution to biodiversity conservation. The most important provision of the CBD on indigenous knowledge is article 8(j):

³⁶ The Bonn Guidelines, online: <<http://www.cbd.int/abs/bonn.shtml>>

³⁷ Oguamanam, *supra* note 5 at 5.

"Each Contracting Party shall, *as far as possible* and as appropriate:...

(j) *Subject to its national legislation*, respect, preserve and maintain knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles *relevant* for the conservation and sustainable use of biological diversity and *promote* wider application with the *approval and involvement of holders of such knowledge*, innovations and practices and *encourage* the equitable sharing of the benefits arising from the utilization of such knowledge, innovations and practices."³⁸

However, though the CBD is a highly significant international instrument which is cognizant of the importance of traditional knowledge and local/indigenous communities to the preservation of global biodiversity, it does not, as it stands, provide any explicit legal means to recognize, protect and compensate indigenous peoples.³⁹ First, the language of the CBD *encourages rather than obliges* States to protect the rights of Indigenous Peoples and to develop national legislation to respect, preserve and maintain the knowledge, innovations and practices of traditional people.⁴⁰ Words and expressions such as "subject to," "as far as possible," "relevant," "promote," or "encourage" (in italics above) are very lax from a legal perspective. Article 31 of the Bonn Guidelines, for instance, states that:

"Respecting established legal rights of indigenous and local communities associated with the genetic resources

³⁸ Emphasis added.

³⁹ Donna Craig, "Biological Resources, Intellectual Property Rights and International Human Rights: Impacts on Indigenous and Local Communities" in P. Phillips and C. Onwuekwe, eds., *Accessing and Sharing the Benefits of the Genomics Revolution* (Dordrecht: Springer, 2007) at 99.

⁴⁰ *Ibid.* at 103.

being accessed or where traditional knowledge associated with these genetic resources is being accessed, *the prior informed consent of indigenous and local communities and the approval and involvement of the holders of traditional knowledge, innovations and practices **should***⁴¹ be obtained, in accordance with their traditional practices, national access policies and *subject to domestic laws.*⁴²

Second, the CBD imposes few specific obligations and few well-defined targets, leaving states much latitude with respect to how they may achieve the Convention's goals. As the Report of the Fourth Global Biodiversity Forum notes, "the Convention on Biological Diversity is a framework for general principles and obligations. There is little of the detailed structure that is necessary to implement its provisions."⁴³ Thus, though a number of countries, including Brazil, have enacted access and benefit-sharing laws, this process has been very slow and with several bumps on the road. Finally, the Bonn Guidelines, which are intended to 'operationalize' the CBD's provisions, are **not** legally binding upon the 180 countries that have adopted it.

Without strong access and benefit-sharing laws that empower indigenous communities vis-à-vis other policy actors, the Convention's main goals cannot be successfully achieved, as it shall be demonstrated throughout this paper.

3 THE IMPLICATIONS OF BIOPIRACY, BIOPROSPECTING AND IPRS ON INDIGENOUS POPULATIONS AND BIODIVERSITY CONSERVATION

⁴¹ Choice of word: "should" as opposed to "shall"

⁴² Emphasis added.

⁴³ Mgbeoji, *supra* note 16 at 76 (citing the Report of the Fourth Global Biodiversity Forum, 1996, Montreal, Canada (Gland, Swit.: 1996) at 35).

3.1 The Concept of 'Traditional Knowledge'

From the beginning of civilization, communities have generated, refined and passed on their knowledge from generation to generation. This includes knowledge of current and potential use of plants and animal; preparation, processing and storage of species; formulations involving more than one ingredient; planting methods or selection criteria; ecosystem preservation; and biogenetic resources.⁴⁴ This traditional knowledge has played, and continues to play, vital role in the daily lives of countless people, from agricultural practices to traditional medicine. In some developing countries, for example, as much as 80 percent of the population depends on traditional medicine for primary health care.⁴⁵

An important dimension of cultures which have for centuries been subjugated, discriminated and marginalized, indigenous knowledge has often been dismissed as 'backward' by Western science. However, it seems that Western science has begun to recognize the value of traditional knowledge. Scientific breakthroughs in areas such as agriculture, pharmacology, biomedicine, and genetic have been linked either directly or indirectly to indigenous/traditional knowledge of biodiversity.⁴⁶ Twenty-five percent of all prescription drugs, for example, come from rainforest plants, with 75 percent of these having been

⁴⁴ IUCN Inter-Commission Task Force on Indigenous Peoples, *Indigenous Peoples and Sustainability* (Utrecht: International Books, 1997) at 229.

⁴⁵ World Health Organization, "Traditional Medicine," online: <<http://www.who.int/mediacentre/factsheets/fs134/en/>>

⁴⁶ Oguamanam, *supra* note 5 at 5.

gathered from information provided by indigenous peoples.⁴⁷ Moreover, indigenous knowledge has been found to increase the chances of developing at least one marketable pharmaceutical from a thousand plant samples from 22 to 78 percent,⁴⁸ and the efficacy of screening plants for medicinal properties by more than 400 percent.⁴⁹ For example, 74 percent of the pharmacologically active trees reported by an indigenous group correlated with laboratory tests, compared with only 8 percent of random samplings by 'formal' scientists.⁵⁰

Virtually "all the major pharmaceutical firms are already at work screening the genetic resources found in Brazil, Costa Rica, China, Micronesia and other biologically diverse countries."⁵¹ A study conducted by researchers from Newcastle University and presented on November 24th, 2009 at a conference in India found that Brazilian mint tea – the *traditional* way of administering the medicine – was *as effective* at relieving pain as synthetic aspirin-style drug called 'Indomethacin'.⁵² Traditional healers in Brazil have long used the herb to treat a range of health problems including headaches, stomach pain, fever and flu.⁵³ In the words of study leader Graciela Rocha, "[w]hat we have done is to take a plant that is widely *used to safely treat pain* and *scientifically proven* that it works *as well as* some synthetic

drugs. Now the next step is to find out how and why the plant works."⁵⁴

Traditional knowledge has been generally regarded by Western intellectual property laws as information in the 'public domain,' that is, freely available for anyone to use.⁵⁵ In 1994, the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) established global minimum standards for intellectual property. The negotiation, implementation and substantive content of TRIPS was largely influenced by the United States, Europe and Japan, and commercial interests in these countries played a critical role in the shaping of its provisions.⁵⁶ As a result, despite coercing developing countries and, by implication, indigenous and local communities to commit to minimum universal standards of intellectual property protection, TRIPS did not accommodate local knowledge.⁵⁷

3.2 The Implications of Biopiracy on Indigenous Peoples

The erroneous idea that traditional knowledge is information in the public domain, combined with lack of legal protection, has led to the appropriation of several forms of traditional knowledge under intellectual property rights by researchers and commercial enterprises, predominantly from developed countries, without any compensation to the knowledge holders or their prior informed consent. This phenomenon has come to be known as 'biopiracy.'

⁴⁷ *Ibid.* at 6.

⁴⁸ Curtis M. Horton, *supra* note 7 at 5.

