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From the Amazon to the Alps: A Comparison of the Pharmaceutical Biodiversity Legal Protection in Brazil and Switzerland

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COMMENT

FROM THE AMAZON TO THE ALPS: A COMPARISON OF THE PHARMACEUTICAL BIODIVERSITY LEGAL PROTECTION IN BRAZIL AND SWITZERLAND

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I. INTRODUCTION

In the aftermath of the 2002 Johannesburg World Summit on Sustainable Development,[1] countries around the world struggle to harmonize their national legislation[2] with Agenda

[1] *See* World Summit on Sustainable Development, *at* http://www.johannesburgsummit.org/html/basic_info?basicinfo.html (last visited Aug. 10, 2002) (reporting that the Johannesburg Summit took place from August 26 to September 4, 2002, and focused on conservation of natural resources). *See also* Paula Stober, *Summit Holds Hope for Saving the Planet*, NEWS & RECORD, Aug. 6, 2002, at A10 (mentioning that the 2002 World Summit evaluated developments since the 1992 Rio Earth Summit), LEXIS, News Group File; Michael Hanlon, *Commentary*, DAILY MAIL, Aug. 7, 2002 (suggesting that the 1992 Earth Summit only resulted in political debates and that biodiversity today is decreasing at a faster rate than ten years ago), LEXIS, News Group File; James Lamont & John Mason, *A Long Way to Go for a Little Success*, FIN. TIMES (LONDON), Sept. 4, 2002 (noting that the summit only achieved a limited success in the area of biodiversity protection), LEXIS, News Group File. *See generally* Barry James, *Summit Aims, Again, for a Better World; Lofty Goals, Sorry Record*, INT'L HERALD TRIB., Aug. 8, 2002, at 1 (expressing an opinion that the results since the 1992 Earth Summit are disappointing and that environmental degradation nowadays is much worse than ten years ago), LEXIS, News Group File.

[2] *See* Mario Osava, *Environment-Brazil: From Pariah to World Conservation Leader*, INTER PRESS SERVICE, June 6, 2002 (explaining that Brazil seeks to reinforce its leadership in the area of biodiversity and to stay behind the commitments it made ten years ago in Rio de Janeiro), LEXIS, News Group File. *See also* S. K. Verma, *Biodiversity and Intellectual Property Rights*, CASRIP NEWSLETTER (Uni-

21 ("the Agenda"),[3] the Convention on Biological Diversity ("CBD"),[4] and the Agreement on Trade-Related Aspects of Intellectual Property Rights ("TRIPS").[5] Brazil is one such example where 20,000 medicinal plant samples disappear from the Brazilian rainforest every year due to the absence of permanent national legislation regulating access to medicinal herbs.[6] Bioprospecting[7] flourishes and professional scientists prefer not to conduct trials in Brazil, which delays the development of new drugs of global significance.[8] Thus, it is not a surprise that while Brazil owns about half of the world medicinal plant re-

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versity of Washington School of Law/CASRIP, Seattle, WA), Spring 2000, at 1-2 (declaring that all members of the CBD and TRIPS face the problem of compliance), *at* http://www.law.washington.edu/casrip/newsletter/newsv7i2Verma.pdf (last visited Aug. 7, 2002).

[3] *See U.N. Conference on Environment and Development*, Agenda 21, U.N. Doc. A/Conf.151/26/Rev.1 (1992) (noting the importance of environmental conservation and the role of indigenous people for sustainable development), at http://www.un.org/ esa/sustdev/agenda21.htm (last visited Aug. 7, 2002).

[4] *See* U.N. Convention on Biological Diversity, June 5, 1992, U.N. Doc. DPI/1307 (1992) [hereinafter CBD] (emphasizing the ownership of every country over its own natural resources and the importance of intellectual property law to preserve natural resources), *at* http://www.biodiv.org/convention/articles.asp (last visited Aug. 6, 2002). *See generally* Carrie Smith, *Patenting Life: The Potential and the Pitfalls of Using the WTO to Globalize Intellectual Property Rights*, 26 N.C.J. INT'L L. & COM. REG. 143, 152 (2000) (providing an analytical overview of the CBD such as seen by developed and developing countries).

[5] *See* Agreement on Trade-Related Aspects of Intellectual Property Rights, Apr. 15, 1994, Marrakesh Agreement Establishing the World Trade Organization, Annex 1C, 33 I.L.M. 1197 (1994) [hereinafter TRIPS] (defining the minimal standards of intellectual property protection).

[6] *See* EMBASSY OF BRAZIL, SUSTAINABLE AMAZON, Summer 2000 (assessing that every year 20,000 extracts leave Brazil), *at* http://www.brasilemb.org/environ_sustainable_ amazon.shtml (last visited Aug. 7, 2002).

[7] *See* Valentina Tejera, *Tripping Over Property Rights: Is it Possible to Reconcile the Convention on Biological Diversity with Article 27 of the TRIPS Agreement*, 33 NEW ENG. L. REV. 967, 971 (1999) (defining biodiversity as a search by professional botanists and shamans for biological resources for pharmaceutical use, or a "gene hunting," that results in treatments for diseases such as cancer).

[8] *See* MINISTRY OF THE ENVIRONMENT, FIRST NATIONAL REPORT FOR THE CONVENTION ON BIOLOGICAL DIVERSITY-BRAZIL 159 (1999) [hereinafter FIRST NATIONAL REPORT OF BRAZIL] (revealing that the main reason for biopiracy in Brazil is the lack of permanent law on access to genetic resources and benefit-sharing), *available at* www.biodiv.org/doc/world/br/br-nr-01-p9-en.pdf (last visited Aug. 9, 2002). *See also* Estela Viana, *Brazil's Biodiversity Attracts More Interest*, GAZETA MERCANTIL, June 1, 2001 (explaining that the fauna and flora in Brazil may be worth $4 trillion), LEXIS, Major World Newspapers.

sources, the country benefits the least from the commercial transformation of plants into pharmaceuticals.[9]

At the same time, Switzerland has twenty times fewer medicinal plants than Brazil, but benefits the most out of any country from the commercialization of plants.[10] Switzerland implemented guidelines for access to medicinal plant resources,[11] ecotourism,[12] and regulation of its endangered flora.[13] Switzerland also adopted the "Swiss claim"[14] in its pat-

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[9] *See* Ana Paula Corazza, *Bio Plunderers*, BRAZIL, Mar. 2001, (specifying that of the 240,000 species of plants with flowers in the world, 150,000 are in the tropics, and of these, 55,000 are on the territory of Brazil), *at* http://www.brazzil.com/p24mar01.htm (last visited Aug. 10, 2002). *See also* Larry Rohter, *Brazil's Tribes Seek Jungle-Plant Profits*, PITTSBURGH POST-GAZETTE, Dec. 31, 2001 (stating that many of those plants grow only in Brazil and indigenous people have used them to treat various diseases), 2001 WL 28685712; FIRST NATIONAL REPORT OF BRAZIL, *supra* note 8, at 12 (declaring that Brazil is the richest megadiversity country and has about twenty-two percent of the world's plants). *See generally* EMBASSY OF BRAZIL, KEY FACTS 1 (providing statistics about Brazil's investment in scientific research and development), *at* www.brasilemb.org/tech2.shtml (last visited Aug. 6, 2002).

[10] *See* A. Cunningham, *Ethics, Biodiversity, and New Natural Products Development*, PEOPLE AND PLANTS ONLINE (Apr. 1993) (comparing biodiverse countries with countries that benefit the most from the commercialization of their natural resources), *available at* http://www.rbgkew.org.uk/peopleplants/dp/dp2 (last visited Aug. 7, 2002).

[11] *See* Draft Guidelines of Switzerland on Access and Benefit Sharing Regarding the Utilization of Genetic Resources, Oct. 30 - Nov. 1, 2000 [hereinafter Swiss Guidelines] (outlining important measures to ensure the proper preservation and access to natural resources), *at* http://www.unctad.org/trade_env/ docs/swiss.pdf (last visited Aug. 7, 2002).

[12] *See* D. J. De Villier, *Beyond Attractive Destinations*, WORLD SURFACE.COM (July 30, 2001) (defining ecotourism as a type of tourism where tourists visit places and pay special attention to the preservation of the environment, and stating that it is a powerful source for creating more jobs, combating poverty, and protecting the natural and cultural environment), *at* http://www.worldsurface.com/browse/static.asp?staticpageid=1084 (last visited Aug. 10, 2002).

[13] *See* Swiss Agency for the Environment, Forests and Landscape, *Swiss Clearing-House Mechanism Biodiversity: Switzerland at a Glance/ Red Lists/ Introduction* (1998) (describing the purpose and impact of the red lists of endangered plant species), *available at* http://www.buwal.ch/nachh/chm/e/ch/problems/redintro.htm (last visited Aug. 10, 2002).

[14] *See* Loi fédérale du 25 juin 1954 sur les brevets d'invention, Legge federale del 25 giugno 1954 sui brevetti d'invenzione, Bundesgesetz vom 25. Juni 1954 über die erfindungspatente [Switzerland Federal Law on Patents for Inventions], RO 1955 893, RU 1955 899, AS 1955 871, art. 7(c) (1954) (amended 1995) (defining "Swiss type" claims as compounds subject of a prior right, which do not meet these conditions with respect to their use for the implementation of a method of therapeutic treatment or diagnosis constitute new substances to the extent that they are intended solely for such use, and such patent is known as a "Swiss claim" or

ent law, which is a claim for new therapeutic uses of known molecules, and continues to rely on ethnobiological knowledge.[15]

This comment compares the existing national laws for medicinal plant protection in Brazil and Switzerland. It recommends that Brazil adopt the "Swiss claim" model for patent protection and make provisionary laws on access to genetic resources less stringent.[16] This comment further recommends that Brazil incorporate sustainable ecotourism guidelines into its draft law on access to genetic resources and introduce the red and blue book listing of endangered herbs.[17]

Part I presents the international legal framework for the protection of biodiversity and enforcement of intellectual property rights.[18] Part I also discusses the implementation of the relevant international treaties in Brazil and Switzerland.[19] Part II analyzes, first, why Brazil has much to learn from Switzerland and, second, what the basis for comparison is between the two countries.[20] Then, Part III recommends that Brazil adopt the type of intellectual property and environmental legal

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"Swiss type" claim), *available at* http://clea.wipo.int/clea/lpext. dll?f=templates& fn=main-hit-h.htm&2.0 (last visited Aug. 10, 2002).

[15] *See* Gelvina Stevenson, *Trade Secrets: The Secret to Protecting Indigenous Ethnobiological (Medicinal) Knowledge*, 32 N.Y.U. J. INT'L & POL. 1119, 1132 (2000) (defining ethnobiological knowledge as knowledge belonging to indigenous people, where indigenous people can draw attention to a specific plant, describe the specific part of the plant that contains the medical substance, identify the time of the year when the substance is present, explain the physiological effects of that plant, describe the method of preparing the substance, and thus provide valuable clues to the identity of active molecules and expedite their isolation in the laboratory).

