

## Note

# The “Tragedy of the Commons” in Plant Genetic Resources: The Need for a New International Regime Centered Around an International Biotechnology Patent Office

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The last several centuries have seen a transformation in the ways in which wealth is generated. As society has transformed itself in the post-industrial era, “knowledge” and “information,” as opposed to land and physical property, have increasingly become the primary sources of wealth generation.<sup>1</sup> For example, historically, it was ownership of the forest that was the principal channel for the derivation of riches. Today it is the possession of the patent in the pharmaceutical product derived from the leaves of the trees of the very same forest that is the fountain from which the greatest wealth springs. It is not surprising, therefore, that the strategy of wealth maximization has shifted from the desire to accumulate physical property to one in which the domination of intellectual property rights (“IPRs”) has become preeminent.<sup>2</sup>

As already alluded to, the products derived from plant genetic resources (“PGRs”)<sup>3</sup> are major sources of wealth generation for developed

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† J.D., Yale Law School, expected 2002. I am grateful to Professor Gideon Parchomovsky for his guidance and valuable commentary. I should also thank my colleagues at the Yale Law School, especially Saema Somalya, Jean Tom and the other editors of the Yale Human Rights and Development Law Journal, without whose constant challenge to my ideas, this project would never have come to fruition.

1. See, e.g., CHRISTOPHER MAY, A GLOBAL POLITICAL ECONOMY OF INTELLECTUAL PROPERTY RIGHTS: THE NEW ENCLOSURES? 4-5 (2000).

2. See generally *id.* at 164-67.

3. “[PGRs are the] genetic information found in the chromosomes of the nucleus and associated subcellular structures [of plants].” H. Garrison Wilkes, Comment, *Plant Genetic Resources Over Ten Thousand Years: From a Handful of Seed to the Crop-Specific Mega-Gene Banks*, in SEEDS AND SOVEREIGNTY: THE USE AND CONTROL OF PLANT GENETIC RESOURCES 67, 79 (Jack

countries. Over the last several decades, the economic value of these PGRs has risen tremendously.<sup>4</sup> It is a basic principle of property law that as the economic value of property increases, it is less likely to be destroyed. However, this is not true of PGRs. In fact, in the last several decades the destruction of PGRs, rather than ceasing, has actually accelerated.<sup>5</sup> If PGRs are the source of great wealth, why are they being destroyed? The answer is rather simple—those who have physical dominion (and thus decide whether the PGRs are conserved or consumed), are, by in large, not those who profit from their conservation.

In the current international legal regime, Lesser Developed Countries (“LDCs”),<sup>6</sup> in which most of the PGRs are housed, only collect the rents from the destruction of PGRs—what I will refer to as “consumption.”<sup>7</sup> It is Developed Countries (“DCs”)<sup>8</sup> that profit most from the preservation of these resources—“conservation.”<sup>9</sup> This divide is a product of the combination of the treatment of “raw genetic resources” in international law as the “common heritage of mankind,”<sup>10</sup> or as *global public goods*, and the international intellectual property (“IP”) regime that treats the products derived therefrom as private property. Global public goods are distinct from private goods in that those who consume them do not have to pay for their use.<sup>11</sup> Thus, like other global public goods, PGRs have suffered what property law scholars have termed “the tragedy of the commons.”<sup>12</sup> The

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R. Kloppenburg, Jr. ed., 1988).

4. See, e.g., Mary Parlange, *Eco-nomics*, NEW SCIENTIST, Feb. 6, 1999, at 42 (“Consumers in the US spend at least \$6 billion each year on medicines originally derived from tropical plants.”).

5. See, e.g., ANNE BECHER, BIODIVERSITY: A REFERENCE HANDBOOK 22 (1998) (“[E]ven the most conservative estimates indicate that we are in the midst of a crisis on the order of the great prehistoric extinctions.”).

6. “Countries that do not have extensive infrastructure, capital and natural resource development.” Mark Hanning, *An Examination of the Possibility to Secure Intellectual Property Rights for Plant Genetic Resources Developed by Indigenous Peoples of the NAFTA States: Domestic Legislation Under the International Convention for Protection of New Plant Varieties*, 13 ARIZ. J. INT’L & COMP. L. 175, 182-83 (1996).

7. By “consumption,” I mean all of those activities, such as logging and industrial development, that require the destruction of PGRs.

8. Countries that have well established infrastructures and strong capital reserves.

9. The industries that derive commercial profit from the conservation of PGRs are those that use the PGRs to develop commercially valuable products, or “end products.”

10. The use of the phrase the “common heritage of mankind” is usually traced to the FAO Undertaking. See *infra* notes 62-64 and accompanying text.

11. Other examples of global public goods are oxygen and the oceans. See Christopher D. Stone, *What to do About Biodiversity: Property Rights, Public Goods, and the Earth’s Biological Riches*, 68 S. CAL. L. REV. 577, 580 (1995). Genetic resources are treated as public goods, but unlike oceans and oxygen, they are not *pure* public goods. As this Note hopes to demonstrate, there are principled ways in which these goods can be treated as property and their rights can be vested in owners. See *infra* Part IV. The same is not true for pure public goods such as oxygen and oceans, whose use is *nonexcludable*.

12. See, e.g., James O. Odek, *Bio-Piracy: Creating Proprietary Rights in Plant Genetic Resources*, 2 J. INTELL. PROP. L. 141,149 (1994) (“[Plant resources] are considered a common heritage of mankind. . . . This approach leaves plant genetic resources in a jurisprudential void, unprotected by private property rights and freely accessible to all.”); Lakshmi Sarma, Note, *Biopiracy: Twentieth Century Imperialism in the Form of International Agreements* 13 TEMP. INT’L & COMP. L.J. 107, 114 (1999) (“[T]ransnational corporations . . . take plant genetic resources from

tragedy "is the situation in which unowned and unmanaged common resources are available to all, with the consequence that entrants crowd onto these resources, overusing them and underinvesting in their maintenance and improvement."<sup>13</sup>

If conservation of PGRs did not impose a cost upon the host country, treating them as global public goods would not necessarily lead to their destruction. In point of fact, however, the conservation of PGRs requires host countries to forego the profits that can be derived from consumption strategies such as logging.<sup>14</sup> It is no surprise, therefore, that LDCs continue to consume, rather than conserve. While DCs are not shy about condemning LDCs for their destruction of biodiversity, they are also the principal architects of an international regime in which this destruction is the most attractive economic option available to LDCs. The "international regime" to which I primarily allude is the IP regime which grants property rights in the products derived from PGRs to industrialists in DCs and grants LDCs no similar right.