⁴⁹ Balick, *supra* note 8.

⁵⁰ Curtis M. Horton, *supra* note 7 at 5.

⁵¹ Walter V. Reid et al., *Biodiversity Prospecting: Using Genetic Resources for Sustainable Development* (Washington, DC: WRI, 1993).

⁵² MedicineNet, "Brazilian Mint Tea Naturally Good for Pain Relief," online: <<http://www.medicinenet.com/script/main/art.asp?articlekey=108059>>

⁵³ *Ibid.*

⁵⁴ *Ibid.* (Emphasis added).

⁵⁵ Carlos M. Correa, *supra* note 9 at 3.

⁵⁶ Olufunmilayo B. Arewa, "TRIPS and Traditional Knowledge: Local Communities, Local Knowledge and Global Intellectual Property Frameworks," (2006) 10 *Marquette Intellectual Property Law Review* at 166.

⁵⁷ Oguamanam, *supra* note 1 at 32.

Biopiracy is unfair and has several repercussions upon indigenous peoples. First, it appropriates the knowledge of traditional groups without their consent and generates monetary benefits which are not shared with them. According to Kate and Laird (2000), it takes on average 15 years to bring a new drug to market.⁵⁸ The 'discovery phase' of the 'pharmaceutical research and development' process takes on average 5 years and requires the screening of 5,000 to 10,000 compounds.⁵⁹ Estimates of the cost of developing new medicine range between US\$500 million to US\$ 600 million and about 37 percent of R&D budgets in the United States are allocated to discovery-related research.⁶⁰ Thus, if traditional knowledge increases screening efficacy and the chances of developing at least one marketable pharmaceutical, then this knowledge is generating pecuniary benefits in three different ways by: (i) reducing the amount of time it takes to discover/screen new biological compounds and consequently develop new medicines; (ii) reducing costs; and (iii) generating sales revenue (i.e. discovery of this specific drug would have been likely improbable without the traditional knowledge). The first two factors combined yield larger profits and return on investment than in the improbable case of the exact same drug being developed without the aid of traditional knowledge. Second, financial compensation for the use of traditional knowledge through the 'fair and equitable sharing of benefits' can contribute to ameliorating the living conditions of indigenous and local communities, the majority of which are

extremely poor. Third, community control over access to traditional knowledge and resources is seen as a basic right, and is supported by a number of international agreements and conventions including the Convention on Biological Diversity, Agenda 21 and UN Declaration on the Rights of Indigenous Peoples. For instance, the principle of 'Prior Informed Consent' (PIC) is recognized by Article 15 of the Convention, which states that: "Access to genetic resources shall be subject to prior informed consent of the Contracting Party providing such resources, unless otherwise determined by that Party." Lastly, the promotion of access to genetic resources and proposals to patent genes could eventually deny Indigenous people the biological resources they have managed for thousands of years.⁶¹

3.3 Bioprospecting, IPRs and their Impact on Biodiversity Conservation

Central to the protection of biodiversity are the notions that indiscriminate screening (bioprospecting) and harvesting of plant materials for production of pharmaceuticals, and intellectual property rights (IPRs) may contribute to the loss of biodiversity. First, the screening process used to evaluate the commercial utility of plants takes a huge toll on plant species and the ecosystem as a whole, and can sometimes lead to the extinction of rare plants.⁶² As mentioned above, the discovery phase of the pharmaceutical

⁵⁸ Kerry ten Kate and Sarah A. Laird, *The Commercial Use of Biodiversity: Access to Genetic Resources and Benefit-Sharing* (London: Earthscan Publications Ltd, 2000) at 47.

⁵⁹ *Ibid.*

⁶⁰ *Ibid.*

⁶¹ Craig, *supra* note 39 at 102.

⁶² Mgbeoji, *supra* note 16 at 72 (citing Edgar Asebey and Jill Kempenaar, "Biodiversity Prospecting: Fulfilling the Mandate of the Biodiversity Convention" (1995) 28 *Vanderbilt Journal of Transnational Law* 703).

research and development process requires the screening of 5,000 to 10,000 compounds.⁶³ In addition, the actual production of pharmaceuticals can also lead to the near- or complete extinction of species. A few examples illustrate this point. Indiscriminate exploitation of the Brazilian *Pilocarpus jaborandi* by the German pharmaceutical company Merck in the 1980s led the plant to the verge of extinction. Identified by Western researchers through *Guarani* indigenous knowledge, the *jaborandi* is used in the production of one of the most important ophthalmologic treatment drugs.⁶⁴ In another case, compounds derived from the Rosy Periwinkle and used for the treatment of childhood leukemia led to the complete depletion of the plant in Madagascar - fifteen tons of Rosy Periwinkle leaves yield a meagre one ounce of an alkoid named 'vincristine'.⁶⁵ Finally, the production of one kilogram of taxol, an anti-cancer drug, requires 20,000 pounds of bark, or 2,500 to 4,000 Pacific Yew trees.⁶⁶ Second, a report from the CBD Secretariat indicates that IPRs may act as perverse incentives that encourage the development of commercially viable varieties (i.e. monoculture of proprietary crop varieties) at the expense of plant genetic diversity.⁶⁷ IPRs are sometimes cited as a reason for the erosion of thousands of traditional crop varieties and their replacement by a much smaller "elite" of varieties. For instance, at the

same time that the strength of IPR over plant varieties increased, vast numbers of traditional crop varieties disappeared.⁶⁸

4 INDIGENOUS PEOPLES AND THE FAIR AND EQUITABLE SHARING OF BENEFITS

As previously stated, one of the main objectives of the CBD is the 'fair and equitable sharing of benefits from utilization of genetic resources.' (Article 1) However, none of these terms are defined, being thus left open for interpretation. This leads to an important question: "how will 'fairness' and 'equity' be determined?" The underlying essence behind the Convention's third goal is the concept of 'justice,' which has been debated at least since the time of the great Greek philosophers.⁶⁹ If we visualise an old scale, like the one famously depicted in Lady Justice's hand, we know that the only way it will balance is if both sides carry equal weight. Similarly, the intuitive insight is that 'fairness' and 'equity' cannot be achieved if one side carries greater weight than the other. The reality, however, is that in the real world, power politics tilts the scale. Nonetheless, this visual image serves to illustrate the point that we cannot arrive at an outcome that is remotely fair and equitable if parties can be imposed upon.

Thus, with respect to the fair and equitable sharing of benefits arising from the utilization of genetic resources and associated traditional knowledge, it should be intuitive that indigenous peoples must be recognized as important stakeholders beyond rhetoric, and have a say as to what they think is fair and equitable, rather than having definitions imposed upon. It must

⁶³ Kate and Laird, *supra* note 58.

⁶⁴ Tania Bubela et al., *supra* note 4 at 18.

⁶⁵ Erin Newman, "Earth's Vanishing Medicine Cabinet: Rain Forest Destruction and Its Impact on the Pharmaceutical Industry" (1994) 20 American Journal of Law and Medicine at 482.

⁶⁶ Holly Doremus, "Patching the Ark: Improving Legal Protection of Biological Diversity" (1991) 18 Ecology Law Quarterly at 266.