[16] *See infra* notes 173-84, 194-200 and accompanying text (recommending that Brazil make its medicinal plants more accessible to scientists and adopt the "Swiss claim" approach).

[17] *See infra* notes 184-93, 201-11 and accompanying text (discussing that Brazil should incorporate ecotourism guidelines into its draft law and that red-listing should be a good approach).

[18] *See infra* notes 23-32, 60-73 and accompanying text (outlining the international laws for the protection of biodiversity and intellectual property).

[19] *See infra* notes 33-59, 74-91 and accompanying text (describing how Brazil and Switzerland implemented the international laws on biodiversity and intellectual property protection into their national legislation).

[20] *See infra* notes 101-37 and accompanying text (comparing the constitutional and ethnobiological traditions in Brazil and Switzerland).

protection already in place in Switzerland.[21] Finally, the comment concludes in favor of the Swiss model for the protection of medicinal plant resources in Brazil.[22]

II. BACKGROUND

This background section outlines the international framework for environmental protection of pharmaceutical biodiversity and its implementation in Brazil and Switzerland respectively. The section also describes TRIPS and its national implementation in each of the two countries.

A. *Environmental Protection of Pharmaceutical Biodiversity*

1. *International Framework: Agenda 21 and CBD*

Agenda 21 and the CBD contain provisions to assist countries in the implementation of national legislation against biopiracy.[23] The Agenda encourages commercial use of natural resources and the protection of ethnobiological traditional knowledge[24] through intellectual property.[25] It propagates a conservation of biological diversity and a sustainable use of biological resources.[26] The Agenda views biological resources as

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[21] *See infra* notes 173-211 and accompanying text (suggesting that Brazil make its biodiversity legislation less stringent, adopt the "Swiss claim" patents and implement the red listing system).

[22] *See infra* notes 212-18 and accompanying text (concluding favorably on the implementation of the Swiss model in Brazil).

[23] *See* Graham Dutfield, *Developing and Implementing Systems for Protecting Traditional Knowledge: A Review of Experiences in Selected Developing Countries*, at 8 (defining biopiracy as an unauthorized extraction of biological resources or associated biological knowledge from developing countries), *available at* http://www.unctad.org/trade_env/tk.htm (last visited Aug. 10, 2002). *See also* Michael Gollin & Sarah Laird, *Global Policies, Local Actions: The Role of National Legislation in Sustainable Biodiversity Prospecting*, 2 B.U. J. SCI. & TECH. L. 16, para. 15 (1996) (highlighting that the best and only possible way to deal with global problems is through adequate laws and regulations).

[24] *See* CBD, *supra* note 4 (defining traditional knowledge as "knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles" in article 8(j)). *Id.*

[25] *See* David R. Downes, *How Intellectual Property Could be a Tool to Protect Traditional Knowledge*, 25 COLUM. J. ENVTL. L. 253, 281 (2000) (concluding that intellectual property use in accordance to the development needs of developing countries could protect their biological knowledge).

[26] *See* Agenda 21, *supra* note 3, ch. 15 (stating that the natural ecosystems contain most of Earth's biodiversity and that biological resources provide medicines, and that the current decline in biodiversity is a serious threat to human

an important asset to yield sustainable benefits and emphasizes states' sovereign rights over their own natural resources.[27] Moreover, the Agenda recognizes that cooperation between scientists and industries could result in a transfer of technology to improve human health.[28]

The CBD calls for conservation and sustainable development of biodiversity, fair benefit-sharing, and absolute control of developing countries over their natural resources.[29] The

development). *See also id.* ch. 2 (noting that environment and trade policies should be mutually supportive and that governments should meet those objectives through multilateral forums).

[27] *See id.* ch. 15 (highlighting that developing countries have control over their biological resources and must benefit from the biotechnological development and commercial utilization of the products derived from their national resources, and that those goals could be achieved through a broader regional and international cooperation). *See also id.* ch. 26 (clarifying that governments around the world should incorporate the rights and responsibilities of indigenous people in their national legislation); Tanja Sturm, *Government Launches Bid to Discover New Herbal Medicine*, WORLD MARKETS RESEARCH CENTRE, Feb. 26, 2002 (observing that the World Health Organization states there are 250,000 species of medicinal plants in the developing world and that those plants' extracts are the source of "more than eighty-five percent of the medicines used by eighty percent of the population in the developing world"), LEXIS, Major World Newspapers.

[28] *See* Agenda 21, *supra* note 3, ch. 16 (stating the necessity for training and technology transfer in the developing world).

[29] *See* Press Release, U. N. Convention on Biological Diversity, *International Day for Biological Diversity Dedicated to Forest Biodiversity* (May 22, 2002) (declaring that forests are vital for human health and other economic benefits), *at* www.biodiv.org/ doc/press/pr-2002-05-02-ibd-en.pdf (last visited Aug. 5, 2002). *See also* U.N. Conference for Trade and Development, *The Biotrade Initiative* (highlighting that the world production of natural ingredients for cosmetics has been estimated at $1 billion, out of which fifty-five percent is derived from developing countries, and that ecotourism is becoming important within the tourism industry generating more than $260 billion per year), *at* http://www.biotrade.org/QuickPlace/biotrade/ Main.nsf/h_B4BD9585D70EA32CC1256C0000352A94/5d978e894aaaa092c1256c0000352aba/!OpenDocument (last visited Aug. 10, 2002); CBD, *supra* note 4, art. 1 (establishing that the objectives of the CBD are 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); *Id.* art. 15 (declaring the importance of sharing the benefits from the commercial utilization of genetic resources); Vandana Date, *Global "Development" and the Environmental Ramifications- The Interlinking of Ecologically Sustainable Development and Intellectual Property Rights*, 27 GOLDEN GATE U.L. REV. 631, 631 (1997) (describing the link between biodiversity and intellectual property rights in the CBD). *See generally* Amy Guerin Thompson, *An Untapped Resource in Addressing Emerging Infectious Diseases: Traditional Healers*, 6 IND. J. GLOBAL LEG. STUD. 257, 272 (1998) (noting that traditional medicine is vital to fight the spread of infectious diseases).

CBD also recognizes the interest of developing countries in protecting their natural resources, the preservation of indigenous cultures,[30] and the transfer of technology.[31] The CBD addresses the importance of intellectual property rights to protect biodiversity in that proper intellectual property protection facilitates the transfer of technology and sharing of ethnobiological traditions.[32] In sum, the Agenda and CBD propagate access to genetic material against fair compensation and respect for ethnobiological knowledge.

2. *National Implementation in Brazil*

Although Brazil was the first country in the world to sign the CBD,[33] it has failed to update its law regulating access to biological diversity in compliance with the CBD and the Agenda.[34] The country has adopted various decrees, but lacks a permanent law regulating access to pharmaceutical biodiversity. In 1969, Brazil adopted a temporary decree that addressed access to biodiversity.[35] It established the Science Council, which is responsible for authorizing and supervising foreign scientific expeditions to explore the Amazon.[36] The Ministry of Science and Technology inspects and retains all materials collected by foreigners.[37] In 1990, Brazil implemented a decree

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[30] *See* CBD, *supra* note 4, art. 8(j) (stating the importance of indigenous people and their cultures for sustainable development).

[31] *See id.* art. 16 (stating that access and transfer of environmentally sound technology among contracting parties are essential for the conservation and sustainable use of biological diversity); *Id.* arts. 20-21 (remarking that developed countries shall provide financial resources to enable developing countries to meet the costs of implementation of the CBD).

[32] *See* CBD, *supra* note 4, arts. 15 -16, 19 (addressing respectively the issue of access to genetic resources, the access and transfer to technology, and the handling and distribution of benefits to developing countries).

[33] *See* FIRST NATIONAL REPORT OF BRAZIL, *supra* note 8, at 159 (stating that Brazil signed the Convention on Biological Diversity during the United Nations Conference on Environment and Development in Rio de Janeiro in June 1992).

[34] *See id.* (discussing Decree No.65.057 from August 26, 1969 as it relates to access to genetic material in Brazil).

[35] *See id.*

[36] *See id.* (stating that the decree No. 65.057 from August 1969 established the norms for scientific expeditions in Brazil).

[37] *See id.* (reporting that collected materials include pressings, photographs, and drawings of the scientific material).

that required an advance authorization to export biological material outside the territory of Brazil.[38]

In 1995, Brazil drafted a law that the Brazilian Senate has yet to ratify.[39] The Draft Law requires prior consent from the indigenous people over access to their territories and fair compensation for the utilization of genetic resources.[40] According to the Draft Law, Brazil has national sovereignty over its genetic resources[41] and the federal government has the sole authority to grant access to the country's medicinal plants.[42] The procedure to obtain permission is long and complex and requires detailed documentation.[43] The permission limits research

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[38] *See id.* at 158 (discussing that decree No. 98,830 from January 15, 1990, legislates on the collection of scientific material by foreigners).

[39] *See* FIRST NATIONAL REPORT OF BRAZIL, *supra* note 8, at 159 (discussing that Bill of Law No. 306/95 still has not become a permanent law). *See also Brazil Sees Promise in Jungle Plants, But Tribes See Peril*, Dec. 23, 2001 (discussing that since permanent legislation is absent, the Brazilian government has issued several temporary decrees to regulate research, and remarking that in the absence of permanent legislation, many foreign research institutions hesitate to sign cooperation contracts, especially after a contract between a government-controlled institution and the pharmaceutical company Novartis failed in 2000), *at* http://senrs.com/brazil%20_sees_promise_in_jungle_plants.htm (last visited Aug. 5, 2002); Greg Brown, *Holding Pattern*, LATINTRADE.COM, Health & Medicine Section, (Nov. 2001) (discussing a deal with Novartis in which they were to spend 4 million on research programs in Brazil and in return they would be permitted to ship 10,000 gene samples to its Basel headquarters; however, the contract was later denounced and Novartis was accussed of biopiracy), *at* http://www.latintrade.com/newsite/content/archives.cfm?TopicID=13&StoryID=1493 (last visited June 14, 2002).

[40] *See Brazil's Bill on "Access to Genetic Resources,"* Decreto No. 306 de 19.09.1995, art. 5 (Nov. 19, 1997) (trans. By Vanira Tavares) (outlining provisions for access to genetic resources and their derived products), *at* http://lbaecology.gsfc.nasa.gov/lbaeco/ Invest/docs/genetic_resources_bill.htm (last visited June 22, 2002).

[41] *See id.* ch. III, art. 5(II) (recognizing the national sovereignty of Brazil over their genetic resources and derived products on its territory).