A review of the various arguments made by both DCs and LDCs reveals two basic points of view. On one hand, there is the compelling positive argument that granting property rights to industrialists is a prerequisite to valuable innovation and these inventions ultimately help everyone. Equally gripping is the normative contention that the system is inequitable in that LDCs, who are the sources of PGRs, are being pillaged.

None of this is new. My purpose in writing this Note is not to further illuminate the battle lines, nor is it to come up with the argument that finally settles the score in the contest between the normativists and positivists. Too many others have put their pens to that endeavor. While my normative preferences are rather evident, I write here as a *pragmatist*. My goal is to elaborate a structural proposal that is empirically realizable and also results in a world that is normatively superior. My proposal has at its core the premise that *both* LDCs who house PGRs and DCs whose industrialists develop commercial products from them, should have property rights and "get their fair share." There are two strands to the argument. The theoretical one draws upon the work of legal scholar Carol Rose and posits that PGRs should be treated as Limited Common Property ("LCP") rather than global public goods. LCP is "property held as commons amongst the members of a group, but exclusively vis-à-vis the

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these communities for free."); *But see* Michael J. Huft, *Indigenous Peoples and Drug Discovery Research: A Question of Intellectual Property Rights*, 89 NW. U.L. REV. 1678, 1685 (1995) (noting that some governments are proposing and enacting domestic legislation to restrict access to their genetic resources unless a compensation agreement has been reached). It is unclear whether these domestic laws will be treated as trade barriers under TRIPs, a treaty which will be discussed more fully in Part I. *See infra* note 49, for a discussion of possible WTO sanctions against these countries.

13. Carol M. Rose, *The Several Futures of Property: Of Cyberspace and Folk Tales, Emission Trades and Ecosystems*, 83 MINN. L. REV. 129, 129 (1998).

14. International law does recognize a nation-state's property right in "hard resources"--the actual trees and plants. *See* Stone, *supra* note 11, at 590 (noting that state sovereignty over internal resources is "entrenched in international law").

outside world.”<sup>15</sup> The second, structural, strand has at its core the proposal that an International Biotechnology Patent Office (“IBPO”) to which all patent applications for products derived from PGRs, from around the world, are referred, be created for the explicit purpose of granting industrialists patents in commercial products on the condition that part of the revenues be distributed to the governments of the LDCs from which the PGRs were derived. In elaborating my proposal I aspire to fill what I perceive to be a rather sizeable lacuna in the scholarship and to simultaneously shift the dialogue away from the normativist vs. positivist debate towards a conversation focused on potential *solutions* that will both aid in the development of LDCs and maintain incentives for innovation.

This Note is divided into six Parts. Part I sets forth the normative case for changing the status quo regime. Part II considers in detail bio-prospecting and the ways in which the status quo allocates the rents of conservation and consumption. The discussion evaluates the existing international legal regime with particular emphasis on the role of IP law. Part III explores the reasons why the status-quo regime is both ineffective and inefficient. Part IV develops the IBPO model in detail. Part V evaluates other proposals that have been forwarded in the scholarship and defends the IBPO model as a superior policy option for both LDCs and DCs. Finally, Part VI defends the proposal for the IBPO as creating a regime that is normatively superior to the one that currently exists.

## I. THE NORMATIVE CASE FOR CHANGE

Any attempt to propose structural policy changes to the status quo must first grapple with the all-important question, why change? As alluded to in the introduction, I propose a dual response to this macro-question, one based on the inefficiency of the status quo and the other on its normative undesirability. I begin in this Part by setting forth the second prong.

The current international regime raises significant issues relating to the human rights of indigenous communities. Some suggest that the regime retards the long-term development of LDCs by forcing their hand into consumption rather than conservation strategies.<sup>16</sup> These authors note that this reflects a manifestation of the desire to control access to wealth; a strong motivating force in industrialized economies.<sup>17</sup> Referring to the current international system, Professor James Boyle notes: “[I]f one has the slightest concern for distributional justice in one’s criteria for property regimes, this regime must surely fail.”<sup>18</sup> As it stands, corporations from

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15. Rose, *supra* note 13, at 132.

16. See *infra* notes 112-20 for an explanation for why the status quo “forces the hand” of LDCs.

17. See, e.g., SHIVA, *supra* note 96; *Biocolonialism Patent Mightier Than Sword*, THE STATESMAN (India), Mar. 3, 1998.

18. JAMES BOYLE, SHAMANS, SOFTWARE AND SPLEENS: LAW AND THE CONSTRUCTION OF THE

DCs are able to use PGRs held within third world countries to their benefit without distributing any of the rents back to the LDCs. This system presupposes that nations do not have sovereign rights over the PGRs within their borders. Thus, PGRs leave the South as the "common heritage of mankind" and return as "individually owned" commodities for sale at prices that inhibit many citizens of the LDCs, from which the PGRs originated, from having access to them.

Further aggravating distributive justice concerns is the fact that many of the "inventors" that are awarded patent protection for their "inventions" would not have developed their end-products without the help of indigenous communities. Many bio-prospectors rely upon the advice of indigenous communities to identify plants that may have specific uses.<sup>19</sup> They then send those plants to labs where they are tested, screened, and sometimes developed into marketable products. While the corporations from DCs collect the rents from these products, the contributions of indigenous knowledge go unrecognized and uncompensated.

#### A. The Neem Tree

While there are many examples that illustrate the inequities in the current system, the Neem tree is perhaps the most illustrative. Indians have used the Neem tree for centuries. They have used the bark to clean teeth, the leaf juice to treat skin disorders and control infections, and the seeds as spermicide and insecticide. Researchers capitalized on this knowledge and isolated a chemical called *azadirachtin* in the seed. They were able to stabilize the chemical so that it could be sold commercially. W.R. Grace & Co. subsequently sought and received a patent on *azadirachtin* in the United States.<sup>20</sup> Neemix, the name of the pesticide containing *azadirachtin*, has brought great profits to W.R. Grace & Co. Neither the Indian government, nor native Indians, have received any compensation.<sup>21</sup> Additionally, the price of Neem is now so high that many

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INFORMATION SOCIETY 142 (1996).

19. See, e.g., Naomi Roht-Arriaza, *Of Seeds and Shamans: The Appropriation of Scientific and Technical Knowledge of Indigenous and Local Communities*, 17 MICH. J. INT'L L. 919, 929 (1996) ("Thus the 'shaman' is no longer a 'witch doctor' but a healer with knowledge of traditional remedies worthy of new respect from Western science.").