⁶⁷ UNEP/CBD/COP/3/22, online: <http://www.iisd.ca/biodiv/cop3/3_22_vfinal.htm>

⁶⁸ *Ibid.*

⁶⁹ See for example Plato's *Republic*.

be recognized that there is a clash of core cultural differences and that what one group views as appropriate does not necessarily mean that the other agrees.

5 DAVID AND THE GOLIATH: THE NEED TO EMPOWER INDIGENOUS COMMUNITIES

It is estimated that there are between 300 and 370 million indigenous people worldwide, constituting approximately 5 percent of the world's population.⁷⁰ They are amongst the most marginalized groups in the world, suffering higher rates of poverty, landlessness and internal displacement than other members of society, as well as, lower levels of literacy and less access to health services.⁷¹ Indigenous groups make up about one third of the world's 900 million extremely poor people,⁷² meaning that the majority leave on less than \$1.25 a day.⁷³ In Guatemala, for example, where indigenous peoples constitute more than half of the country's population, 86.6 percent of them are poor.⁷⁴

Traditional indigenous territories encompass up to 22 percent of the world's land surface and coincide with areas that hold about 80 percent of the planet's biodiversity.⁷⁵ Biological

resources are crucial to the pharmaceutical, agricultural, and biotechnology industries, to name a few, and economic interests linked to these industries are soaring. The estimated value of products derived from genetic resources worldwide in 2002 was between \$500 and \$800 billion.⁷⁶ Ernst & Young estimates global biotechnology industry revenues for publicly-held companies for 2008 at \$89.7 billion, a 12 percent increase from previous year.⁷⁷ At the same time, the demand for natural/organic ingredients has significantly increased in the past decade or so. It is estimated that world market for herbal medicines will exceed \$26 billion by 2011.⁷⁸

The implications of this picture are enormous. On one side, we have a very small and marginalized percentage of the global population holding the majority of the Earth's biological resources and the priceless knowledge associated with it. On the other, powerful national and international players with very different political and economic interests. Without strong access and benefit-sharing laws that empower indigenous communities vis-à-vis national and international players, CBD's main goals cannot be successfully achieved. The following case helps illustrate this point. Prior to the Convention, Brazil had no national legislation aimed at the regulation of bioprospecting and access to traditional

⁷⁰ International Fund for Agricultural Development (IFAD), "Statistics and Key Facts about Indigenous Peoples," online: <<http://www.ruralpovertyportal.org/web/guest/topic/statistics/tags/indigenous%20peoples>>

⁷¹ *Ibid.*

⁷² In 2005, the World Bank changed the international poverty line from \$1.00 to \$1.25 a day in 2005 prices. Anyone living below this poverty line is considered to be "extremely poor."

⁷³ International Fund for Agricultural Development (IFAD), *supra* note 70.

⁷⁴ *Ibid.*

⁷⁵ *Ibid.*

⁷⁶ Kate and Laird, *supra* note 58 at 45.

⁷⁷ Plunkett Research Ltd, "The State of the Biotechnology Industry Today," online: <<http://plunkettresearch.com/Industries/BiotechnologyDrugsGenetics/BiotechnologyDrugsGeneticsTrends/tabid/299/Default.aspx>>

⁷⁸ RNCOS Industry Research, "Herbal Medicines' Value Set to Cross US\$26 billion Mark by 2011," online: <[http://www.rncos.com/Blog/2007/05/Herbal-Medicines-Value-Set-to-Cross-US\\$26-Billion-Mark-By-2011.html](http://www.rncos.com/Blog/2007/05/Herbal-Medicines-Value-Set-to-Cross-US$26-Billion-Mark-By-2011.html)>

knowledge.⁷⁹ It was only after the *Bioamazônia-Novartis* scandal that the federal government finally moved to establish a legal framework. *Bioamazônia* was created on August 4th, 1998 as a not-for-profit organization modeled after Costa Rica's *National Institute of Biodiversity (INBio)*, with the purpose of supporting the development of biotechnology in the Amazon region. On May 29th, 2000, *Bioamazônia* and the Swiss pharmaceutical company *Novartis Pharma AG (Novartis)* signed a contract⁸⁰ which included **exclusive** access to micro-organisms in the Amazon region without the knowledge or participation of the Ministry of the Environment. When the terms of the contract became public, there was general outburst. The scientific community was the first to protest against the contract, and was soon joined by the NGOs and indigenous peoples. Generally speaking, these parties based their complaints on the *lack of involvement in the negotiations* and regarded the contract as *non-equitable*.⁸¹ They also claimed that the contract constituted biofraud and opened the doors for *biopiracy*.⁸² According to legal scholars, the contract: (i) violated Brazil's sovereignty rights (Article 225 of the Brazilian Constitution and Article 15 of the CBD); (ii) was unfair as a result of the disparities in rights, obligations and benefits; (iii) constituted unlawful use of traditional knowledge (Article 231 of the Brazilian Constitution and Article 15 of the CBD); (iv) *détournement de pouvoir* (abuse of power); (v) violated property rights (Article 5, para. 0, subpara. XXII of the Brazilian Constitution and Article 1228 of

the Brazilian Civil Code); and (vi) violated intellectual property rights. For the scope of this paper and illustration, we shall briefly discuss only the aspects pertaining to the indigenous population.⁸³ First, according to the contract, one of *Bioamazônia* duties was to contact local indigenous communities with the purpose of identifying plants with pharmacologic potential. The principle of 'Prior Informed Consent' is protected under both the CBD (Article 15) and the Brazilian Constitution (Article 231 in relation to Article 15 of the CBD). However, the *Bioamazônia-Novartis* agreement hardly contained any provisions for the protection of traditional knowledge.⁸⁴ Second, the contract also violated the property rights of owners of the land where the resources were found, as they were not parties to the agreement. These include not only the State, but also indigenous peoples and other individuals.

6 THE BRAZILIAN AMAZON

This paper has explained the importance of drafting and implementing ABS policies that are sensitive to indigenous values, interests and concerns and that effectively acknowledge and include indigenous groups as important stakeholders. Let us now turn to the Brazilian Amazon to illustrate these points.

6.1 Overview

The Amazon is the world's largest rainforest with unparalleled biodiversity. Though the forest covers only 3.5 percent of the Earth's surface, it houses

⁷⁹ Tania Bubela et al., *supra* note 4.

⁸⁰ See Table 2.

⁸¹ Peña-Neira et al., "Equitably Sharing Benefits from the Utilization of Natural Genetic Resources: The Brazilian Interpretation of the Convention on Biological Diversity" (2002) 6 Electronic Journal of Comparative Law at 5.

⁸² *Ibid.*

⁸³ For a deeper analysis of the *Bioamazônia-Novartis* agreement, see Peña-Neira et al.