[42] *See id.* Title IV, ch. I, art. 14 (stating that access to genetic resources in Brazil shall be subject to prior government authorization and to the signing of a contract between the government and the foreign object, and establishing that the government of Brazil must keep a reference file of the contract negotiations).

[43] *See id.* Title IV, ch. I, sec. I, art. 15 (outlining that, "to obtain authorization and sign a contract of access to a genetic resource, the petitioner or the agency of access must present a detailed petition, together with the project of access," as well as "complete information on the timetable, budget, and sources of financing for the activities," detailed and specific description of the genetic resources to which access is intended, their current and potential uses and detailed description of the collection systems and tools to be used, precise location of the areas where the procedures of access will be carried on, and an indication of the destination of the material collected and of its probable future use).

activities to the geographic area and natural resources defined in the contract.[44] The petitioner, the government agency, the providers of traditional knowledge, and the other parties to the additional contracts negotiate mutually agreeable terms for the sharing of benefits.[45] A special fund from the collected money goes to the conservation, research, and inventory of genetic patrimony.[46] Access to genetic resources without authorization constitutes a crime subject to imprisonment and a fine of up to 10,000 times the daily fine.[47] Upon ratification, this law will control the access to biological material and its export abroad, as well as equitable remuneration.[48]

The last piece of legislation concerning access to biological resources in Brazil is the Government Provisional Decree 2052.[49] The provisional decree constitutes the current Brazilian regime for access to genetic resources;[50] however, it still

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[44] *See id.* Title IV, ch. I, sec. V, art. 34 (noting that the government must monitor "compliance with the provisions of the authorization and of the contract of access" and ensure a detailed account of the activities, and a detailed destination of the collected samples).

[45] *See id.* Title IV, ch. I, sec. VI, art. 35 (reporting that in addition to the payments and sharing of benefits agreement, the government must ensure a fair compensation in the form of money or commercialization rights as described in the contract of access).

[46] *See Brazil's Bill on Access to Genetic Resources,* Decreto No. 306 de 19.09.1995, *supra* note 39, art. 36 (stipulating that the forms of compensation shall form a special fund for the conservation, research, and inventory of the biological resources to support projects related to the conservation of natural resources).

[47] *See id.* Title IV, ch. I, sec. VI, art. 56 (acknowledging that "the acquisition and commercialization of genetic resources and derived products," their shipment abroad, and the use of traditional knowledge without an authorization constitute a crime subject to imprisonment of one to four years and a fine of up to ten thousand Brazilian currency money).

[48] *See* FIRST NATIONAL REPORT OF BRAZIL, *supra* note 8, at 159-60 (explaining that once the Draft law is passed, it will apply to biological and genetic resources in Brazil and the government will have the right to prohibit access to endangered species).

[49] *See* Francisco Arcanjo, *Intellectual Property Rights and Biodiversity in Brazil: Conservation, Sustainable Use and Protection of the Indigenous Rights*, 36-40 (Nov. 2000) (comparing the provisional decree with the Senate bill 306/95 and stating that the provisional decree bears the same idea as the Senate bill and has the force of a law), *at* http://www.gwu.edu/~ibi/minerva/fall2000/Eugenio.Arcanjo.pdf (last visited Aug. 6, 2002).

[50] *See id.* at 36 (asserting that the provisional decree is the current decree for access to natural resources in Brazil until the Brazilian Senate passes a permanent law).

awaits discussions and approval by the Brazilian Congress.[51] The next subsection outlines the implementation of the Agenda and the CBD in Switzerland.

3. *National Implementation in Switzerland*

Unlike Brazil, Switzerland already had permanent laws for the protection of biodiversity[52] when it ratified the CBD in November 1994.[53] For example, the 1992 Swiss fund, endowed with fifty million Swiss Francs, contributed to the conservation of traditional landscapes and the preservation of cultural heritage.[54] Switzerland has also created "red lists" and "blue lists" of endangered plant species.[55] Red lists provide information about the endangered status of medicinal plants, determine what geographic sites need protection from access, and act as an important landscape, planning tool.[56] Blue lists register those red list species that increased in number and act as a psychological counterweight to the red lists.[57]

Switzerland also developed guidelines to serve as a reference for parties involved in the access to genetic resources and the sharing of benefits.[58] The country is presently implementing such national guidelines to regulate access to genetic re-

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[51] *See id.* (arguing that a law becomes permanent in Brazil after an approval by the Brazilian Senate).

[52] *See* SWISS AGENCY FOR THE ENVIRONMENT, FORESTS AND LANDSCAPE, NATIONAL REPORT OF SWITZERLAND FOR THE CONVENTION ON BIOLOGICAL DIVERSITY, 15 (1998) [hereinafter NATIONAL REPORT OF SWITZERLAND] (stating that the pre-existing laws include the Federal Law on the Protection of Nature and the Landscape from 1966, the Federal Law Relating to the Protection of the Environment from 1983, and the Federal Law on Forests from 1991), at http://www.biodiv.org/doc/world/ch/ch-nr-ol-en.pdf (last visited Aug. 5, 2002).

[53] *See id.* (describing the progress made in Switzerland to implement the CBD in the country's national legislation).

[54] *See id.* at 17 (stating that the fund commemorated the 700th anniversary of the Swiss Confederation).

[55] *See id.* at 18 (describing the various methods introduced in Switzerland to protect endangered species and threatened biodiversity systems).

[56] *See Swiss Clearing House Mechanism Biodiversity/ Red Lists/ Introduction*, *supra* note 13, at 1 (describing the significance of the red lists as they relate to the protection of endangered medicinal plants).

[57] *See* A. Gigon, *Blue Lists: A Conservation Tool Used for Assessing the Enhancement of Threatened Animal and Plant Species,* THE SWISS BIODIVERSITY FORUM (specifying that blue lists are used only in conjunction with the red lists), *at* http://www.biodiversity.ch/ch/index.html (last visited July 20, 2002).

[58] *See* Swiss Agency for the Environment, Forests and Landscape, *Thematic Report on Benefit-Sharing*, 8-9 (2001) (discussing the need to monitor and regulate

sources, their utilization, and the fair sharing of benefits.[59] Switzerland presented those guidelines at the Johannesburg World Summit on Sustainable Development.[60] The following section discusses how commercial use of medicinal plants and equitable compensation in both Brazil and Switzerland is indispensable without national legislation compliant with the TRIPS Agreement.

B. *Intellectual Property Law Protection of Biodiversity*

1. *The TRIPS Agreement*

Similar to the CBD and the Agenda, TRIPS gives its member countries flexibility to choose the means to protect ethnobiological knowledge and medicinal plant resources.[61] The principal objective of TRIPS is to harmonize intellectual property laws around the world.[62] The agreement provides the minimum intellectual property standards for countries to implement in their national legislation.[63] TRIPS addresses intellectual property protection through patents.[64] The agree-

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access to biodiversity and assure fair benefit sharing), *at* http://www.biodiv.org/world/reports.asp?t=all#S (last visited Aug. 5, 2002).

[59] *See id.* (outlining that the guidelines provide guidance on the fair sharing of benefits). *See generally* Swiss Guidelines, *supra* note 11 (stating that article 1.1 provides for non-discriminatory access to natural resources; article 7.2 provides that it is necessary for the government to record collected resources and respect the customs and traditions of the local shareholders; and article 8.3 recommends the sharing of intellectual property rights between the local shareholders and the explorers who commercialize natural resources).

[60] *See* World Summit on Sustainable Development, *supra* note 1 (remarking that the Johannesburg Summit focused on how countries have implemented Agenda 21 and the CBD).

[61] *See* TRIPS, *supra* note 5, art. 27.3(b) (noting that members can exclude from patentability plants and animals, other than microorganisms, and essentially biological processes for the production of plants, other than non-biological and microbiological processes).

[62] *See generally* J.H. Reichman, *The TRIPS Agreement Comes of Age: Conflict or Cooperation with the Developing Countries*, 32 CASE W. RES. J. INT'L L. 441 (2000) (giving an overview of the TRIPS Agreement, and considering, specifically some of the positive achievements and negative trends in TRIPS since the inception of the TRIPS Agreement).

[63] *See* TRIPS, *supra* note 5, art. 65 (providing least-developed countries until 2006, economies in transition and developing countries until 2000, and developed countries until 1996 to comply with the TRIPS Agreement).

[64] *See id.* art. 27 (stating that patents shall be available for any inventions, whether products or processes, in all fields of technology, provided that they are new, involve an inventive step, and are capable of industrial application). *See gen-*

ment allows member states to exclude from patent protection certain inventions.[65] For example, countries could deny patents for plants and animals other than microorganisms, but could not do so for non-biological and microbiological processes related to the production of plants.[66] Member states thus have flexibility to protect newly discovered medicinal herbs and traditional knowledge via patents.[67] However, the language of the agreement is ambiguous and controversial,[68] and it is presently undergoing a review by the TRIPS Council of the WTO.[69]

TRIPS fails to directly refer to the CBD and the Agenda or to prevent countries from regulating access to their genetic resources and from sharing the benefits from commercial use.[70] In addition, TRIPS lacks provisions on traditional knowledge but allows states to protect traditional knowledge by means

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erally Richard Wilson, *Protection of Traditional Medicine*, July 2001, at 8-10 (emphasizing the importance of patents for the preservation of traditional medicinal knowledge and medicinal plants in developing countries), *at* http://www.cmhealth.org/docs/wg4_paper4.pdf (last visited Aug. 10, 2002).

[65] *See* TRIPS, *supra* note 5, art. 27.2 (stating that TRIPS excludes those inventions from patentability to "protect human, animal, or plant life or health, or to avoid serious prejudice to the environment").

[66] *See id.* art. 27.3(b) (stating that members may exclude plants from patentability).

[67] *See* Smith, *supra* note 4, at 152 (discussing that TRIPS allows countries the flexibility to decide whether to protect biological material and process with patents).

[68] *See generally* TRIPS, *supra* note 5 (defining the terms for the patentability of plants and biological processing). However, it is unclear what is the rationale. *Id.*

[69] *See id.* art. 27.3(b) (stating that the World Trade Organization shall review the provisions of this subparagraph four years after the date of its entry into force). *See also* World Trade Organization Doha Ministerial Conference, Draft Ministerial Declaration, WT/MIN(01)?DEC/W/1 (Nov. 14, 2001) (reporting that the work in the TRIPS Council on these reviews should look at the relationship between the TRIPS Agreement and the CBD, the protection of traditional knowledge and folklore, and discussing that TRIPS Agreement's development objectives as defined in article 7 should guide the TRIP Council's work), *at* http://docsonline.wto.org) (last visited Aug. 1, 2002). *See generally* Matthew Stilwell, *Review of Article 27.3(b) Center for Int'l Envtl. Law* (June 2001) (analyzing the link between the provisions of article 27.3(b) and development, and the overlapping coverage of TRIPS and the CBD), *at* http://www.ciel.org/Publications/pubtae.html (last visited Aug. 10, 2002).