20. U.S. Patent No. 5,281,618.

21. See, e.g., Roht-Arriaza, *supra* note 19, at 922 (noting that Grace does not plan on compensating India calling Indian knowledge "folk medicine"). But cf. Bojoy B. Patro, *India-Trade: Patent Denial Boosts Foes of Bio-Piracy*, Inter Press Service, Sept. 4, 1997, available in LEXIS, News Group File (describing the successful legal challenge by India's Council for Scientific and Industrial Research (CSIR) of a patent on the use of turmeric granted by the USPTO to the University of Mississippi Medical Center in December 1993).

local farmers can no longer afford it.<sup>22</sup>

### B. The IP Policy in the Context of the DC Framework

Perhaps one of the more contradictory aspects of the position taken by DCs is the call for greater “responsibility” on the part of LDCs with regards to the preservation of ecological resources.<sup>23</sup> DCs view subsidies for preservation as *charity* as opposed to *contributions*. The Developed Countries’ position might be summed up as follows:

The conservation of environmental habitats is central to the continued production of global public goods such as oxygen, and PGRs. Even though you can derive profits by consuming these resources as private goods, you have an obligation to preserve these habitats so that the world can benefit from the continued use of the global public goods. And, you should bear the entire burden of paying for the global public goods.

Not only is this a poor utilitarian strategy, it is normatively problematic. It is the equivalent of a policy that would free anyone within the richest five percent in the United States from paying any taxes, thereby increasing the burden on the middle class and poor. Most would agree that a policy that forces those who have the fewest resources to pay for public goods while allowing the richest part of the population to pay little would be both irrational and unjust.

Compounding the difficulty with the proposition that LDCs have a moral obligation to bear the cost of ecological preservation, is the fact that the very countries that condemn LDCs for not conserving used deforestation and consumption of ecological resources during their own period of industrialization.<sup>24</sup> Audiences in DCs feel it is ironic that the United States and other DCs refused to accept IPRs during the period of time when they were developing but now suggest that IPRs are somehow essential to development, the natural right of inventors, and fundamental

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22. See, e.g., David S. Tilford, *Saving the Blueprints: The International Legal Regime for Plant Resources*, 30 CASE W. RES. J. INT’L L. 373, 377 (1998) (arguing that people in LDCs are often forced to purchase from the Developed World that which they provided without charge).

23. See Odek, *supra* note 12, at 158:

The poor countries have been told to preserve their forests and other genetic resources on the off-chance that at some future date something is discovered which might prove useful to humanity . . . . We are also told that the rich will not agree to compensate the poor for their sacrifices.

24. See MAY, *supra* note 1 at 85-6.

tenets of an international fair trade.

### C. Insufficient DC Justifications

Aside from the argument that LDCs have some sort of moral obligation to conserve their ecosystems, the DCs have offered two main arguments in support of the current international regime. First, they argue that IPRs are necessary to protect corporations from the theft of intellectual property. They claim that DCs had a right to demand stronger IPR protection through TRIPs in order to prevent LDCs from free-riding off of corporate investments by pirating their products.<sup>25</sup> Second, they suggest that LDCs do not deserve compensation for products derived from raw germplasm. Applying a romantic version of natural rights theory,<sup>26</sup> the DCs propose that no one should own the genetic resources within plants. They then argue that once scientists have transformed these raw materials into *useful inventions*, they become intellectual goods worthy of protection. Because conserving the resources, and in some cases pointing out their potential usefulness to scientists, are not “innovative steps,” the LDCs have no right to the commercial profits that are the products of the intellect of scientists.

To augment these normative claims, the DCs propose utilitarian defenses for the current regime. They contend that ineffectual IPR regimes, and schemes that force corporations to redistribute wealth to LDCs, will serve as barriers to innovation. Appealing to the idealistic vision that technological innovation is the solution to all problems, the DCs propose that the current international regime will ultimately help the LDCs by producing more socially valuable goods. Additionally, DCs propose that LDCs who have not had strict IPR regimes have suffered because these policies have prevented them from attracting foreign capital and from stimulating domestic technological growth. The not-so-implicit suggestion has been that governments of the LDCs have pursued strategies that have stunted their own growth and that TRIPs is a way to force countries to *help themselves*.

While each of these arguments has some merit, collectively they fail to address the concerns raised by indigenous communities and the governments of LDCs. Although they do suggest that there are legitimate claims to be made on each side of the controversy, they fail to acknowledge

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25. See e.g., Michael L. Doane, *Trips and International Intellectual Property Protection in an Age of Advancing Technology*, 9 AM. U.J. INT'L L. & POL'Y 465, 470 (1994) (“[S]ome pharmaceutical companies face foreign competitors who misappropriate information with the active assistance and encouragement of their governments to produce inexpensive and potentially ineffective or dangerous imitations.”).

26. See *supra* notes 104-109 and accompanying text.

the guilt of DCs in stunting the development of LDCs by forcing them to consume and denying them access to valuable bio-technologies and pharmaceuticals. The DCs also fail to recognize the human rights of indigenous communities who have a powerful claim that they too are "being robbed."

#### D. Summation

In this Part, I have attempted to provide the normative answer to the macro-question, "Why change?" In a world very much unlike the one in which we live, this would be sufficient to instigate policy reorientation. While I do not deny that human rights and development issues are instigators for change, I am not persuaded that simply illuminating the distributional consequences of the actions of DCs is *sufficient* to revise the system. Thus, in Part III, I attempt to answer the "why change" question by providing an efficiency-based justification. Before moving to this secondary explanation, I provide a more detailed sketch of the problem in Part II.

## II. BIO-PROSPECTING AND THE CURRENT INTERNATIONAL LEGAL SCHEME

### A. How PGRs Are Used

Over the last several decades scientists and researchers in DCs have discovered that PGRs, which are almost exclusively found within the borders of LDCs,<sup>27</sup> are an important source for the development of commercially valuable end products.<sup>28</sup> For example, PGRs have been used to bioengineer seeds,<sup>29</sup> develop pesticides,<sup>30</sup> and produce pharmaceuticals.<sup>31</sup>

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27. See, e.g., BECHER, *supra* note 5, at 96 (noting that nearly half of the world's species are concentrated in 17 "Global Hotspots" that comprise two percent of the world's surface area and are *all* within the borders of LDCs).