⁸⁴ Tania Bubela et al., *supra* note 4 at 8.

approximately 50 percent of the world's living species⁸⁵ and is home to one in ten known species on Earth.⁸⁶ The forest is home to between 150,000 to 200,000⁸⁷ indigenous inhabitants, who reside in some 400 legally recognized indigenous lands.⁸⁸ Indigenous territories comprise more than 1 million squared kilometers, or approximately 21 percent of the Brazilian Amazon.⁸⁹

Recent efforts to map centers of biodiversity in the Brazilian Amazon reveal a high degree of overlap between indigenous territories and areas of exceptionally high biodiversity.⁹⁰

Researchers from the Brazilian Institute for the Environment and Renewable Natural Resources and the World Wildlife Fund overlaid indigenous territories onto a map showing forest cover, and the result revealed a strong correlation between indigenous presence and the protection of natural ecosystems.⁹¹ The territories of indigenous groups who have been given

the rights to their land have been better conserved than the adjacent lands.⁹²

Scientific research has, in the last decades, established a clear link between the health of the Amazon and the integrity of the global environment.⁹³ The main threat to tropical biodiversity is the high rates of deforestation and forest degradation in the region.⁹⁴ In Brazil, development of the Amazon has destroyed 12 percent⁹⁵ of the original forest cover. The rate of deforestation largely increased and accelerated during the military regime (1964-1985), which aggressively sought to colonize and develop the Amazon region. Today, the main causes of deforestation in the region are: Agribusiness, slash-and-burn agriculture, (illegal) logging, cattle ranching, and mining.

6.2 Indigenous Land Rights in the Brazilian Constitution of 1988

Article 26 of the 2007 United Nations Declaration on the Rights of Indigenous Peoples states that:

- “1. Indigenous peoples have the right to the lands, territories and resources which they have traditionally owned, occupied or otherwise used or acquired
2. Indigenous peoples have the right to own, use, develop and control the lands, territories and resources that they possess by reason of traditional ownership or other traditional occupation or use, as well as those which they have otherwise acquired.”

⁸⁵ Anne Marie Todd, “Environmental Sovereignty Discourse of the Brazilian Amazon: National Politics and the Globalization of Indigenous Resistance” (2003) 27 *Journal of Communication Inquiry* at 356.

⁸⁶ World Wild Life, online: <<http://www.worldwildlife.org/what/wherewework/amazon/index.html>>

⁸⁷ Estimates vary depending on the source (Brazilian or international). National sources looked at include: IBGE (Instituto Brasileiro de Geografia e Estatística), FUNAI (Fundação Nacional do Índio), and ISA (Instituto SocioAmbiental).

⁸⁸ Stephan Schwartzman and Barbara Zimmerman, “Conservation Alliance with Indigenous Peoples of the Amazon” (2005) 19 *Conservation Biology* at 722

⁸⁹ *Ibid.*

⁹⁰ World Bank, “The Role of Indigenous Peoples in Biodiversity Conservation,” online: <<http://siteresources.worldbank.org/INTBIODIVERSITY/Resources/RoleofIndigenousPeoplesinBiodiversityConserva>

⁹¹ *Ibid.*

⁹² *Ibid.*

⁹³ World Wild Life, *supra* note 86.

⁹⁴ Convention on Biological Diversity, “Technical Series No. 3: Assessment, Conservation and Sustainable Use of Forest Biodiversity,” online: <<https://www.cbd.int/doc/publications/cbd-ts-03.pdf>>

⁹⁵ Anne Marie Todd, *supra* note 85 at 356.

These same principles are echoed in the Brazilian Constitution, though it predates the UN Declaration. Article 231 of the Brazilian Magna Carta assures indigenous peoples' rights to their social organization, customs, languages, beliefs, and traditions and *to the lands they have traditionally occupied*. Paragraph 1 defines lands 'traditionally occupied' by indigenous peoples as those "permanently inhabited by them, those used for their productive activities, those

indispensable to the environmental resources necessary for their well-being, and those necessary to their physical and cultural reproduction, according to their uses, customs and traditions."

Though they do not have ownership rights over these lands – which are property of the federal government (Art. 20) –, indigenous peoples are accorded

Table 1: Rights and duties of Bioamazônia and Novartis

<p>Duties of Bioamazônia:</p> <ul style="list-style-type: none"> (i) Collect 30,000 micro organisms; (ii) Screening of these micro organisms; (iii) Contact local indigenous communities, with the purpose of identifying plants with pharmacologic potential; (iv) Send information of the samples examined and on traditional knowledge to Novartis; (v) Send 10,000 samples with pharmacological potential to Novartis laboratories, Basel. 	<p>Duties of Novartis:</p> <ul style="list-style-type: none"> (i) Pay 2 million Swiss francs as a donation; (ii) Train Brazilian researchers in bioprospecting on 30,000 micro organisms; (iii) Pay 250 Swiss francs for each sample shipped to Swiss laboratories (total 2,5 million Swiss francs); (iv) In the case of development of inventions with commercial potential based on samples shipped, pay to Bioamazônia a fixed sum of 4,1 million Swiss francs; (v) Pay Bioamazônia, in the case of effectively commercialised inventions, the sum of 5,2 million Swiss francs, plus 0,5% as royalties, which will be calculated on the net annual sales of the invention.
<p>Rights of Bioamazônia:</p> <ul style="list-style-type: none"> (i) Possibility of establishing research capacities; (ii) Right to receive up to 2.5 million Swiss francs for the shipment of 10,000 samples of micro organisms investigated by Bioamazônia. 	<p>Rights of Novartis:</p> <ul style="list-style-type: none"> (i) Select 10,000 micro organisms from the set of 30,000 bio-prospected and studied by Bioamazônia; (ii) Exclusive right to research the samples mentioned in item (i) supra; (iii) Unilaterally alter the goal of the contract on micro organisms for biological resources; (iv) Unilaterally extend the duration of the contract; (v) Decide the date when to pay Bioamazônia at the end of the year (This means that Novartis could choose the moment when currency exchange was low); (vi) Exclusive Intellectual Property Rights over any of the features identified on any of the 10.000 samples submitted by Bioamazônia; (vii) Exclusive rights to licence to third parties the patents obtained over the microorganisms submitted.

Source: Peña-Neira, Dieperink and Addink (2002)

permanent occupation, as well as, *exclusive usufruct rights* over the riches associated with the soil, rivers and lakes within indigenous lands (Art. 20, para. 2). Excluded are subsoil, mineral and

water rights, which remain under government control. Therefore, biodiversity of indigenous lands cannot be accessed and/or exploited without prior consent of the indigenous populations.

6.3 Biodiversity Conservation and Indigenous Lands

The role that indigenous peoples play – or can play – in the conservation of biodiversity seems to generate great debate amongst scholars. Schwartzman, Moreira and Nepstad (2000) have argued against people-free wildlands as the best servants of biodiversity conservation in tropical forests such as the Amazon.⁹⁶ According to them, a narrow emphasis on old-fashioned parks will be self-defeating in the long run. Others such as Terborgh (2000), and Redford and Sanderson (2000) argue that it would be short-sighted to trust the future of biodiversity to the hands of indigenous groups whose extractive lifestyles may be rapidly changing.⁹⁷ Another group of scholars recognizes the contribution of indigenous groups to biodiversity conservation but warns against generalizations. Richardson (2001), for example, cautions that “it is important to recognize that not all indigenous lifestyles may necessarily be compatible with environmental

⁹⁶ Stephan Schwartzman et al., “Rethinking Tropical Forest Conservation: Perils in Parks” (2000) 14 *Conservation Biology* at 1351.