[70] *See Symposium on Issues Confronting the World Trade System-Summary Reports by the Moderators*, July 6-7, 2001 [hereinafter *Issues Confronting the World Trade System*] (discussing the issue of divergence or convergence between the CBD and the TRIPS Agreement), *at* http://www.wto.org/ english/forums_e/ngo_e/ngo_symp2001_repTRIPS2_e.htm (last visited Aug. 4, 2002).

other than patents.[71] Nevertheless, TRIPS seems consistent with the developmental purposes of Agenda 21 and the CBD.[72]

In sum, TRIPS has developmental, technological, and public purpose objectives.[73] However, its ambiguous language in regard to biotechnology patents complicates national implementation by member countries.[74] The following subsections discuss the implementation of TRIPS in Brazil and Switzerland in regard to pharmaceutical biodiversity.

2. *TRIPS Implementation in Brazil*

The new Industrial Property Law of Brazil[75] came into effect in April 1996 to comply with the minimum requirements established by the TRIPS Agreement.[76] The law appears, however, to have weaknesses,[77] specifically live organisms are not discoveries and therefore are not patentable.[78] The Industrial Property Law of Brazil states an invention is patentable if it meets the requirements of novelty, inventive step, and industrial application.[79] In other words, discoveries do not constitute inventions,[80] and patents are granted neither to biological materials found in or isolated from nature nor to second medical

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[71] *See id.* (noting that TRIPS does not discuss traditional knowledge and indigenous people).

[72] *See* G. Kristin Rosendal, *Impacts of Overlapping International Regimes: The Case of Biodiversity*, REV. MULTILATERALISM & INT'L ORG., Jan. 1, 2001, at 36 (explaining how TRIPS and the CBD overlap because both introduce opposing regulations aimed at the same issue area), 2001 WL 23902206.

[73] *See* TRIPS, *supra* note 5 (setting the general goals of TRIPS).

[74] *See id.* art. 27.3(b) (noting that article 27.3(b) reads ambiguously).

[75] *See* Industrial Property Law of Brazil, Law No. 9279, May 14, 1996 (outlining the amended Brazilian patent law in 1996), *at* http://www.inpi.gov.br/idiomas/conteudo/law.htm (last visited Aug. 2, 2002).

[76] *See* TRIPS, *supra* note 5.

[77] *See* Robert Sherwood, *Intellectual Property in Developing Countries and Judicial Systems, and Economic Development* (noting that the 1996 industrial property law in Brazil introduced improvements but was not a great advance, and discussing that the system is suffering from bureaucracy, inadequate judicial system, and weak protection of trade secrets), *at* http://www.kreative.net/ ipbenefits (last accessed Jan. 31, 2002).

[78] *See* Industrial Property Law of Brazil, *supra* note 74, art. 18(II) (stating that living organisms are not patentable).

[79] *See id.* art. 8 (marking that "anything contrary to morality, decency, public safety, order, and public health is not patentable"). *Id.* at 18(I).

[80] *See id.* art. 10 (determining that discoveries of living organisms are not patentable).

uses.[81] Thus, the new industrial law of Brazil does not allow patents for biological materials isolated from nature and for natural biological processes.[82] Allowing patents for isolated biological matter and secondary use in Brazil could attract more foreign investment and stimulate development of modern biotechnology.[83]

3. *TRIPS Implementation in Switzerland*

Switzerland adopted its new intellectual property law in 1996.[84] According to the new law, inventions contrary to public policy cannot obtain a patent.[85] The Swiss Patent Office grants patents for microbiological and non-biological processes,[86] but the Swiss patent law provides no explicit language about biological extractions.[87] Switzerland has recognized a "'Swiss type' claims . . . for new therapeutic uses of known molecules . . . ."[88] Therefore, if a known substance has new medicinal uses, such

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[81] *See id.* art. 10(IX) (stating that all or part of natural living beings and biological materials found in nature, or isolated therefrom, including the genome or germ plasm of any natural living being and the natural biological processes, are not patentable).

[82] *See id.* (noting that biological processes are not patentable under the patent law of Brazil).

[83] *See* Arcanjo, *supra* note 49, at 25 (arguing that patenting of living forms and biological processes in Brazil could guarantee entry of private pharmaceutical companies).

[84] *See* Switzerland Federal Law on Patents for Inventions, *supra* note 14 (providing an overview of the minimum requirements to accord a filing date and the requirements for patentability).

[85] *See id.* art. 2(a) (excluding inventions contrary to public order and morality from patentability).

[86] *See id.* art. 1(a) (stating that compounds obtained through non-biological and microbiological processes are patentable).

[87] *See id.* (observing that the language of article 1(a) is ambiguous). *See also WTO Council for Trade-Related Aspects of Intellectual Property Rights*, Communication from Switzerland, IP/C/W/284 (June 15, 2001) (outlining the view of Switzerland that countries should have the discretion to exclude plants from patentability in their national laws).

[88] Switzerland Federal Law on Patents for Inventions, *supra* note 14, art. 7(c) (stating that substances or compounds subject of a prior right that have a new use shall be considered new to the extent that they are intended solely for such use). *See also id.* art. 8(3) (determining that if the invention concerns a process, the effects of the patent shall extend to the immediate products of the process). *See generally A Case for 'Swiss-type' Claims in Indian Patent Act*, THE HINDU, Mar. 29, 2001 (reporting that it is necessary to distinguish between a new benefit of a known use of a known molecule and a completely new use), *at* http://www.hinduonnet.com/thehindu/2001/03/29/stories/0629000a.htm (last visited Aug. 10, 2002).

inventions qualify for patent protection.[89] For example, aspirin's original use was to treat headaches.[90] Later on, it became known that aspirin could also treat heart diseases, and therefore patents could protect this second medical use to stimulate future pharmaceutical research.[91]

The "Swiss claim" approach is an important aspect of the Swiss patent law because it facilitates the development of plant-derived drugs based on traditional ethnobiological knowledge,[92] and therefore a similar approach could benefit Brazil. Patents for non-biological processes and secondary use benefit the protection of pharmaceutical biodiversity and yield commercial benefits for the country that has implemented them.[93] The following analysis will establish the framework for comparison between the two countries.

III. ANALYSIS

Given that the international framework provides only minimal standards for protection of pharmaceutical biodiversity, this analysis section considers constitutional protection, richness of pharmaceutical biodiversity, and ethnobiological traditions in Brazil and Switzerland. While Brazil is a heaven of pharmaceutical biodiversity, its stringent temporary laws act as a barrier to the progress of science, and the country's present patent protection hinders innovation.

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[89] *See* Switzerland Federal Law on Patents for Inventions, *supra* note 14, art. 7(c) (allowing patents for new uses of known substances).

[90] *See* EVERSHEDS NATIONAL BIOSCIENCE GROUP, 2ND PHARMACEUTICAL USE-THE SWISS TYPE CLAIM (Dec. 21, 2000) (explaining that the new medical use must be completely new and not simply a modification of an existing treatment or a better method for treating a disease), *at* http://www.stepc.gr/~katharak/2nd_Pharmaceutica _use.doc (last visited Aug. 10, 2002).

[91] *See id.* (stating that research that results in the second medical use is significant and as such is not less worthy of patent protection).

[92] *See A Case for 'Swiss-type' Claims in Indian Patent Act*, *supra* note 88 (arguing that the "Swiss claim" approach is in use in Malaysia, New Zealand, Switzerland, and the United States while India considers introducing it in its patent law because of its significant advantages).

[93] *See supra* notes 82-90 and accompanying text (outlining the benefits of having patents for secondary use).

A. *The International Framework Only Sets Minimal Standards*

The Agenda, CBD, and TRIPS only provide the minimum international framework for protection of biodiversity through intellectual property, and they all require language clarification.[94] For example, the Agenda and CBD fail to specify how benefit sharing could take place, except that negotiating parties must reach a mutual agreement.[95] The Agenda and CBD also fail to explicitly refer to TRIPS[96] and remain silent on the issue of patentable subject matter.[97]

TRIPS creates a discord between developed and developing countries over the criteria for patentability in the field of biotechnology and the relationship between TRIPS and CBD.[98] Developed countries support a strong protection of all biotechnological innovations through patents.[99] Developing countries, at the same time, accuse TRIPS of encouraging biopiracy and environmental damage by allowing for patenting of biological and non-biological processes.[100] Adequate patent protection for biological extracts and processes, however, fosters economic

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[94] *See* Smith, *supra* note 4, at 152, 163 (observing that the CBD has "overly broad standards" and that the language of article 27.3(b) is both "sweeping and vague").

[95] *See* INTERNATIONAL CHAMBER OF COMMERCE COMMISSION ON INTELLECTUAL INDUSTRIAL PROPERTY, TRIPS AND THE BIODIVERSITY CONVENTION: WHAT CONFLICT (June 28, 1999) (arguing that there is no conflict between TRIPS and the CBD), *at* http://www.iccwbo. org/home/menu_intellectual_property.asp (last visited Aug. 10, 2002).

[96] *See* CBD, *supra* note 4, art. 16(5) (recognizing that intellectual property rights are important for the implementation of the CBD without directly referring to TRIPS). *See also* Agenda 21, *supra* note 3, ch. 16 (failing to incorporate intellectual property protection provisions).

[97] *See* CBD, *supra* note 4, art. 16(2) (favoring technology patents, but failing to address patent subject matter). *See also* Agenda 21, *supra* note 3, ch. 15 (lacking provisions on patents).

[98] *See Issues Confronting the World Trade System*, *supra* note 70 (expressing the opposing views that the two conventions overlap or that they deal with very different issues).

[99] *See World Trade Organization Communication from Switzerland*, *supra* note 87 (highlighting that Switzerland favors an adequate protection of biotechnological inventions). *See also* WORLD TRADE ORGANIZATION, *Review of the Provisions of Article 27.3(b): Further View of the United States*, IP/C/W/209 (Oct. 3, 2000) (providing the views of the United States that a patent discovery that is isolated and unfound in nature is patentable).

[100] *See* TRIPS AND THE CONVENTION ON BIODIVERSITY: WHAT CONFLICT, *supra* note 95 (asserting that TRIPS takes away rights given to developing countries by

growth and development and inflow of foreign investment.[101] It is therefore in the best interest of developing countries, like Brazil, to adopt the developed countries' viewpoint, such as the Swiss model, to recognize the importance of patent protection for the biotechnology industry.[102] The following section considers the basis for comparison between Switzerland and Brazil.