28. See, e.g., Huft, *supra* note 12, at 1679 ("It has recently become apparent to many pharmaceutical companies . . . that the imagination of synthetic chemists is far less creative than that of nature, and a renewed effort has been underway for the last several years to search the natural world for sources of new pharmaceuticals."); Laura Tangley, *Ilya Raskin: Probing The Roots of Plant-Based Drugs*, U.S. NEWS & WORLD REPORT, Jan., 2000, available in LEXIS, Magazine Stories, Combined File (explaining how new technologies that are being used in combination with PGRs to develop pharmaceutical products).

29. Many insect-resistant and high-yield crops have been developed by using PGRs discovered through bioprospecting. See, e.g., Odek, *supra* note 12, at 143.

30. One of the most valuable, and perhaps the most notorious, pesticides that has been developed from bio-prospecting is Neemix which is derived from the Neem tree. This case is

The commercial value of these products is a byproduct of gaining property rights in them through established patent systems in DCs.

Industrialists who thrive on these end products have three fundamental objectives: securing strong patent protection for their end products, conserving a large supply of PGRs with which to work,<sup>32</sup> and stemming the destruction of indigenous communities upon which they so heavily rely to identify plants with potentially valuable PGRs.<sup>33</sup> While they have generally succeeded on the first objective, they have failed miserably on the last two. Today, both the world's plant biodiversity and indigenous knowledge are being rapidly depleted.<sup>34</sup>

### B. TRIPS

While the leaders of DCs have repeatedly called on LDCs to enhance their conservation efforts, they have simultaneously pushed for legal regimes that deny LDCs compensation when their PGRs are used commercially by DCs. This relationship is acutely and powerfully codified in the Agreement on Trade Related Aspects of Intellectual Property Rights ("TRIPs"),<sup>35</sup> signed in 1994 as a part of the Uruguay Round of General Agreement on Trade and Tariffs ("GATT").<sup>36</sup> Macroscopically, TRIPs creates an international floor of IP protection below which all signatory countries agree not to go. DCs, pressured by corporations who regard the

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discussed more carefully in Part I.

31. Some estimate that as many as 30% of the drugs that have been discovered in the last 15 to 20 years have been developed using bio-prospecting. See, e.g., Parlange, *supra* note 4. For example, Quinine, the cure for Malaria comes from the bark of the Peruvian cinchona tree. The rosy periwinkle, found in Madagascar, has been used to develop vincristine and vinblastine, both pharmaceuticals that are used to combat Hodgkin's disease and pediatric lymphocytic leukemia. See, e.g., Shayana Kadidal, Note, *Plants, Poverty, and Pharmaceutical Patents*, 103 YALE L.J. 223, 223 (1993).

Aside from examples discussed here, bioprospecting has been used to produce a number of other commercial products. For example, the endod berry, found in Ethiopia, has been used in the maritime industry to kill zebra mussels. See, Roht-Arriaza, *supra* note 19, at 923.

32. "[O]ne can think of wild genetic resources as a lottery ticket containing a vast number of genetic tickets, each with a different potential payoff." Roger A. Sedjo, *Property Rights, Genetic Resources, and Biotechnological Change*, 35 J.L. & ECON. 199, 204 (1992). This is true because the vast majority of plant species have yet to be identified and of those that have been identified even fewer have been studied in depth. See Odek, *supra* note 12, at 144. As the number of these "lottery tickets" decreases so too does the chance of "winning the lottery."

33. See, e.g., Roht-Arriaza, *supra* note 19, at 921-29.

34. By focusing on the role of PGRs in developing commercial end products, I do not intend to minimize the more fundamental danger that these losses create in terms of the stability of the world's ecosystem.

35. Agreement on Trade-Related Aspects of Intellectual Property Rights, Apr. 15, 1994, LEGAL INSTRUMENTS—RESULTS OF THE URUGUAY ROUND vol. 31; 33 I.L.M. 81 [hereinafter TRIPs Agreement].

36. General Agreement on Tariffs and Trade, Oct. 30, 1947, 61 Stat. A - 11, T.I.A.S. No. 1700, 55 U.N.T.S. 194. The GATT treaty was originally signed in 1947 with the aim of reducing international trade barriers. Since 1947 there have been several "rounds" of negotiations between the member countries aimed at lowering trade barriers.

expansion of IPRs as crucial to their wealth maximization, were the driving force behind TRIPs. LDCs who generally regard strong IPRs as inhibitors of their own development, were, for the most part, vehemently opposed to the agreement.<sup>37</sup>

It is not surprising that when the dispute came to a head, the DCs prevailed. They did so by integrating their IP agenda into the GATT.<sup>38</sup> The coercive maneuver left LDCs between the proverbial “rock and a hard place.” By including TRIPs into the larger agreement, LDCs were forced into signing the agreement because rejecting it would have required them to rebuff the entire GATT agreement.<sup>39</sup> The GATT is important to LDCs because non-participation in it means virtually shutting oneself out of the international trade market that holds the key to achieving economic growth for many LDCs. Additionally, the preeminence of trade policy is such that sour trade relations have spillover effects into other crucial realms such as international aid for development.

LDCs were correct to note that global IPRs had never been included as part of the GATT.<sup>40</sup> DCs nonetheless forged ahead because they understood that the GATT was their best opportunity to “convince” LDCs to enforce more stringent IP standards.<sup>41</sup> The DCs defended themselves by arguing that “piracy” by LDCs constituted an unfair trade advantage<sup>42</sup> and amounted to a significant trade barrier. LDCs, understanding that they would be at a severe bargaining disadvantage if IPRs were attached to the GATT, called on DCs to negotiate an independent treaty within the framework of the World Intellectual Property Organization (“WIPO”)—a branch of the United Nations.<sup>43</sup> The DCs, who were aware that they would forego their bargaining advantage<sup>44</sup> if they agreed to WIPO negotiations,

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37. See, e.g., Alan S. Gutterman, *The North-South Debate Regarding the Protection of Intellectual Property Rights*, 28 WAKE FOREST L. REV. 89, 106 (1993).

38. Multinational corporations who developed products argued that their patents should extend beyond national borders and that their inability to obtain patent protection for some of their goods in foreign jurisdictions was a trade barrier. See, e.g., Klaus Bosselmann, *Plants and Politics: The International Legal Regime Concerning Biotechnology and Biodiversity*, 7 COLO. J. INT'L ENVTL. L. & POL'Y 111, 126-27 (1996).

39. See, e.g., Ruth L. Gana, *Has Creativity Died in the Third World? Some Implications of the Internationalization of Intellectual Property*, 24 DENV. J. INT'L L. & POL'Y 109, 110 (1995).