⁹⁷ Carlos A. Peres and Barbara Zimmerman, “Perils in Parks or Parks in Peril? Reconciling Conservation in Amazonina Reserves with and without Use” (2001) 15 *Conservation Biology* at 793.

conservation” and that “we must eschew romantic generalizations of indigenous peoples that overlook areas of ambivalence.”⁹⁸ Fearnside (2003) takes the same view that “indigenous peoples are not inherently conservationist... [and] can be expected to respond to the same economic stimuli that induce other actors to destroy and degrade forests.”⁹⁹ He adds, however, that “so far, indigenous peoples have had a much better record of maintaining the natural ecosystems around them than have other populations in Amazonia.”¹⁰⁰

However, irrespective of the side one might take with respect to this debate, it is important to recognize the key role of indigenous territories – given their size and protected status – in the ultimate fate of Amazonian ecosystems. As Peres and Zimmerman note, indigenous lands are “enormously valuable for biodiversity conservation because they retain a considerable fraction of the Amazonian biota that may otherwise remain unprotected, or serve as buffer zones for adjacent protected areas.”¹⁰¹

There are 370 sectors of officially-recognized indigenous land in the Brazilian Amazon, encompassing 102.3 million hectares or 20.43 percent of the forest.¹⁰² In addition, 19.97 percent of the Legal Amazon¹⁰³ is protected under

⁹⁸ Richardson, *supra* note 2 at 3-4.

⁹⁹ Philip M. Fearnside, “Conservation Policy in Brazilian Amazon: Understanding the Dilemmas” (2003) 31 *World Development* at 774.

¹⁰⁰ *Ibid.*

¹⁰¹ Peres and Zimmerman, *supra* note 97 at 793.

¹⁰² João Paulo Capobianco et al., “Indian Lands as a Key Element in the Biodiversity Conservation of the Brazilian Amazon” CBD Technical Series No. 3 at 25, online: <<https://www.cbd.int/doc/publications/cbd-ts-03.pdf>>

¹⁰³ The Legal Amazon is the region defined by law No. 5.173/66. It encompasses the states of Acre, Amazonas, Roraima, Rondônia, Pará, Amapá,

federal and state ‘Conservation Units’¹⁰⁴ (CUs).¹⁰⁵ There are two types of CUs: (i) *UCs de Proteção Integral*, where the objective is the preservation of biodiversity and only the indirect use of natural resources is allowed; and (ii) *UCs de Uso Sustentável*, which aims at balancing the conservation of biodiversity with the sustainable use of a portion of its natural resources.

In 1999, six non-governmental organizations, co-ordinated by the *Instituto SocioAmbiental*, promoted the “Seminar on Evaluation and Identification of Priority Activities for Conservation, Sustainable Use and Benefit Sharing of the Brazilian Amazon Biodiversity,” which gathered the greatest amount of data on the Brazilian Amazon to date. This included: (i) maps of cattle distribution, main crop cultures, mining, population, land use pressure, deforestation & deforestation pattern, fire risk & fires which had occurred in August 1999, hydro balance, eco-regions, phytophysionomies, protected areas, indigenous lands, land reform settlement, roads, centres of wood exploitation, hydrography and traditional knowledge; (ii) assessment of biological groups (e.g. plants, mammals, fishes and birds); and (iii) socio-economic analysis.¹⁰⁶

The 226 participants pointed out 379 priority areas divided into 4 categories: (i) extremely high priority; (ii) very high priority; (iii) high priority; and (iv) unknown areas with strong probability of biological relevance.¹⁰⁷ The results, presented on the table below, showed that

Mato Grosso and Tocantins in their totality, and part of the state of Maranhão.

¹⁰⁴ In Portuguese: *Unidades de Conservação (UCs)*.

¹⁰⁵ Instituto SocioAmbiental (ISA), “Caracterização Socioambiental das Unidades de Conservação na Amazônia Brasileira,” online: < <http://www.socioambiental.org/uc/> >

¹⁰⁶ Capobianco et al., *supra* note 102.

¹⁰⁷ *Ibid.*

40.1% of the *extremely high* priority areas and 36.4% of the *very high* priority areas are located **within indigenous lands**. These numbers are considerably higher than the percentage of relevant area for biodiversity conservation located **within protected areas**: only 34% of *extremely high* priority areas, and 29.9% of *very high* areas. Thus, the data highlights the importance of indigenous lands to the conservation of Amazonian biodiversity and the need to ensure their protection.

Table 2: Percentage of Priority Areas Included in Protected Areas and Indigenous Lands

Level of Priority	Protected Areas (%)	Indigenous Lands (%) ¹⁰⁸
Extremely High	34.0	40.1
Very High	29.9	36.4
High	0	25.0

Source: CBD Technical Series No. 3

The *Xingu* National Park in the state of Mato Grosso is often cited as one of the greatest examples of biodiversity conservation in indigenous lands. This pristine patch of land in a section of the Amazon where deforestation has left behind a quilt pattern is not only the result of *Xingu* tribes’ cultural values with respect to the environment, but also of their constant and courageous struggle to protect their lands from outsiders. Created in 1961, the Park encompasses about 2.6 million of hectares – an area almost the size of Belgium – and is home to some 3,700 indigenous people of 16 distinct ethnicities.¹⁰⁹ The area was originally selected by the ‘white people,’ and the indigenous groups were flown in from various parts of the Amazon in

¹⁰⁸ These numbers add up to 101.50%; however, they are here transcribed as originally published.

¹⁰⁹ Schwartzman and Zimmerman, *supra* note 88 at 725.

military planes. The *Xingu* brought together, in the same territory, tribes that were once enemies. However, this rather risky venture has had a happy ending, where the different ethnicities have united with the common goal of preserving their land.¹¹⁰

The *Xingu* tribes have, throughout the 1980s and 1990s, repeatedly turned back illegal loggers, seized equipment and expelled intruders hunting and fishing in the park, and defended their land from surrounding ranchers, despite expansion of the agricultural frontier around the park.¹¹¹ In 1990, an alliance between the *Xingu* Land Indigenous Association (ATIX) and the *Instituto SocioAmbiental (ISA)*, Brazil's main nongovernmental organization for indigenous rights and environmental preservation, was undertaken to control and monitor the land, build and man control posts, patrol the park's borders and maintain the demarcation of its boundaries. This partnership has developed into an important mechanism for frontier governance. In 2004, for example, ISA and ATIX organized a series of meetings with local landowners, businesses, ranchers' unions, and state and federal producer organizations to address environmental degradation of the *Xingu's* upper headwaters. Participants reached an unprecedented agreement in favour of restoring and protecting the forest.