B. *Why the Swiss Model is Adaptable in Brazil*

1. *Constitutional Protection of Biodiversity*

Brazil and Switzerland have incorporated the protection of the environment in their constitutions.[103] Both countries' constitutions provide that a well-maintained environment is essential for a healthy way of life,[104] and that the government and the community have the duty to protect the environment.[105] Also, the two countries' constitutions forbid the use of gene

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the CBD). While the CBD assigns sovereignty rights in the biological resources on the territory of each country, TRIPS allows patents for those resources. *See id.*

[101] *See* Kevin McCabe, *The January 1999 Review of Article 27 of the TRIPS Agreement: Diverging Views of Developed and Developing Countries Toward the Patentability of Biotechnology*, 6 J. INTELL. PROP. L. 41, 56 (1998) (stating that TRIPS affects developed and developing countries differently).

[102] *See id.* (outlining the views of developed and developing countries with regards to the revision of TRIPS article 27.3(b)). *See also* Christopher Mayer, *The Brazilian Pharmaceutical Industry Goes Walking From Ipanema to Prosperity: Will the New Intellectual Property Law Spur Domestic Investment?*, 12 TEMP. INT'L & COMP. L.J. 377, 396 (1998) (noting that if patent protection had been in place for medicines, then sales by U.S. pharmaceutical companies in Brazil would have increased by almost fifty percent).

[103] *See* C.F. [Constitution] art. 225 (Braz.)(1988) (amended in 1993) (dedicating one entire chapter to environmental protection), *at* http://www.uniwuerzburg.de/law/br00000_.html (last visited on Aug. 10, 2002). *See also* BV. CST. COST. FED. [Constitution] arts. 73, 74, 77, 78, 120 (Switz.) (1999) (modified in 2001), *at* http://www.swissemb.org/legal/const.pdf (last visited July 21, 2002) (addressing issues such as protection of the environment, forests, nature and cultural heritage, and gene technology in the non-human field).

[104] *See* C.F. art. 225 (Braz.) (stating that all persons have right to an ecologically balanced environment). *See also* BV. CST. COST. FED. art. 73 (Switz.) (noting that the Confederation and the Cantons shall strive to establish a durable equilibrium between nature, in particular its capacity to renew itself).

[105] *See* C.F. art. 225 (Braz.) (declaring that the government and the people of Brazil must preserve and country's rich biodiversity). *See also* BV. CST. COST. FED. art. 74 (Switz.) (articulating that the Confederation has the duty to legislate on the protection of Swiss people and their natural environment against harm and nuisance).

methods that endanger human life.[106] Similarly, each protects flora from extinction,[107] along with nature and cultural heritage.[108] The Brazilian and Swiss constitutions show concern about access to and utilization of natural resources.[109] The constitutions of Brazil and Switzerland thus illustrate their effort to preserve nature for future generations.[110]

2. *Richness of Pharmaceutical Biodiversity*

In addition to constitutional similarities, both countries enjoy rich pharmaceutical biodiversity.[111] Switzerland is the home of the Swiss Alps, which are rich with conifer forests and medicinal plants such as oleader, palm trees, and mimosa.[112] Europeans widely believe that "[i]f mountains had a home, it would be Switzerland."[113] Switzerland is one of the countries

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[106] *See* C.F. art. 225(1)(II) (Braz.) (stating that the government of Brazil must preserve the country's rich natural resources and must supervise entities engaged in research and handling of genetic material). *See also* Bv. Cst. Cost. Fed. art. 120 (Switz.) (providing that the Swiss Confederation shall legislate on the use of genetic material of animals, plants, and other organisms, and establishing that in doing so it shall consider the dignity and security of men, animals and the environment).

[107] *See* Bv. Cst. Cost. Fed. arts. 77, 78(4) (Switz.) (stating that the government and the people of Switzerland shall protect forests and endangered species from extinction). *See also* C.F art. 225(1)(VII) (Braz.) (providing for the protection of flora).

[108] *See* Bv. Cst. Cost. Fed. art. 78 (Switz.) (stating that the Confederation shall preserve natural, cultural, and historical monuments and should take into account public interest). *See also* C.F. arts. 225(1)(II)& (VII)(4) (Braz.) (preserving the integrity of the country's natural resources and enlisting the territories that are part of the national patrimony).

[109] *See supra* notes 98-100 and accompanying text (discussing how the constitutions of Brazil and Switzerland demonstrate both countries' concern about the protection of the environment).

[110] *See generally supra* notes 101-107 and accompanying text (analyzing the constitutional biodiversity legal protection in Brazil and Switzerland).

[111] *See id. See infra* notes 112-23 and accompanying text (comparing richness of pharmaceutical biodiversity in Brazil and Switzerland).

[112] *See* Swiss Agency for the Environment, Forests and Landscape, *Clearing House Mechanism Biodiversity Switzerland at a Glance/Geography/Alps-The Swiss Alps* (mentioning that forests in the Alps include mainly conifer trees above 1,000 meters), *at* http://www.buwal.ch/nachh/chm/e/ch/geo/ geo_alps.htm (last visited Aug. 7, 2002).

[113] *A Summer Holiday in the Alps*, Deutsche Presse-Agentur [Munich], June 11, 2002 (highlighting that the Alps are a special region of culture and nature), LEXIS, News Group File.

with the highest biodiversity in Europe.[114] Switzerland's biodiversity protection is exemplary because the country has implemented restrictive laws and the Swiss deeply care about their country's natural resources.[115] The Alps are among the few large wildlife areas within Europe that continue to stay untouched by industrial development.[116]

Brazil also possesses some of the most diverse and rich ecosystems in the world.[117] The Brazilian Amazon rainforest occupies eighty percent of the South American Amazon and comprises sixty-seven percent of the world's tropical forests.[118] The Brazilian Amazon includes twenty-two percent of the known plant species in the world[119] and fifty percent of the world's biodiversity.[120] Unlike Switzerland, Brazil has serious conservation problems. The Brazilian Amazon rainforest suffers from ecological destruction.[121]

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[114] *See* Bernhard Schmidt, *State and Development of Biodiversity in Switzerland,* Institut für Umweltwissenshaften (stating that Switzerland is one of the European countries with the highest biodiversity), *at* http://www.biodiversity.ch.ch.index.html (last visited Aug. 5, 2002).

[115] *See id.* (observing that Swiss people recognize the unique natural heritage of the Alps since an early age).

[116] *See id.* (asserting that Switzerland is perhaps the only country in the world with a high population density, large economic activities, and rich biodiversity).

[117] *See* Sturm, *supra* note 27 (discussing the rich biodiversity in the Brazilian rainforest). *See also* Charles Clover, *Drugs Companies Are Told To Pay for Plant 'Plundering,'* THE DAILY TELEGRAPH (LONDON), Apr. 18, 2002 (reporting that trade in medicinal plant products is worth 23 billion British pounds per year, and asserting that drugs and perfumes companies plunder plants in developing countries without paying compensation to the countries where those natural resources originate), LEXIS, News Group File.

[118] *See Amazonia in Numbers* (providing biodiversity data about the Brazilian Amazon rainforest), *at* http://www.bioamazonia.org.br/numerose.htm (last visited Aug. 1, 2002). *See also* FIRST NATIONAL REPORT OF BRAZIL, *supra* note 8, at 12-13 (estimating the value of biodiversity in Brazil to be much higher than the country's GDP).

[119] *See Amazonia in Numbers, supra* note 118 (noting that the Brazilian Amazon forest contains somewhere around one-forth of the world's plants).

[120] *See* Corazza, *supra* note 9, at 1 (discussing the plague of biodiversity in the Brazilian rainforest). The Brazilian Amazon forest has thirty percent of all the superior plants in the world. *See id.* International companies exploit the natural resources of the Brazilian Amazon forest for profitable purposes. *See id.*

[121] *See* Reuters News Service, Axel Bugge, *Brazil Amazon Destruction Down But Still Alarming*, PLANET ARK, June 13, 2002 (mentioning that the rate of forest destruction in the Brazilian rainforest worries environmentalists), *at* http://www.planetark.org/dailynewsstory.cfm/newsid/16404/story.htm (last visited Aug. 5, 2002). *See also* Janelle Kellman, *The Brazilian Legal Tradition and Environmental Protection: Friend or Foe*, 25 HASTINGS INT'L & COMP. L. REV. 145, 148

In 2000, the Brazilian Amazon was 7,037 square miles and by 2001, logging and fires destroyed 6,095 square miles.[122] Furthermore, a government development plan, including infrastructure projects, could destroy forty-two percent of the Amazon if it progresses as promised.[123] While, both Switzerland and Brazil are rich in medicinal plant resources, biopiracy in Brazil is flourishing at a large scale and resources leave the country without compensation because of the lack of permanent law on access to genetic resources.[124]

3. *Ethnobiological Traditions*

Wild medicinal plants are an important source of medicines for eighty percent of the developing world.[125] By consulting traditional medicinal knowledge, researchers for new medicinal drugs can increase the success ratio in drug trials from one success in ten thousand samples to one success in two samples.[126] Switzerland is one such country that has solid historical traditions in ethnobiological medicine.[127]

(2002) (discussing that agricultural uses and road building are among the main factors behind the depletion of the Amazon forest).

122 *See* Bugge, *supra* note 121 (providing information about the rate of destruction of the Amazon rainforest in Brazil from the National Institute for Space Research).

123 *See id.* (highlighting that the government has a vital role to play in the protection of the natural environment in Brazil). In 2000, fires in the rainforest decreased due to increased government monitoring. *See id.*

124 *See* Corazza, *supra* note 9, at 3 (noting that a North-American company has catalogued over 7000 Amazon plants without paying anything for their gathering).

125 *See* David Tilford, *Saving the Blueprints: The International Legal Regime for Plant Resources*, 30 CASE W. RES. J. INT'L L. 373, 428 (1998) (arguing that the CBD recognizes the right of developing countries to demand compensation for their natural resources).

126 *See* Naomi Roht-Arriaza, *Of Seeds and Shamans: The Appropriation of the Scientific and Technical Knowledge of Indigenous and Local Communities*, 17 MICH. J. INT'L L. 919, 928 (1996) (stating that consulting indigenous people could be very important for the discovery of new plant-derived drugs). *See also* JoAnn Kawell, *Report on Science and Technology*, NACLA REPORT ON THE AMERICAS, Mar. 1, 2002, at 1-2 (stating that local experts are the best source of knowledge about which plants should be screened), 2002 WL 12669949.

127 *See* Kimberly Johnson, *The Benefits of Studying Medicinal Plants and Ethnobotany*, BIODIVERSITY AND HUMAN HEALTH (discussing that the use of medicinal plants has a long history and people continue to use plants as a source of medicinal cure today), *at* http://www.wms.org/biod/value/ medplants/med_plants2.html (last visited Aug. 10, 2002).