40. See, e.g., Gutterman, *supra* note 37, at 106-07.

41. *Id.*

42. See Bosselmann, *supra* note 38.

43. Convention Establishing the World Intellectual Property Organization (WIPO), July 14, 1967, 21 U.S.T. 1770, 828 U.N.T.S. 3. WIPO was developed to address international IP issues. Since its inception, DCs have generally disfavored WIPO because they perceive the organization to be biased in favor of LDCs. See, e.g., David G. Scalise and Daniel Nugent, Comment, *International Intellectual Property Protection for Living Matter: Biotechnology, Multinational Conventions and the Exception for Agriculture*, 27 CASE W. RES. J. INT'L L. 83, 107 (1995) (“WIPO embodies a strong proclivity towards the plight of developing nations, who compose a majority of UN membership.”).

44. See, e.g., Gutterman, *supra* note 37, at 107; cf. Robert Weissman, *A Long, Strange TRIPs: The Pharmaceutical Industry Drive to Harmonize Global Intellectual Property Rules, and the Remaining WTO Legal Alternatives Available to Third World Countries*, 17 U. PA. J. INT'L ECON. L. 1069, 1083-85 (1996).

refused.<sup>45</sup> DCs appreciated that the GATT, dominated by the DCs, would be a domain in which they would have greater say than they would in WIPO where the LDCs and DCs are not necessarily placed on different footing.

Although the TRIPs agreement addresses issues in copyright, patent, and trademark law, the patent issues turned out to be amongst the most contentious. The United States government, pressured by the highly influential pharmaceutical and biotechnology industries, took a particularly hard line regarding the patent provisions, insisting on the inclusion of U.S.-style patent standards. Both of these industries are particularly dependent on strong patent protection because of a combination of the high costs of research and development that are necessary to produce new products and the relative ease with which they can be copied via reverse engineering.<sup>46</sup>

Despite their vociferous opposition, LDCs ultimately had no choice but to relent and sign.<sup>47</sup> Part of the strong opposition by LDCs can be explained by their understanding that non-compliance with TRIPs would not be a safe fall-back option. As part of GATT, TRIPs will be enforced through the World Trade Organization ("WTO")<sup>48</sup> dispute resolution process.<sup>49</sup> Thus, because of the threat of trade sanctions, LDCs will have a strong incentive not to violate or circumvent TRIPs.

The legal status of PGRs was itself a hotly contested issue in the TRIPs negotiations. The battle lines were roughly as follows: The DCs sought a long patent term<sup>50</sup> and a broad definition of "patentable subject matter;" LDCs sought a short patent term, and a narrow definition of "patentable subject matter" that would exclude plants, products derived from PGRs, and living organisms.<sup>51</sup> The "compromise solution," that TRIPs celebrated

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45. Weissman, *supra* note 44, at 1083-84.

46. See, e.g., Kevin W. 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, 48 (noting that only one in five thousand pharmaceutical products ever reaches the market, and therefore, pharmaceutical companies rely on patent protection and monopoly prices to make up for sunk R&D costs); Weissman, *supra* note 44, at 1075-76.

47. See, e.g., Gana, *supra* note 39, at 110 (noting that nations desiring to be part of the liberal trading system have been forced to accept TRIPs as a prerequisite to that privilege).

48. General Agreement on Trade and Tariffs—Multilateral Trade Negotiations (The Uruguay Round): Agreement Establishing the Multilateral Trade Organization (World Trade Organization) Dec. 15, 1993, 33 I.L.M. 13 (1994).

49. This was important to the DCs because they consider the WTO to be a more effective enforcement body than WIPO or the International Court of Justice for resolving commercial disputes over IP violations. See e.g., Weissman, *supra* note 44, at 1095 ("[The WTO] is likely to apply severe pressure on countries to alter patent or other laws to found by a dispute settlement panel to be WTO-illegal. . . . The threat of "cross-sectoral retaliation"—the imposition of sanctions against a different economic sector than the one in which the WTO-illegal law exists—will be particularly coercive.").

50. See, e.g., McCabe *supra* note 46, at 44.

51. *Id.* There are several reasons why LDCs have protested stronger international IPRs. Among the most prevalent fears are that IPRs will result in high prices and will limit accessibility and technology transfers and that patents will be used by transnational corporations as instruments of control. See, e.g., Valentina Tejera, Note, *Tripping Over Property Rights: Is it Possible to Reconcile the Convention on Biological Diversity with Article 27 of the TRIPs*

itself as, demonstrated the imbalance in bargaining power between the LDCs and DCs. The DCs were able to secure the patentability of living organisms and biological processes, including seeds and pharmaceuticals.<sup>52</sup> They secured a minimum patent term of 17 years from the date of filing. The LDCs “won” the exclusion from patentability of methods of treatment of humans or animals,<sup>53</sup> and plants and animals themselves.<sup>54</sup> If, however, a State chooses not to extend full patent protection to plant varieties, they must provide protection for them by an “effective *sui generis* system.”<sup>55</sup>

While this provision can be interpreted broadly so as to leave LDCs a great deal of leeway, most commentators agree that this phrase will be interpreted by the WTO to refer to a system modeled after the International Conference for the Protection of New Varieties of Plants (“UPOV”).<sup>56</sup> The UPOV provides protection for new plant varieties that are clearly distinguishable by one or more characteristic, homogenous in their sexual reproduction or vegetative propagation, and stable in their essential characteristics.<sup>57</sup> The convention was most recently modified in 1991; the modifications “altered the standard of protection from a modified copyright model to a modified patent model.”<sup>58</sup> Hence, while UPOV is somewhat more favorable to LDCs than the U.S.-style patent protection for plants, it does not represent that much of a victory for LDCs because “plants” are defined narrowly and because the “*sui generis*” protection is still relatively stringent.<sup>59</sup>

The final concession LDCs were able to “win” was a five to ten year transition period for the implementation of TRIPs. The longer terms are applicable to those countries where the patent protections are being extended to products that were not previously the subject of domestic patent protection.<sup>60</sup>

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*Agreement?*, 33 NEW ENG. L. REV. 967 (1999); Bosselmann, *supra* note 38, at 127.

52. See TRIPs Agreement, *supra* note 35, at art. 27.

53. See *id.* at art. 27.3 (stating that members may exclude “diagnostic, therapeutic and surgical methods for the treatment of humans or animals”).

54. *Id.* (“Members may exclude “plants and animals other than micro-organisms, and essentially biological processes for the production of plants or animals other than non-biological and microbiological processes.”).

55. *Id.* at art. 27.3 (b) (“Members shall provide for the protection of plant varieties either by patents or by an effective *sui generis* system or by any combination thereof.”).