On the other hand, the case of the *Kayapós* illustrates the complexity of the issues affecting indigenous lands. At about 6,300,¹¹² the *Kayapós* officially have the

permanent usufruct of some 11 million hectares of continuous forest in the states of Pará and Mato Grosso. For more than 20 years, they have almost single-handedly protected their territories from invasion. In the 1980s, the colonization frontier reached *Kayapó* lands and the government became unable to enforce the laws to protect them. Ranchers, colonists, loggers, gold miners and illegal land speculators supported by road constructions began to invade the indigenous lands. In response, the *Kayapós* reinvaded ranches, took hostages, seized river crossings and expelled thousands of gold miners from their territory. They were largely able to protect their lands from outsiders. At the same time, *Kayapó* chiefs began to selectively allow mahogany and gold-mining concessions in exchange for cash. Uncontrolled logging led to the scarcity of mahogany and international pressures led to government intervention 2002. Since then, the *Kayapós* have begun organizing associations to address community needs and partnerships with FUNAI and NGOs such as 'Conservation International do Brasil' have led to the implementation of territorial surveillance and conservation and development projects.

This section illustrates the importance of indigenous lands to the conservation of the Amazon. It demonstrates the role indigenous peoples can play in conserving the Amazon's biodiversity (the *Xingu* National Park), as well as, the need to work at the local level to address indigenous concerns and necessities (the *Kayapós*).

¹¹⁰ Silvio Ferraz, "Os Guardiães do Verde" in Revista Veja 30 June 1999.

¹¹¹ Schwartzman and Zimmerman, *supra* note 88 at 725.

¹¹² O Estado de São Paulo Newspaper, "Kayapós," online: <

<http://www.estadao.com.br/villasboas/kayapo.htm>

6.4 Indigenous Peoples and the Loss of Biodiversity

Indigenous communities are largely, if not exclusively, dependent upon biodiversity for their livelihoods. This includes, for example, wood for timber or fuel, fibre for clothing, and wild plants and animals for food. For the majority, subsistence agriculture, as well as, hunting and gathering remain the core of household economy. In addition, they also rely on biodiversity for medicinal purposes. In the words of a Native American scholar, “the food upon which indigenous peoples around the world depended for life was also their medicine...many foods were components of medical systems based on natural properties of plants and animals.”¹¹³ In some developing countries, for example, 80 percent of the population depends on traditional medicine for primary health care.¹¹⁴ The World Resources Institute estimates that “Indians dwelling in the Amazon Basin make use of some 1,300 medicinal plants, including antibiotics, narcotics, abortifacients, contraceptives, anti-diarrhoeal agents, fungicides, anaesthetics, muscle relaxants, and many others.”¹¹⁵

Unchecked economic interests can have dire consequences on biodiversity. Excessive exploitation of biological resources can lead to the near, if not

complete, extinction of species.¹¹⁶ It can also contribute to the loss of biodiversity by incentivizing monoculture. As indigenous peoples’ lives depend primarily upon nature, loss of biodiversity or changes to ecosystems pose heavy, direct, and immediate threats to their communities. In the state of Mato Grosso do Sul, Brazil, for example, 80 indigenous children perished from malnutrition between 2003 and 2005.¹¹⁷

Because indigenous peoples are highly vulnerable to biodiversity loss, they are also amongst the most susceptible to the effects of climate change. Tropical forest ecosystems, in particular, are amongst the most vulnerable to climate change variability and long-term changes in temperature and rain fall.¹¹⁸ In many cases, climate change may result in longer dry seasons, and evidence of this can already be seen in the Southern part of the Amazon basin in recent years.¹¹⁹ In 2005, for example, the region was struck by a severe drought.¹²⁰ Crop failures, poor water quality, and forest fires, to name a few, will disproportionately affect indigenous populations. In addition, climate change also critically changes the relevance of traditional knowledge of indigenous groups; natural signals that

¹¹³ Gregory Cajete, *Native Science: Natural Law of Independence* (Santa Fe, NM: Clear Light Publishers, 1999) at 115.

¹¹⁴ World Health Organization, “Traditional Medicine,” online: <<http://www.who.int/mediacentre/factsheets/fs134/en/>>

¹¹⁵ Kenton Miller et al., “Deforestation and Species Loss: Responding to the Crisis” in J.T. Matthews, ed., *Preserving the Global Environment: The Challenge of Shared Leadership* (New York: W.W. Norton, 1991) at 97.

¹¹⁶ See for example the case of the *Pilocarpus jaborandi* in Brazil.

¹¹⁷ Campo Grande News, “Criança Indígena Morre de Desnutrição em Amambai” 17 December 2008, online: <<http://www.campogrande.news.com.br/canais/view/?canal=8&id=242815>>

¹¹⁸ IUCN, “Indigenous and Traditional Peoples and Climate Change,” online: <http://cmsdata.iucn.org/downloads/indigenous_peoples_climate_change.pdf>

¹¹⁹ *Ibid.* at 38.

¹²⁰ Survival International, “The Most Inconvenient Truth of All: Climate Change and Indigenous People,” online: <<http://www.survivalinternational.org/news/5273>>

were used to trigger activities in the past are now less reliable.¹²¹ In the words of the Brazilian *Yanomami* leader and shaman, Davi Kopenawa, “[t]he rains come late. The sun behaves in a strange way. The world is ill. The lungs of the sky are polluted. We know it is happening.”¹²²

Thus, since indigenous peoples are amongst the most affected by the loss of biodiversity and subsequent effects of climate change, and the Convention seeks to “address all threats to biodiversity and ecosystem services, including threats from climate change,”¹²³ indigenous groups are crucial stakeholders and must be included in the formulation of any ABS policy. Governments must come to the realization that the displacement of this already impoverished group will have grave social and environmental consequences. Firstly, because they will add to the millions of indigents who live on roadsides or became newcomers to shantytowns – the infamous *favelas* in the case of Brazil –; and secondly, because as the previous section demonstrates, indigenous peoples can play a significant role in the conservation of biodiversity and their lands serve as buffer zones that slow down degradation.

7 CONCLUSION

Though constituting a very small and marginalized percentage of the global population, indigenous peoples hold the majority of the Earth’s biological resources and the priceless knowledge associated with it. Traditional indigenous

territories encompass up to 22 percent of the world’s land surface and coincide with areas that hold almost 80 percent of the planet’s biodiversity.¹²⁴

Indigenous groups have played an important role in the conservation of the Brazilian Amazon’s biodiversity, though there are certainly exceptions. Recent efforts to map centers of biodiversity in the Brazilian-portion of the rainforest reveal a high degree of overlap between indigenous territories and areas of exceptionally high biodiversity. Researchers from the Brazilian Institute for the Environment and Renewable Natural Resources and the World Wildlife Fund overlaid indigenous territories onto a map showing forest cover, and the result revealed a strong correlation between indigenous presence and the protection of natural ecosystems. The territories of indigenous groups who have been given the rights to their land have been better conserved than the adjacent lands. Nevertheless, the pressures over indigenous communities are enormous and include: poverty, biopiracy, biodiversity loss, climate change, agribusiness, illegal logging, land speculation, national and international business interests, lack of proper law enforcement, discrimination from the rest of the population, disputes with federal governments, *et cetera*.