The field of medicinal chemistry and the use of medicinal plants originated in Switzerland.[128] In Switzerland, medicinal plants serve as traditional medicines, herbal teas, health foods, and pharmaceuticals.[129] For instance, Adonis vernalis is a plant with well-known medicinal properties,[130] thyme cures dry spasmodic coughs and bronchitis,[131] and horehound treats respiratory problems and helps remove phlegm from the lung.[132]

Brazil is also well-known for its ethnobiological traditions.[133] Many of its plants find medicinal and cosmetic uses based on ethnobiological knowledge.[134] For example, the British Body Shop uses oil extracted by the Caiapo Indians[135] to make skin cream and shampoos,[136] Aveda produces cosmetics using the urucum plant, which is a vegetable bleach,[137] and Channel No. 5 uses the pau-rosa.[138] An American ethnobiolo-

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[128] *See id.* (noting that medicinal plants have had a wide use in Europe and that the writings of Theophrastus Bombastus von Hohenheim remain a landmark).

[129] *See* Lucy Hoareau and Edgar DaSilva, *Medicinal Plants: A Re-Emerging Health Aid*, ELECTRONIC JOURNAL OF BIOTECHNOLOGY, Aug. 15, 1999, vol. 2, No. 2 (explaining that interest in medicinal plants has re-emerged as a result of the rising costs of prescription drugs and bioprospecting of new plant-derived drugs), *at* http://www.ejb.org/content/vol2/issue2/full/2/ (last visited Aug. 10, 2002).

[130] *See id.* at 4 (mentioning that the adonis vernalis is specific to Switzerland, Sweden, and Germany).

[131] *See Thyme,* HEALTHNOTES ONLINE (describing the traditional medical uses of thyme to treat bronchitis and gingivitis), *at* http://63.65.255.14/Thyme.htm (last visited July 31, 2002).

[132] *See Horehound,* HEALTHNOTES ONLINE (reporting that horehound is a cough suppressant and a bitter digestive tonic), *at* http://63.65.255.4/Horehound.htm (last visited July 31, 2002).

[133] *See* Alesandra Dalevi, *Green Piracy*, BRAZIL (noting that in Brazil there is a boom of natural medicine and that Brazil ranks second in the world after India in the use of natural medicine for treatment), *at* http://www.brazil-brasil.com/cvrjul 97.htm (last visited on June 14, 2002).

[134] *See id.*, at 9 (noting that in Brazil two thousand pharmacists produce 3,000 medicinal formulas using minerals, animals, and plants).

[135] *See* Antonio Guedes & Maria Sampaio, *Genetic Resources and Traditional Knowledge in Brazil*, BRAZILIAN AGRIC. RES. CORP. Oct. 30 - Nov. 1, 2000 (stating that about 400,000 native Indians live in Brazil today in 215 ethnic groups and that they speak 180 different languages), *at* http://r0.unctad.org/trade_env/test1/openF1.htm (last visited Mar. 14, 2003).

[136] *See* Corazza, *supra* note 9, at 4 (mentioning that the Body Shop uses oil of Brazilian nuts for its creams and shampoos).

[137] *See id.* (noting that Aveda produces cosmetics from the plant urucum).

[138] *See id.* (stating that pau-rosa is on the list of endangered species).

gist exclaimed that "[e]very time a shaman dies, it is as if a library burned down."[139]

In sum, Switzerland and Brazil extensively use ethnobiological knowledge in their pharmaceutical and medical industry: another reason why the Swiss model would be relevant in Brazil. The next section discusses Brazil's rich ethnobiological traditions and biodiversity and its failure to yield enough benefits from the commercialization of its medicinal plants resources.

C. *Brazil: Rich in Biodiversity, but Poor Commercialization*

1. *A Heaven of Pharmaceutical Biodiversity*

Statistics demonstrate that Brazil has the highest number of plant species in the world, while its per capita income is one of the lowest.[140] Brazil's biodiversity serves as a rich source for plant-derived drugs.[141] For instance, salegen, a medicine used to treat xerostoma, contains active ingredients extracted from a plant native to Northeastern Brazil that tribes have used for generations.[142] Additionally, Brazilian found quebra-pedra is an herb that treats hepatitis, and natural prozac, another Brazilian found herb, is the main ingredient in the medicine prozac.[143] However, at the same time, Brazil receives no compensation for the utilization of the natural resources.[144] The

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[139] Alessandra Dalevi, *supra* note 133, at 7 (reporting that shamans already researched about 7000 plants before indigenous people brought to their attention important medicinal plants). Shamans could make significant contributions to the pharmaceutical industry. *Id.*

[140] *See Conserving Indigenous Knowledge- Integrating New Systems of Integration*, UNDP, CSOPP, at 2 (comparing plant biodiversity among countries and placing Brazil on the top of the chart with 55,000 species of plants), at http:// www.undp.org/csopp/ CSO/NewFiles/dociknowledge2.html (last visited Aug. 5, 2002).

[141] *See supra* notes 140-44 (discussing medicinal uses of Brazil's tropical plants).

[142] *See* Dalevi, *supra* note 133, at 1 (asserting that costs of researching medicinal plant uses are much less than the costs associated with the production of new synthetic drugs). Salegen is a medicine produced in the United States from medicinal plants found in Brazil. *Id.*

[143] *See id* at 2 (stating that American foreign companies that conduct bioprospecting in Brazil could have saved much valuable research time if they knew the meanings behind the Indian names of the herbs).

[144] *See id* at 2 (believing that foreign pharmaceutical companies unfairly exploit Brazil, according to Darrell Posey, Director of the Program for Traditional

rainforest is worth $43 billion for plant-derived medicines[145] and Brazil receives less than one percent of the accrued benefits from commercialization.[146] The main reason for the flourishing biopiracy and bioprospecting in Brazil is the lack of adopted permanent law on access to biodiversity.[147]

In addition, dialogue among foreign scientific and business communities and the Brazilian government is strained.[148] Biotechnology is not part of the government's agenda, and this has had devastating consequences for the country's economic development.[149] Foreign pharmaceutical companies and researchers state that the lack of permanent laws decrease their interest in working in Brazil.[150] Many companies have postponed their activities until the implementation of a permanent law regulating access to pharmaceutical biodiversity.[151] For example, under an agreement signed between Novartis and BioAmazonia in 1999, Novartis promised to spend $4 million in research programs in the region.[152] In return, BioAmazonia allowed Novar-

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Resource Rights at the Oxford Center for the Environment in the United Kingdom and Researcher for the Brazilian National Council for Science and Technology).

145 *See id.* (stating that $5.4 billion do not go to indigenous people around the world to compensate them for their traditional knowledge).

146 *See id.* (noting that Brazil receives 0.001 percent from the commercial utilization of its medicinal plants).

147 *See* Dalevi, *supra* note 133, at 3 (Professor Laymert Garcia from the University of the Campinas in Sao Paulo saying that bioprospectors take advantage of the lack of permanent legislation to regulate commercialization of biodiversity).

148 *See* Brown, *supra* note 39 (explaining that Brazil is the world leader in some types of cancer research, but dialogue among industry, the scientific community, and the government is difficult).

149 *See id.* (asserting that Brazil's research science is on the cutting edge and "the potential for human medicine is huge"). However, the lack of partnership between the private and public sector in Brazil has damaging consequences for the commercialization of Brazil's rich medical plant resources. *See id.*

150 *See id.* (highlighting that if clear rules continue to be lacking, business opportunities will decrease).

151 *See* Guedes & Sampaio, *supra* note 135, at 3 (stating the necessity of guidance on how to implement the provisionary law and that the National Research Council, the government agency that previously authorized international scientists to collect genetic resources, awaits a clarification of the rules).

152 *See* Brown, *supra* note 39 (assessing that the outcome of the Novartis deal has negative consequences for the future development of the biotechnology sector in Brazil). As a result, there are many designed projects, but little investment. *See id.* For instance, FIR Capital Partners, a small biotechnology company in Brazil, has a $75 million investment fund and plans to spend one-third of it for biotechnology projects. *See id.* However, the firm is reluctant because the

tis to ship 10,000 gene samples to Switzerland.[153] However, BioAmazonia revoked the agreement, accused Novartis of biopiracy, and cancelled the contract.[154] Novartis stated its intent to no longer develop projects in Brazil because the country lacks permanent laws regulating access to pharmaceutical biodiversity and the Brazilian government fails to enforce its contractual obligations.[155] Thus, the lack of permanent laws on access to biological resources and the inability to enforce contracts create a disincentive among foreign companies to explore Brazil's rich pharmaceutical biodiversity for new medicinal drug development.[156] This is detrimental to Brazil because the country lacks enough researchers and national infrastructure to benefit from commercial uses of its biodiversity.[157]

2. *A Barrier to Progress of Science*

The provisional decree in Brazil hinders international scientists from exploring the rainforest and researching medicinal plants for new drug development.[158] Research permits and access and research restrictions cause scientists to reconsider

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government of Brazil lacks consistency in its actions and permanent biodiversity laws do not exist in Brazil. *See id.*

153 *See id.* (estimating that other companies will also remain reluctant to sign contracts in Brazil, because the Brazilian government fails to enforce contracts).

154 *See* Brown, *supra* note 39 (detailing that a board member of BioAmazonia denounced the contract and the government of Brazil cancelled the deal under the growing pressure from environmental groups).

155 *See id.* (quoting the CEO of Novartis Pharma that Novartis "would not contribute a nickel" toward the Biotechnology Center in the Amazon). *See also* Larry Rohter, *Brazil Moves to Protect Jungle Plants from Foreign Biopiracy*, N.Y. TIMES, Dec. 23, 2001, A1, at 4, col. 3 (reporting that many pharmaceutical companies and laboratories hesitate to sign bioprospecting agreements in Brazil after the Novartis contract failed apart), LEXIS, News Group File.

156 *See supra* notes 138-53 and accompanying text (demonstrating that foreign companies express no interest in signing cooperation agreements with the Brazilian government because laws in Brazil constantly change and it is difficult to overcome the mutual distrust between foreign researchers and the Brazilian government).

157 *See* Geoff Dyer, *Brazilians Hope to Turn Plants into Profits: Biotechnology Can Make Money from the Rainforest, but Will Any of the Profits Stay in the Country?*, FIN. TIMES (LONDON), Aug. 28, 2001, at 8 (assessing that the value of Brazil's biodiversity is about $2 trillion, nearly four times Brazil's annual GDP), LEXIS, News Group File.

158 *See* Andrew Revkin, *Biologists Sought a Treaty; Now They Fought It*, N.Y. TIMES, May 7, 2002, at F1 (observing that the CBD seriously impedes biologists' efforts to explore new biological resources), LEXIS, News Group File.

work in the Amazon forest and to leave thousands of plants unknown and unused for potentially vital medicines to cure such diseases as HIV/AIDS.[159] The problem is significant when researchers in other countries need samples of natural plants to work on their doctoral dissertations and lack permission to ship plant samples to their laboratories.[160]

Moreover, nationalist movements in Brazil hinder the access of international scientists to the rainforest.[161] The Brazilian military demarcates indigenous areas to protect the rainforest from foreign invasion, which is disastrous for researchers who collect samples and search for unknown plants with rare medicinal value.[162] The increased number of criminal charges against foreign scientists also creates a disincentive among foreign scientists to participate in research expeditions in the Amazon rainforest.[163] Harsh visa restrictions, nationalist tension, and severe criminal penalties in Brazil act as serious barriers for world renown scientists to undertake research

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[159] *See id.* (giving an example how criminal penalties might be severe, and explaining that the Federal Police of Brazil arrested an American scientist who studied the Amazon forest and seized his collection even though he had all the necessary visas).