56. International Conference for the Protection of New Varieties of Plants, Dec. 2, 1961, 815 U.N.T.S. 89, 92. For support for the proposition that TRIPs will be interpreted so as to require LDCs to maintain a minimal floor equal to that set by UPOV, see for example, Roht-Arriaza, *supra* note 19; and J. Benjamin Bai, Comment, *Protecting Plant Varieties under TRIPs and NAFTA: Should Utility Patents be Available for Plants?*, 32 TEX. INT’L L.J. 139, 140 (1997).

57. See, McCabe, *supra* note 46, at 58.

58. *Id.* at 59.

59. *Id.*

60. See TRIPs Agreement, *supra* note 35, at art. 65. DCs agreed to a transition period, in part, because they recognized that it would be very costly and time consuming for LDCs to develop an infrastructure to properly assign and enforce IP rights as they are required to do by TRIPs. See, e.g., Robert Sherwood, *The TRIPs Agreement: Implications for Developing Countries*, 37 IDEA 491, 527-28 (1997) (describing the tremendous burden building an infrastructure compliant with TRIPs will place on LDCs).

### C. Before TRIPS

While it is quite clear that nations that fail to comply with the TRIPS provisions will be in violation of their international commitment, and will be sanctioned by the WTO,<sup>61</sup> there are several other conventions and treaties that predate TRIPS. These are briefly discussed here because they help illuminate the nature and intensity of the dispute.

The first major international effort to confront the issue of bio-prospecting was a resolution passed by the United Nations Food and Agriculture Organization ("FAO") in 1983,<sup>62</sup> called the International Undertaking on Plant Genetic Resources ("FAO Undertaking").<sup>63</sup> The FAO Undertaking is premised on the principle that all plant germplasm is "the common heritage of mankind."<sup>64</sup> The intent of the FAO Undertaking was that *both* "raw" germplasm *and* the commercial products derived therefrom, would be treated as the "common heritage of mankind" or global public goods.<sup>65</sup> For apparent reasons, DCs rejected the FAO Undertaking arguing that it constituted a violation of their private property systems.<sup>66</sup> While they refused to accept the principle that their commercial products were the "common heritage of mankind," they had no qualms with the proposition that *raw* germplasm should be treated as common heritage.<sup>67</sup> Thus, DCs developed their patent systems granting property rights to commercial products derived from PGRs while simultaneously denying the existence of any property rights in the PGRs themselves.

Frustrated by the refusal of the DCs to recognize the validity of the FAO Undertaking, the LDCs reintroduced the issue at the 1992 United

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61. See, e.g., Tejera, *supra* note 51, at 981 (noting that India is resisting the WTO's demands to implement TRIPS requirements and that the WTO has responded by threatening sanctions); Scalise & Nugent, *supra* note 43, at 117 (detailing the ability of the United States to use Special 301 of the Omnibus Trade and Competitiveness Act, Section 337 of the Tariff Act of 1930, and other statutes, as trade sanctions to punish nations that violate IPRs in a way that hurts the competitiveness of U.S. firms).

62. One of the outcomes of the FAO Undertaking that has raised a great deal of controversy is the system of international seed banks that make up the Consultative Group on International Agricultural Research (CGIAR) that was set up after the Undertaking. These seed banks were built, mostly within the borders of DCs, as *ex situ* preservation sites for germplasm, mostly from LDCs. The system was designed to make the germplasm, as well as the commercial products developed from it, the "common heritage of mankind." See, e.g., Kadidal *supra* note 31, at 229. The seed banks, however, have been used largely as mechanisms to preserve germplasm from LDCs for *uncompensated* use by DCs. See, e.g., Odek, *supra* note 12, at 167 ("This lack of international control has facilitated the transfer of plant genetic resource [sic] from their centers of origin to the gene banks of developed countries. This situation has illuminated the absence of clear mechanisms, other than moral suasion, for enforcing the free exchange of plant genetic resources in gene banks.").

63. International Undertaking on Plant Genetic Resources, at 22, U.N. Doc. C/83/REP (1983).

64. See, e.g., Bosselmann, *supra* note 38, at 132.

65. See *id.* at 133.

66. See, e.g., *id.* at 133-34.

67. See, e.g., Roht-Arriaza, *supra* note 19, at 943; Tilford, *supra* note 22, at 377 (noting that DCs defend this system by arguing that benefits will "flow back" to the LDCs).

Nations Convention on Environment and Development.<sup>68</sup> The issues related to PGRs were specifically addressed within the Convention on Biological Diversity ("CBD").<sup>69</sup> LDCs and DCs were once again split. While the negotiations did ultimately result in a treaty, the United States refused to sign it and the United Kingdom, France, Italy and Switzerland would only sign with reservations.<sup>70</sup> In the end, the U.S. government grudgingly signed the treaty. When it did so it offered its own "interpretive statement" which, in many substantial ways, effectively diluted the CBD's force.<sup>71</sup>

While the CBD addresses many issues, the most relevant for the purposes of this Note is the way in which PGRs are treated. The Preamble to the CBD states that the conservation of biological diversity is a "common concern of humankind."<sup>72</sup> This language is different from that of the FAO Undertaking, which states that biological diversity is the "common heritage of mankind."<sup>73</sup>

Although there are several articles of the CBD that one could argue are applicable to the issue of PGRs, a few are particularly relevant. Article 3 acknowledges the "sovereign rights of States over their natural resources."<sup>74</sup> The implication of Article 3 is that PGRs should no longer be regarded as the "common heritage of mankind."<sup>75</sup> Article 15, "Access to Genetic Resources," is even more specific—"the authority to determine access to genetic resources rests with the government."<sup>76</sup> Additionally, it mandates "the sharing in a fair and equitable way, the results of research and development and the development and the benefits arising from the commercial and other utilization of genetic resources with the Party providing such resources."<sup>77</sup> Article 16 emphasizes the need to establish access to, and transfer of, technology to LDCs.<sup>78</sup> The CBD fails, however, to propose a structural mechanism to enforce or enact these provisions.<sup>79</sup> Therefore, while it is hard to argue with the claim that the CBD was a landmark event in international law, the impressive opaqueness<sup>80</sup> of the

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68. The United Nations Conference on Environment and Development was held from June 3-14, 1992. It involved 30,000 participants from 176 countries. See, e.g., Ajay K. Sharma, *The Global Loss of Biodiversity*, 4 U. BALTI. INTELL. PROP. J. 1, 9 (1995).