The Convention on Biological Diversity is the most authoritative international instrument that recognizes the importance of indigenous communities and their traditional knowledge to the conservation of biodiversity. However, it does not provide any explicit legal means to recognize, protect and compensate indigenous peoples. First, the language of the CBD *encourages rather than obliges* States

¹²¹ IUCN, *supra* note 118 at 41.

¹²² Survival International, *supra* note 120 at 3.

¹²³ Convention on Biological Diversity, “Press Release: Forest Biodiversity provides an ‘Insurance Policy’ against Climate Change,” online: <<http://www.cbd.int/doc/press/2009/pr-2009-10-26-ts43-en.pdf>>

¹²⁴ World Bank, *supra* note 90.

to protect the rights of Indigenous Peoples and to develop national legislation to respect, preserve and maintain the knowledge, innovations and practices of traditional people.¹²⁵ Second, the Convention imposes few specific obligations and few well-defined targets, leaving states much latitude with respect to how they may achieve the Convention's goals. Finally, the Bonn Guidelines, which are intended to 'operationalize' the CBD's provisions, are **not** legally binding upon the 180 countries that have adopted it. Therefore, it is ultimately at the domestic level that normative shifts at the international level need to be worked out.¹²⁶

This paper has examined the importance of drafting and implementing ABS policies that are sensitive to indigenous values, interests and concerns and that effectively acknowledge and include indigenous groups as important stakeholders. It has argued that failure to do so prevents the Convention's goals from being successfully achieved. However, it is important to recognize that domestic politics, capabilities and priorities significantly affect how the CBD's guidelines and goals are implemented at the national level. Now the hope is that an International ABS regime, which is currently being negotiated, will help improve the situation.

¹²⁵ *Ibid.* at 103.

¹²⁶ Ikechi Mgbeoji, "Lost in Translation" in P. Phillips and C. Onwuekwe, eds., *Accessing and Sharing the Benefits of the Genomics Revolution* (Dordrecht: Springer, 2007) at 135.

REFERENCES

Books

- Kate, Kerry ten and Sarah A. Laird. *The Commercial Use of Biodiversity: Access to Genetic Resources and Benefit-Sharing* (London: Earthscan Publications Ltd, 2000).
- Matthews, J.T. *Preserving the Global Environment: The Challenge of Shared Leadership* (New York: W.W. Norton, 1991).
- McNeely, Jeffrey A. et al. *Conserving the World's Biological Diversity* (Washington, DC: IUCN, 1990).
- Mgbeoji, Ikechi. *Global Biopiracy: Patents, Plants, and Indigenous Knowledge*. (Vancouver: UBC Press, 2006).
- Oguamanam, Chidi. *International Law and Indigenous Knowledge: Intellectual Property, Plant Biodiversity, and Traditional Medicine*. (Toronto: University of Toronto Press, 2006).
- Phillips, Peter W.B. and Chika B. Onwuekwe. *Assessing and Sharing the Benefits of the Genomics Revolution*. (Dordrecht: Springer, 2007).
- Reid, Walter V. et al. *Biodiversity Prospecting: Using Genetic Resources for Sustainable Development* (Washington, DC: WRI, 1993).
- Shiva, Vandana. *Biodiversity Conservation: Social and Ecological Perspectives* (London and Penang, Malaysia: World Rainforest Movement / Zed Books, 1990)
- Wood, Paul M. *Biodiversity and Democracy: Rethinking Society and Nature* (Vancouver: UBC Press, 2000)

Articles from Journals

- Arewa, Olufunmilayo B. "TRIPS and Traditional Knowledge: Local Communities, Local Knowledge and Global Intellectual Property Frameworks" (2006) 10 Marquette Intellectual Property Law Review 156.
- Balick, Michael. "Ethnobotany and Identification of Therapeutic Agents from the Rainforests," in P.J. Chadwick and J. Marsh, eds., *Bioactive Compounds from Plants* (New York: John Wiley and Sons, 1990).
- Boisvert, Valérie and Frank-Dominique Vivien. "The Convention on Biological Diversity: A Conventionalist Approach" (2005) 53 Ecological Economics 461.

- Bosselman, Klaus. "Plants and Politics: The International Legal Regime Concerning Biotechnology and Biodiversity" (1995) 7 *Colorado Journal of International Environmental Law and Policy* 111.
- Cunha, Manuela Carneiro da, and Mauro W. B. de Almeida. "Indigenous People, Traditional People, and Conservation in the Amazon" (2000) 129 *Daedalus* 315.
- Dávalos, Liliana M, et al. "Regulating Access to Genetic Resources under the Convention on Biological Diversity: an Analysis of Selected Case Studies" (2003) 12 *Biodiversity and Conservation* 1511.
- Dore, Mohammed D. I. Dore and Jorge M. Nogueira. "The Amazon Rain Forest, Sustainable Development and the Biological Convention: A Political Economy Perspective" (1994) 23 *Ambio* 491.
- Doremus, Holly. "Patching the Ark: Improving Legal Protection of Biological Diversity" (1991) 18 *Ecology Law Quarterly* at 266.
- Fearnside, Philipe M. "The Conservation Policy in Brazilian Amazonia: Understanding the Dilemmas" (2003) 31 *World Development* 757.
- French, Duncan A. "Managing Global Change for Sustainable Development: Technology, Community and Multilateral Environmental Agreements" (2007) 7 *International Environmental Agreements* 209.
- Gadgil, Madhav. "Indigenous Knowledge for Biodiversity Conservation" (1993) 22 *Ambio* 151.
- Hahn, Anja von. "Implementing and Further Development of the Biodiversity Convention: Access to Genetic Resources, Benefit Sharing and Traditional Knowledge of Indigenous and Local Communities" (2003) 63 *ZaöRV* 295.
- Horton, Curtis M. "Protecting Biological Diversity and Cultural Diversity Under Intellectual Property Law," (1995) 10 *Journal of Environmental Law and Litigation* 1.
- Jenks, Daniel T. "The Convention on Biological Diversity - An Efficient Framework for the Preservation of Life on Earth?" (1995) 15 *Northwestern University Law Review* 636.
- Lawson, Charles. "The Role of Patents in Biodiversity Conservation" (2009) 27 *Nature Biotechnology* 994.
- Mgbeoji, Ikechi. "Beyond Rhetoric: State Sovereignty, Common Concern, and the Inapplicability of the Common Heritage Concept to Plant Genetic Resources." (2003) 16 *Leiden Journal of International Law* 821.
- Mulligan, Shane P. "For Whose Benefit? Limits to Sharing in the Bioprospecting 'Regime'" (1999) 8:4 *Environmental Politics* 35.