[160] *See id.* (mentioning that a German botanist pursuing a science doctorate degree at Yale University studied plants in the Brazilian Amazon when regional newspapers announced that she was collecting genetic material in order to develop new drugs). The resulting difficulties forced her to abandon her research. *See id.*

[161] *See* Dalevi, *supra* note 133, at 11 (mentioning that the military of Brazil keeps foreigners out of the Amazon). *See also* Mark Stevenson, *China, Brazil, India, 9 Other Nations Form Alliance Against Biopiracy*, ASSOCIATED PRESS, Feb. 18, 2002 (reporting that the new alliance against biopiracy would like to see more equal trade rules on patenting and a fairer benefit-sharing mechanism), LEXIS, News Group File.

[162] *See* Dalevi, *supra* note 133, at 11 (stating that the nationalist movement believe that the entry of foreign scientists in the Amazon forests is against the country's national security and indicating that their motto is "Fight for the Forest").

[163] *See Biopiracy in Brazil* (noting that Selva Viva, an NGO created by a Swiss citizen, was brought to court by the local Roman Catholic Church in Brazil for illegally stealing indigenous knowledge, and discussing that this criminal case resulted from a law implemented in the state of Acre, which protects biodiversity and imposes harsh penalties against foreigners who claim rights in the Amazon forest), *at* http://www.dmac.co.uk/ gen/a-sbio.html (last visited Aug. 9, 2002).

missions that could lead to the discovery of new drugs of global significance.[164]

3. *Present Patent Protection in Brazil Hinders Innovation*

Current Brazilian patent law eliminates the possibility of patenting products extracted from medicinal plants, and, until recently, the law excluded biological processes from patents.[165] Moreover, Brazil invests only 1.24 percent of its GDP in science and 0.7 percent goes to Research and Development, and additionally the Ministry of Science and Education only dates back to 1985.[166] This is problematic because the biotechnology industry depends on patent law protection due to the high costs of research, development, and commercialization.[167] For example, it costs about $231 million to develop a drug, and patenting a biological invention in the United States costs approximately $80,000.[168] Consequently, pharmaceutical research and development takes place predominantly in countries with a strong research and development sector such as Switzerland.[169]

Economic studies on patents concluded that intellectual property protection is crucial for foreign direct investment and

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[164] *See supra* notes 156-61 and accompanying text (analyzing how harsh visa restrictions, nationalistic tension, and severe criminal penalties in Brazil hinder innovation).

[165] *See* FIRST NATIONAL REPORT OF BRAZIL, *supra* note 8, at 160 (discussing the latest changes in the Brazilian intellectual property legislation).

[166] *See* KEY FACTS, *supra* note 9 (providing statistics about Brazil's investment in scientific research and development).

[167] *See* Gerald Mossinghoff & Ralph Oman, *The World Intellectual Property Organization: A United Nations Success Story*, 160 WORLD AFF. 104, 105 (1997) (discussing the successes achieved by the World Intellectual Property Organization in Geneva). *See also* Alan Holmer, *Patent Protection is Key*, USA TODAY, Oct. 29, 2001 (emphasizing that strong patents give research-based companies the incentives to invest the average $500 million needed to discover and develop each new drug), *at* http://www.usatoday.com/ news/comment/2001-10-29-ncoppf.htm (last visited Aug. 10, 2002). *See generally* John Baremore, *Don't Shoot the Messenger: Congress and the Prospect of Patent Harmonization*, 44 LOY. L. REV. 761 (1999) (stating that a nation's patent law is its cornerstone for economic development).

[168] *See* Verma, *supra* note 2, at 4 (highlighting that intellectual property rights protection is crucial for investment decisions of businesses).

[169] *See* Stevenson, *supra* note 15, at 1152 (emphasizing that trade secrets could be used as an intellectual property tool to protect traditional medicinal knowledge).

development.[170] About eighty percent of the firms in the study testified that strong patent protection is important for investment in research and development in developing countries, and that Brazil has weak patent protection.[171] Furthermore, biotechnology is an industry in which wealth depends on patents.[172]

Allowing patents for natural extracts from medicinal plants would accrue more local benefits to Brazil.[173] The country should view its genetic resources as a common heritage of mankind that could be a significant resource to produce life-saving, plant-derived medicines for the benefit of the entire world.[174] After all, since the Swiss model is relevant in Brazil, the Amazon country may refer to it for guidance on how to effectively protect its pharmaceutical biodiversity.

IV. RECOMMENDATIONS

This Part recommends that Brazil increase access of international scientists to its medicinal plants and regulate ecotour-

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[170] *See* Edwin Mansfield, *Intellectual Property Protection, Foreign Direct Investment, and Technology Transfer*, at 21 (presenting empirical evidence between the respect and disrespect for patents by the developing countries and foreign direct investment flow by developed countries to those developing countries), *at* http://www.ifc.org/economics/ pubs/discuss.htm (last visited Aug. 11, 2002).

[171] *See id.* (concluding that strong patent protection fosters larger foreign direct investment). *See also* Keith Maskus, *Intellectual Property Rights and Economic Development*, 32 CASE W. RES. J. INT'L L. 471, 494 (2000) (discussing that intellectual property protection is very important for development; however, the cost of administration and enforcement of intellectual property rights could be burdensome as developing countries implement stronger intellectual property systems).

[172] *See* John Thomas, *An Examination of the Issues Surrounding Biotechnology Patenting and Its Effect Upon Entrepreneurial Companies*, CRS REPORT FOR CONGRESS, Aug. 31, 2000, at 7 (noting that the biotechnology industry is known for the heavy expenditures on research and development and a reliance on patent protection).

[173] *See* Viana, *supra* note 8 (stating that data from the National Institute of Industrial Property in Brazil demonstrates that in 1999, after the 1996 Patent Law came into effect, the number of patents granted in the biotechnology pharmaceutical industry has risen on average twenty percent a year).

[174] *See* WORLD HEALTH ORGANIZATION, WORLD HEALTH ORGANIZATION MEDICINE STRATEGY 2002-2005 (2002) (discussing the widespread use of traditional medicine and ethnobiological knowledge, the international legal framework for access to traditional medicine, as well as the international and national resources for traditional medicine), *at* http://www.who.int/medicines/ library/trm/ trm_strat_eng.pdf (last visited Aug. 11, 2002).

ism, adopt the "Swiss claim" patents, and incorporate the listing of endangered herbs.

A. *Make Medicinal Plants More Accessible to Scientists and Regulate Ecotourism*

The Brazilian law on access to genetic resources limits the access of international scientists to medicinal plants in the Amazon jungle.[175] As a result of the long process to obtain a scientific permit in order to access the resources and the criminal penalties, scientists prefer not to conduct research in the Brazilian forests.[176] Brazil should still continue to control access to its resources and their commercialization; however, the country's Draft Law should introduce less cumbersome restrictions.[177] The Draft Law should reduce the wait period to obtain a permit to less than one year, and it should allow scientists to keep the collected samples against fair compensation.[178]

The Draft Law should take into account the Swiss guidelines for access to biological material.[179] The Brazilian Draft Law should incorporate the following provisions from the Draft Guidelines of Switzerland.[180] The law should implement an objective access to the country's medicinal plant resources to reassure researchers that their rejection to Brazil's genetic resources is not discriminatory and arbitrary.[181] In addition, Brazil should remove the requirement to perform research and development in Brazil because pharmaceutical companies generally keep their know-how in their headquarters in order to protect their intellectual property assets from appropriation

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[175] *See* Revkin, *supra* note 158, at F1 (adding that in 2000, Brazil stopped exports of biological samples from the Amazon forest even to Brazilians working abroad).

[176] *See id.*, at F1 (reporting that a researcher from Singapore abandoned a project in the Brazilian Amazon and moved his research to a different country, where he received better treatment).

[177] *See* Swiss Guidelines, *supra* note 11, art. 3(1) (favoring a fair and equitable sharing of genetic resources).

[178] *See id.* art. 11(2) (noting that the government should issue access permits within a reasonable time and should facilitate access to genetic resources).

[179] *See id.* arts. 6, 7, 8 (including guidelines about responsibilities of users and providers during and after the research process).

[180] *See id. See infra* notes 181-83 and accompanying text (recommending that the provisions from the Swiss guidelines could be pertinent to Brazil).

[181] *See* Swiss Guidelines, *supra* note 11, art. 1(1) (denoting that access to natural resources should be non-discriminatory).

abroad.[182] Decisions about access to the genetic resources could result in twenty days because if it takes too long, as in Brazil, researchers could change their dissertation topics and conduct research in countries that offer more speedy access to genetic resources.[183] Sharing of intellectual property assets should be permissive because otherwise pharmaceutical companies would be skeptical about investing in the Brazilian Amazon.[184] In addition, a mediator should resolve differences and help avoid biased Brazilian courts.[185]

Furthermore, ecotourism should become part of the Draft Law before Brazil increases its use.[186] The Brazilian government has already drafted guidelines for a national ecotourism policy and Brazil has a vast heritage for ecotourism.[187] The guidelines should require, as the Swiss policy, an environmental assessment before the access to the natural resources takes place and should become part of the Draft Law for access to genetic material.[188] Researchers entering Brazil under the Draft Law should be required to comply with environmentally sound methods for access to the medicinal plant resources.[189] This is especially important because presently foreign tourists use ecotourism to obtain access to Brazil's medicinal plants for bioprospecting purposes.[190]

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[182] *See id.* art. 7(4) (noting that the Swiss guidelines do not require that foreign companies perform their research in Switzerland).

[183] *See id.* arts. 10, 11, 12 (noting that donors should cooperate with other stakeholders to foster collaboration in the collection of genetic resources).

[184] *See id.* arts. 8(2), 8(3) (highlighting that sharing of intellectual property assets is not a requirement).

[185] *See id.* art. 15(1) (encouraging the use of a mediator during the negotiation of mutually agreeable contract terms).

[186] *See id. See infra* notes 187-88 and accompanying text (outlining how ecotourism should become part of the draft law in Brazil).

[187] *See* FIRST NATIONAL REPORT OF BRAZIL, *supra* note 8, at 181 (discussing the use of ecotourism in Brazil).

[188] *See* Laurie Goering, *Brazil Wants Cut of Biotech Firms' Jungle Plunder*, TRIB. COMPANY, July 6, 1999 (stating that tourists take away plants and act as biopirates in the Amazon), *at* http://forests.org/archive/brazil/biotechs.htm (last visited Aug. 5, 2002).