69. Convention on Biological Diversity, June 5, 1992, 31 I.L.M. 818. [hereinafter CBD].

70. See Tilford, *supra* note 22, at 412 (pointing out that other DCs followed suit after the United States refused to sign the CBD).

71. Bosselmann, *supra* note 38, at 136-37.

72. See CBD, *supra* note 69.

73. See, e.g., Bosselmann, *supra* note 38, at 136-37.

74. CBD, *supra* note 69, at art. 3.

75. See, e.g., Bosselmann, *supra* note 38, at 137.

76. CBD, *supra* note 69, at art. 15.

77. *Id.*, art. 15 § 7.

78. *Id.*, art. 16 § 4.

79. See, e.g., Sharma, *supra* note 68, at 23 ("The end result [of Article 16] is therefore ambivalent and susceptible to varying interpretations.").

80. *The Earth Conference: Biodivisive*, ECONOMIST, June 13, 1992, at 93, 94; see also, Tilford, *supra* note 22, at 378 ("[W]hile the Biodiversity Convention recognizes the rights of countries to claim control over their genetic resources, it does not attempt to determine the amount and form of compensation."); Kadidal, *supra* note 31, at 226 ("Like many modern multilateral treaties, the Rio Convention makes clear its goals but not the means to implement them.").

treaty's language and the failure to elaborate an enforcement mechanism seriously undercut its effectiveness.

Given that the United States did sign the CBD, one could make the case (and many have) that TRIPs is a violation of international law. DCs, most prominently the United States, have responded by noting that the CBD was only signed with reservations.<sup>81</sup> The letter sent by President Clinton in 1993 to the Senate when the CBD was ratified included language that has been used to support this contention. President Clinton's letter states that any efforts leading to a decrease in levels of protection for IPRs would be strongly resisted by the United States.<sup>82</sup> LDCs' resentful reaction to the letter and their fears that it would be held up as a defense against violations of the CBD were validated soon after the CBD ended when the U.S. began lobbying for inclusion of TRIPs into the GATT.<sup>83</sup>

Several empirical examples could be cited to demonstrate the position taken by the United States. I have chosen one. In 1998 Rice-Tec, Inc. obtained a patent from the United States Patent and Trademark Office for a strain of basmati rice.<sup>84</sup> It also secured a trademark in the use of the word "basmati."<sup>85</sup> Basmati rice has been a staple in India for centuries.<sup>86</sup> The Indian government challenged the patent because the patented strain clearly incorporates an Indian PGR and exploits Indian knowledge without compensation.<sup>87</sup> Citing the CBD, they claimed that India should either receive compensation or that the patent and trademark should be revoked.<sup>88</sup> The corporation defended its actions, in part, by arguing that the United States only committed to the CBD as long as that commitment did not interfere with the ability of corporations to obtain IPRs in their inventions.<sup>89</sup> They argued that claims, such as the ones made by India, would frustrate that ability.<sup>90</sup> In addition, they relied on TRIPs to argue that the attempts by India to pass legislation protecting its natural

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81. The reservations pertained mainly to Articles 15 and 16. Pharmaceutical and biotechnology companies were afraid that the Articles would be interpreted in a way that would commit DCs to compulsory licensing and IP expropriation. See, e.g., *U.S. Biotech Companies Leery of Biodiversity Treaty*, STAR TRIB., June 11, 1992.

82. Letter of Transmittal from William J. Clinton to the United States Senate, Convention on Biological Diversity 1 (Nov. 19, 1993), available in WESTLAW, 1993 WL 796847 at \*1. There were four principle areas of concern laid out in the letter: "(1) the treaty is not retroactive, (2) transfer of technology must be voluntary and must take into account companies' exclusive rights to the technologies they own, (3) there will be no compulsory licensing and (4) biosafety protocol on the safety of biotechnology products is not necessary." See, Scalise & Nugent, *supra* note 43, at 112.

83. See, e.g., Scalise & Nugent, *supra* note 43, at 113 ("International commentators accuse the U.S. of attempting to unilaterally obtain the terms it was unable to procure in treaty negotiations.").

84. See, e.g., *India to Approach US Patent Office over Basmati Patent*, ASIA PULSE (New Delhi), Feb. 13, 1998.

85. See *id.*

86. See *id.*

87. See *id.*; *Basmati Patent to be Challenged in U.S. Court*, THE HINDU (New Delhi), Apr. 25, 2000.

88. See, e.g., Tejera, *supra* note 51, at 983-84.

89. *Id.*

90. *Id.*

resources and indigenous knowledge “runs contrary to the objective of the TRIPs Agreement of simplifying world trade.”<sup>91</sup> Regardless of the ultimate outcome of this particular controversy, it acutely demonstrates that TRIPs has been interpreted by DCs so as to trump the provisions of the CBD as they might apply to bio-prospecting.

#### D. Summation

This Part has demonstrated the way in which PGRs are used in the development of commercially valuable products. It has briefly described the current international legal regime centered around TRIPs that protects property rights in the form of IP for these products. It has also briefly traced the history of the dispute over PGRs and given some context with which to appreciate the nature of the controversy. Part III offers my critique of TRIPs and the present legal status of PGRs. I attempt to set up my argument for an IBPO and a system in which both LDCs and DCs are granted property rights by contending that the present system is sub-optimal for everyone involved.

### III. THE CURRENT INTERNATIONAL REGIME IS INEFFECTIVE AND INEFFICIENT

Two aspects of international lawmaking stand in the way of an effective solution to the global environmental crisis<sup>92</sup>—(1) it is difficult to convince rational politicians to make sacrifices today in order to reap gains for future generations,<sup>93</sup> and (2) international actors are ultimately accountable to their own self-interested constituencies.<sup>94</sup> Thus, even though efforts to limit the loss of biodiversity have been on the international

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91. *Id.* at 983.

92. Surely one could argue that there are many other problems that plague international environmental agreements. I wish to simply focus on these two for the purposes of this Note.

93. As an initial matter, one might respond that by redistributing wealth now politicians can ensure that more overall wealth will be secured for the future and therefore as rational actors they should prefer solutions that make conservation profitable for LDCs. This argument is knotty because it assumes that rational actors will make sacrifices in the status quo in order to reap future profits. (This problem becomes even more difficult when one takes into account the fact that many of the “profits” that will be derived from conservation, will be enjoyed by future *generations*. For a discussion of a similar problem, see generally Ronald R. Rychlack, *Ocean Aquaculture*, 8 *FORDHAM ENVTL. L.J.* 497 (1997), which discusses the problem of overaquification.