- Newman, Erin. "Earth's Vanishing Medicine Cabinet: Rain Forest Destruction and Its Impact on the Pharmaceutical Industry" (1994) 20 *American Journal of Law and Medicine* 479.
- Ni, Kuei-Jung. "Legal Aspects of Prior Informed Consent on Access to Genetic Resources: An Analysis of Global Lawmaking and Local Implementation Toward an Optimal Normative Construction" (2009) 42:1 *Vanderbilt Journal of Transnational Law* 227.
- Oguamanam, Chidi. "Local Knowledge as Trapped Knowledge: Intellectual Property, Culture, Power and Politics." (2008) 11 *The Journal of World Intellectual Property* 29.
- Overwalle, Geertrui Van. "Protecting and Sharing Biodiversity and Traditional Knowledge: Holder and User Tools" (2005) 53 *Ecological Economics* 585.
- Peña-Neira, S., C. Dieperink and H. Addink. "Equitably Sharing Benefits from the Utilization of Natural Genetic Resources: The Brazilian Interpretation of the Convention on Biological Diversity." (2002) 6 *Electronic Journal of Comparative Law*.
- Peres, Carlos A. and Barbara Zimmerman. "Perils in Parks in Peril? Reconciling Conservation in Amazonian Reserves with and without Use" (2001) 15 *Conservation Biology* 793.
- Polski, Margaret. "The Institutional Economics of Biodiversity, Biological Materials, and Bioprospecting" (2005) 53 *Ecological Economics* 543.
- Richardson, Benjamin. "Indigenous Peoples, International Law and Sustainability." (2001) 10 *Review of European Community and International Environmental Law* 1.
- Richerzhagen, Carmen and Karin Holm-Mueller. "The Effectiveness of Access and Benefits Sharing in Costa Rica: Implications for National and International Regimes" (2005) 53 *Ecological Economics* 445.
- Rosendal, Kristin G. "Balancing Access and Benefit Sharing and Legal Protection of Innovations from Bioprospecting" (2006) 15 *The Journal of Environment & Development* 428.
- Schwartzman, Stephan and Barbara Zimmerman. "The Conservation Alliances with Indigenous Peoples of the Amazon" (2005) 19 *Conservation Biology* 721.
- Schwartzman, Stephan et al., "Rethinking Tropical Forest Conservation: Perils in Parks" (2000) 14 *Conservation Biology* 1351.
- Todd, Anne Marie. "Environmental Sovereignty Discourse of the Brazilian Amazon: National Politics and the Globalization of Indigenous Resistance" (2003) 27 *Journal of Communication Inquiry* 354.
- Trommetter, Michael. "Biodiversity and International Stakes: A Question of Access" (2005) 53 *Ecological Economics* 573.

Articles from Magazines

Ferraz, Silvio. "Os Guardiães do Verde: As tribos do Xingu em paz, mas alertas para a Guerra contra os destruidores da natureza" in Revista Veja, Issue No. 1 604 on 30 June 1999.

Convention on Biological Diversity Documents

"Access and Benefit-Sharing in Practice: Trends in Partnerships Across Sectors." CBD Technical Series No. 38. < <http://www.cbd.int/doc/publications/cbd-ts-38-en.pdf>>

"Bonn Guidelines on Access to Genetic Resources and Fair and Equitable Sharing of the Benefits Arising Out of their Utilization."
<<http://www.google.ca/search?hl=en&source=hp&q=bonn+guidelines+on+access+to+genetic+resources&meta=&aq=0&oq=bonn+guidelines>>

"Message of the Executive Secretary: Sustaining Life on Earth."
<<http://www.cbd.int/convention/guide.shtml?id=action>>

"Press Release: Forest Biodiversity provides an 'Insurance Policy' against Climate Change."
<http://www.cbd.int/doc/press/2009/pr-2009-10-26-ts43-en.pdf>

"Press Release: The Role of Indigenous and Local Communities in Protecting Life on Earth," online: <<http://www.cbd.int/doc/press/2009/pr-2009-10-30-wg8j-en.pdf>>

"Sustaining Life on Earth: National Call."
<<http://www.cbd.int/convention/guide.shtml?id=nataction>>

"Technical Series No. 3: Assessment, Conservation and Sustainable Use of Forest Biodiversity," online: <<https://www.cbd.int/doc/publications/cbd-ts-03.pdf>>

"The Impact of Intellectual Property Rights Systems on the Conservation and Sustainable Use of Biological Diversity and on the Equitable Sharing of Benefits from its Use"
< http://www.iisd.ca/biodiv/cop3/3_22_vfinal.htm>

Electronic Sources

Arcanjo, Francisco Eugenio Machado. "Intellectual Property Rights and Biodiversity in Brazil: Conservation, Sustainable Use and Protection of the Indigenous Rights," online: <<http://www.gwu.edu/~ibi/minerva/Fall2000/Eugenio.Arcanjo.pdf>>

Bubela, Tania et al. "Respecting, Promoting, and Protecting Traditional Knowledge: A Comparative Case Study of Brazil, Kenya, and Northern Canada." The Innovation Partnership.

<http://www.theinnovationpartnership.org/data/ieg/documents/cases/TIP_TK_Case_Study.pdf>

Correa, Carlos M. "Traditional Knowledge and Intellectual Property: Issues and Options Surrounding the Protection of Traditional Knowledge."

<<http://www.quuno.org/geneva/pdf/economic/Discussion/Traditional-Knowledge-IP-English.pdf>>

Instituto Socioambiental (ISA). "Terra Indígena Raposa Serra do Sol," online:

<<http://www.socioambiental.org/inst/esp/raposa/>>

International Fund for Agricultural Development (IFAD), "Statistics and Key Facts about Indigenous Peoples," online:

<<http://www.ruralpovertyportal.org/web/guest/topic/statistics/tags/indigenous%20peoples>>

IUCN, "Indigenous and Traditional Peoples and Climate Change," online:

<http://cmsdata.iucn.org/downloads/indigenous_peoples_climate_change.pdf>

MedicineNet, "Brazilian Mint Tea Naturally Good for Pain Relief," online:

<<http://www.medicinenet.com/script/main/art.asp?articlekey=108059>>

Plunkett Research Ltd, "The State of the Biotechnology Industry Today," online:

<<http://plunkettresearch.com/Industries/BiotechnologyDrugsGenetics/BiotechnologyDrugsGeneticsTrends/tabid/299/Default.aspx>>

RNCOS Industry Research, "Herbal Medicines' Value Set to Cross US\$26 billion Mark by 2011," online:

<[http://www.rncos.com/Blog/2007/05/Herbal-Medicines-Value-Set-to-Cross-US\\$26-Billion-Mark-By-2011.html](http://www.rncos.com/Blog/2007/05/Herbal-Medicines-Value-Set-to-Cross-US$26-Billion-Mark-By-2011.html)>

Survival International Report. "The Most Inconvenient Truth of All: Climate Change and Indigenous Peoples," online <<http://www.survivalinternational.org/news/5273>>

The International Bank for Reconstruction and Development; The World Bank. "The Role of Indigenous Peoples in Biodiversity Conservation: The Natural but Forgotten Partners," online

<<http://www.google.ca/search?hl=en&source=hp&q=the+role+of+indigenous+peoples+in+biodiversity+conservation&meta=&aq=f&oq=>>>

World Bank, "The Role of Indigenous Peoples in Biodiversity Conservation," online:

<<http://siteresources.worldbank.org/INTBIODIVERSITY/Resources/RoleofIndigenousPeoplesinBiodiversityConserva>>

World Wild Life, online:

<<http://www.worldwildlife.org/what/wherewework/amazon/index.html>>