[189] *See supra* notes 186-88 and accompanying text (implying the importance of ecotourism for the protection of the environment).

[190] *See* Mae-Wan Ho, *Brazilian Shamans Denounce Biopiracy*, ISIS NEWS, no. 13/14, Feb. 2002 (discussing the increasing concern among indigenous people in Brazil about biopiracy), *at* http://www.i-sis.org.uk/isisnews/I-sisnews13-16.php (last visited Aug. 10, 2002). *See also* Corazza, *supra* note 9 (reporting that biopirates arrive on tourist visas and that it is not easy to catch them).

Ecotourism finds wide uses in Switzerland and people are becoming increasingly aware of the need to preserve the natural and cultural landscape.[191] For example, the Swiss Confederation has limited transportation to certain tourism areas to protect the natural resources and new projects for transport access are subject to environmental impact assessment.[192] It has also issued guidelines for managing conflicts between tourism and biological diversity.[193] Switzerland urges tourists to contribute to the survival of ecosystems, respect human dignity, choose sustainable mobility, and participate in civil society during their travel.[194]

Similar to Switzerland, Brazil should make its proposed Draft Law less restrictive and more aware of ecotourism.[195] This would likely assist Brazil to attract more internationally renown scientists and accrue benefits from commercialization. The next section discusses how it would be advantageous to Brazil to grant patent protection to secondary uses.

B. *Protect Biodiversity Through the "Swiss claim" Patent Approach*

Brazil would protect its medicinal plants and stimulate pharmaceutical companies to research for new medicinal uses of already discovered drugs if it adopts the "Swiss claim" approach as Switzerland.[196] As a result, Brazilian and foreign

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191 *See* NATIONAL REPORT OF SWITZERLAND, *supra* note 52, at 39-42 (mentioning that tourism in Switzerland ranks third in exports and one person out of eleven works in the field of tourism).

192 *See "Code of Conduct" to Rein in Tourists, Save the Earth*, DEUTSCHE PRESSE-AGENTUR, May 22, 2002 (stating that Switzerland, Austria, and Germany are the three countries "world champions of travel"), LEXIS, News Group File.

193 *See* NATIONAL REPORT OF SWITZERLAND, *supra* note 52, at 39 (discussing the government objectives to adapt regional tourism to the ecological and landscape problems).

194 *See "Code of Conduct" to Rein in Tourists, Save the Earth*, *supra* note 192 (stating that principles of ecotourism apply equally in rich and poor countries). Tourism guidelines are necessary since the number of tourists in Europe and Latin America is expected to double over the next decade. *Id.*

195 *See* Valerie Boisvert & Armelle Caron, *The Convention on Biodiversity: An Institutionalist Perspective of the Debates*, 39 J. ECON. ISSUES 1, Mar. 1, 2002, at 11 (arguing that the current restrictions on access to biological material in Brazil have their limits and stating that those measures would further increase the problems), 2002 WL 17669311.

196 *See supra* notes 80-89 (explaining how the "Swiss claim" approach works in Switzerland and its advantages). *See generally* Teresa Scasa, *Patents for Second*

pharmaceutical companies would have an incentive to search for secondary cures from already discovered and patented drugs.[197] This would also encourage clinical research and new uses in Brazil for traditional medicines.[198] For instance, "Swiss claim" patents in Switzerland have increased the research and development of biotechnology companies in biotechnology investment.[199] The "Swiss claim" type could possibly discover several uses in just one medicinal plant in Brazil and save time for scientists in terms of searching for new medicinal plants for genetic material.[200] Otherwise, investment in new pharmaceutical research would further diminish because without patent protection for secondary uses, researchers have little incentive to investigate the properties of existing pharmaceuticals in order to determine any unknown medical uses.[201] The "Swiss claim" approach could therefore benefit the medicinal plant protection and drug development in Brazil.[202]

Medical Indications and Their Potential Impact on Pharmacare in Canada, 9 HEALTH L.J. 23 (2001) (discussing that "Swiss type" claims have been adopted in Switzerland, the United States, the United Kingdom, Sweden, and Germany).

197 *See A Case for "Swiss-type" Claims in Indian Patent Act*, *supra* note 88 (discussing how the "Swiss claim" patents work).

198 *See id.* (discussing the significance of "Swiss claim" patents).

199 *See* ROLF AUF DER MAUR, INTRODUCTION TO SWISS INTELLECTUAL PROPERTY LAW 22, (vol. 3 (1995)) (providing a brief overview of Swiss copyright, patent, trademark, conflicts of law, and civil procedure laws), *available at* http://www.baerkarrer.ch/ 4publications/4_3_3cont.html (last visited Aug. 11, 2002).

200 *See supra* notes 195-199 (implying the significance of "Swiss claim" patents to protect environmental resources). *See also* Jane Calvert & Greg Lynch, *The Swiss-Style Claim Saga- Is this the End?*, PATENT PROSE, Jan./Feb. 2000 (mentioning that "Swiss type" patents are favorable to scientists and companies involved in research to find new medical uses for compounds already known to have pharmaceutical properties), *at* http://www.bsw.com/articles22.html (last visited Aug. 10, 2002).

201 *See Patents for Methods of Medical Treatment of Humans* (emphasizing that a "Swiss claim" enables second medical uses to obtain patent protection), *at* http://www.med.govt.nz/buslt/int_prop/patentsreview/patentsreview-09.html#P556_133581 (last visited Aug. 10, 2002).

202 *See id.* (asserting that in the absence of "Swiss claim" patents, discoverers of second medical have no incentive to invest in second medical uses, because cost of research is high and benefits are low).

C. *Red and Blue List the Endangered Herbs in the New Database*

Brazil should regulate access to endangered herbs as is the practice in Switzerland.[203] "Red lists" provide information about the endangered status of Swiss medicinal plants and landscape planning.[204] In addition, "blue lists" complement the red lists to monitor stabilization and increase of plant resources.[205] The use of red lists and blue lists has been especially successful in northern Switzerland, where red list findings tended to depress people, while blue lists encouraged decision-makers and the public to increase their nature conservation efforts.[206]

Brazil recently has created a centralized databank to store knowledge accumulated by local indigenous people.[207] This collection of traditional knowledge and medicinal plants would provide information to patent offices about prior art[208] and would be helpful for sharing the benefits between indigenous people and scientists.[209] Brazil has already mapped three hundred medicinal plant species.[210] A red list specification of

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[203] *See Swiss Clearing House Mechanism Biodiversity/ Red Lists/ Introduction*, *supra* note 13 (discussing that Switzerland has introduced the red lists for endangered species and is presently implementing a red book on tourism).

[204] *See id.* (explaining that red lists provide information about endangered species).

[205] *See* Gigon, *supra* note 57 (analyzing the significance of the blue lists to increase efforts to protect the environment).

[206] *See id.* (describing the positive effect of the concurrent use of red and blue lists in Switzerland).

[207] *See Brazil Sees Promise in Jungle Plants, But Tribes See Peril*, *supra* note 39 (noting that Brazil recently created a centralized bank to store traditional knowledge and explaining that to use that information a researcher must pay fees).

[208] *See* Industrial Property Law of Brazil, *supra* note 75, art. 11(1) (stating that an invention is not new if it comprises everything made available to the public, by means of written or oral description, or in any other way before the filing date of the patent application).

[209] *See* Caroline Ryan, *Patent to Protect Ancient Knowledge*, BBC NEWS, Feb. 19, 2002 (stating that the Indian government created a Traditional Knowledge Digital Library to record traditional treatments and prevent them from being patented as novel ideas, and that this new creation could be a model for countries in Latin America), *at* http://news.bbc.co.uk (last visited Feb. 19, 2002).

[210] *See Brazil to Map Potential Medicinal Plants*, REUTERS, Feb. 25, 2002 (stating that IBAMA has created the database of medicinal plants to prevent commercial use of the plants outside Brazil), *at* http://www.ictsd.org/biores/02-03-07/in brief.htm (last visited June 12, 2002).

plants in the Brazilian database would enable the government of Brazil to stay abreast of what species are decreasing in numbers.[211] In addition, use of blue lists should help maintain nature conservation efforts as in Switzerland.[212] Consequently, the Brazilian government should regulate shipping of samples abroad, determine access to the Amazon rainforest, and monitor landscape planning.[213]

V. CONCLUSION

Brazil is a haven of pharmaceutical biodiversity, but its lack of permanent legislation on access to medicinal plants acts as a barrier to progress of international science, and its present patent law hinders innovation.[214] Instead, Brazil could attract foreign scientists by adapting its Draft Law to the Swiss guidelines for access to biological resources and by passing a permanent law on access to genetic resources that is fair to foreign researchers.[215] Brazil should provide patent protection for secondary uses of already patented plant-derived medicines to encourage the continuance of trials on already patented medicines.[216] Since ecotourism could be an easy excuse for biopiracy, the Brazilian government should also consider including ecotourism in its Draft Law on access to biological resources.[217] Finally, the Swiss method of red and blue listing would be a good addition to the recently created Brazilian databank system to keep track of endangered medicinal plants in the Amazon.[218]

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[211] *See supra* notes 180-83 (implying that red list classification could work well in Brazil).

[212] *See supra* notes 182-83 (highlighting that blue lists in Brazil could encourage decision-makers and the public to improve further their nature conservation efforts).

[213] *See id.* (deducing that the positive effects of red lists in Switzerland could apply in Brazil).

[214] *See supra* notes 129-60 (analyzing why Brazil presently does not yield benefits from the commercialization of its medicinal plant resources).

[215] *See supra* notes 161-77 and accompanying text (recommending that Brazil make its medicinal plants more accessible to scientists).

[216] *See supra* notes 189-93 and accompanying text (recommending that Switzerland adopt the "Swiss claim" patents).

[217] *See supra* notes 171-76 and accompanying text (encouraging Brazil to incorporate ecotourism clauses in its draft law).

[218] *See supra* notes 180-90 and accompanying text (suggesting that "red lists" could be vital for protection of pharmaceutical biodiversity in Brazil).

Brazil has much to learn from Switzerland since the two countries share significant similarities in their constitutional protection of biodiversity, richness of medicinal plants, and ethnobiological traditions.[219] The Swiss model should assist Brazil in protecting medicinal plant resources and managing plants' commercial use in a way that would return economic benefit to Brazil.[220]

[219] *See supra* notes 95-128 and accompanying text (establishing the basis for comparison between Brazil and Switzerland and why the Swiss model could be adaptable in Brazil).

[220] *See* Michael Huft, *Indigenous Peoples and Drug Discovery Research: A Question of Intellectual Property Rights*, 89 NW. U.L. REV. 1678, 1690-91 (1995) (stating that during the last decade medicinal plants have become an important source for plant-derived drugs to treat various forms of cancer).