94. Because they are generally part of democratic governments, leaders of DCs are primarily accountable to their own constituencies. In democratic systems, politicians’ primary and underlying objective is to win elections. See generally Joseph Schlesinger, *AMBITION AND POLITICS: POLITICAL CAREERS IN THE UNITED STATES* (1966). Specific special interest groups, such as the biotechnology and pharmaceutical industry, at whose expense wealth distribution strategies would be pursued, have a vested interest in legislation to expand their profit margins. Therefore, they pool their efforts and coalesce their influence in order to “convince” politicians not to pursue redistribution policies. The result is that what seems irrational from a collective perspective is actually sound when observed through the lens of the individual self-interested politician.

agenda for almost three decades,<sup>95</sup> by most accounts, the effort is failing. If my two propositions are true—that it is hard to make sacrifices today to benefit tomorrow, and international actors have to be responsive to self-interested constituencies—then solutions have to be designed so as to maximize short-term benefits and distribute these gains between and amongst the parties. In other words, conservation strategies have a low probability of succeeding unless they are appealing from an economic perspective (i.e. LDCs are not willing to forego short-term economic rents in order to provide for global public goods for the world's enjoyment and for their own long-term benefit).<sup>96</sup>

Earlier, I proposed that of the three goals of industrialists—maximizing patent protection, conserving biodiversity and preserving indigenous knowledge—only the first was being satisfied. In this Part, I hope to show how the TRIPs agreement and the rest of the current international regime ensure that end. I propose that while the status quo may maximize patent protection, it does nothing to aid in conservation—an outcome that is sub-optimal from the perspective of LDCs as well as DCs. I should note again that I am writing here as a positivist not in an effort to obscure the normative problems with the status-quo regime, but rather, to be pragmatic about what it takes to “get things done.”<sup>97</sup>

#### A. The Regime is Sub-Optimal From the Global Perspective

The current international regime can be evaluated from three distinct perspectives—the “global community,”<sup>98</sup> the LDCs, and the DCs—it is sub-optimal from all three. From the perspective of the “global community” the status quo regime is sub-optimal because the world's biodiversity is being depleted, thereby threatening the ecosystems upon which the human race depends for quality of life and ultimately, for survival. In short, while

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95. In 1970 the first United Nations Conference on the Environment was held in Stockholm. Nearly ten years later, in 1979, British ecologist Norman Myers published the first findings on tropical rain forest destruction. His findings inspired many in the international community to focus their attention to the problems posed by the loss of biodiversity. *See id.* at 57-61.

96. Some have suggested that ecological destruction is a direct consequence of capitalism and that the only way to end biodiversity loss is to replace capitalism. *See generally* VANDANA SHIVA, *CAPTIVE MINDS, CAPTIVE LIVES* (1995) While addressing this issue is beyond the scope of this Note, I do not believe that the overthrow of capitalism is preferable and it is almost certainly not imminent. If we begin with the baseline that the world is increasingly capitalist and countries who hope to succeed must maximize wealth, developing economic incentives to conserve is valuable. *See, e.g.,* Tilford, *supra* note 22, at 376 (arguing that countries with the richest biodiversity are eager to develop quickly in order to “catch up” with the developed world's standard of living and to keep up with their population growth).

97. It is critical that a proposed solution establish some middle ground between the LDCs and DCs. From a political perspective, this is essential because politicians might be able to expend the political capital necessary to replace the status quo with a compromise solution. They would not, however, have enough political capital to replace the current international regime with a regime that was heavily biased in favor of LDCs.

98. The term “global community” is used to refer to a holistic view of the world in which efficiency is measured globally rather than through the lens of any individual actor.

the current international legal regime does provide incentives for the development of valuable “innovations” such as pharmaceuticals, it is inefficient because it encourages the over-consumption of the natural resources necessary for the discovery of new innovations and upon which all of life depends.

#### B. The Regime is Sub-Optimal from the LDCs’ Perspective

For LDCs the status-quo regime is troublesome because whatever benefits TRIPs might create for them pales in comparison to the harms that come in two forms—the decreased availability of socially beneficial goods and the denial of any of the profits that are derived by industrialists who use their PGRs.

Let me first address and disprove the significance of the supposed benefits. There are two main proposals within this genre—that TRIPs will spur growth and development,<sup>99</sup> and indigenous communities will learn to use IP laws to their own advantage. While the first argument—that TRIPs will spur growth and development—has a kernel of merit, it does not take into account the fact that DCs are already so far ahead of LDCs in technological development that, given the expense of building and maintaining a productive research and development infrastructure,<sup>100</sup> most LDCs will be unable to ramp up to the scale necessary to successfully compete in the international market—at least not anytime in the near future.<sup>101</sup>

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99. See, e.g., McCabe, *supra* note 46, at 46-47 (“[I]t has been suggested that a patent system stimulates investment by reducing the risk of innovation. . . . [As a consequence] the benefits that enhanced intellectual property protection provide are not limited to developed countries.”); Scalise & Nugent, *supra* note 43, at 104 (arguing that failure to compensate inventors of new and improved products for their inventions will lead to a sub-optimal level of innovation and that because innovation helps LDCs as well as DCs, LDCs will ultimately suffer from weak IP protections); Sherwood, *supra* note 60, at 504 (arguing that countries with robust IP protection encourage private investment).

100. R & D costs in industries such as pharmaceuticals and biotechnology can be so tremendous that many companies, even in the DC, are unable to compete. See, e.g., CARLOS M. CORREA, *INTELLECTUAL PROPERTY RIGHTS, THE WTO AND DEVELOPING COUNTRIES* 39 (2000) (“[I]n most cases, patents will be simply out of reach for least developed countries and many other developing countries, because of the high standards to be complied with. The patent system as an incentive to local innovations is unlikely to work, except in those countries where there already exist a significant scientific and technological infrastructure and firms of considerable size.”); Joseph A. DiMasi, *New Drug Development: Cost, Risk and Complexity*, *DRUG INFO. J.*, May 1995, at 357.

101. There are several reasons, aside from the sheer cost of R & D, for this conclusion. First, the western IP model is based on the existence of a market economy where private capital and open trade are encouraged. Because many LDCs do not fit this mold, the western IP model will not necessarily apply to many LDCs. See McCabe, *supra* note 46, at 54. Second, patent protection will raise the price of goods for LDCs who will have to rely on exports. This price will be sensitive to currency exchanges and the pricing of monopoly goods over competitive levels. Because pirated technology can help fuel economic development, the system will have the short-term effect of slowing growth and development. *Id.* at 55-6. *But see* Mark Ritchie et al., *Intellectual Property Rights and Biodiversity: The Industrialization of Natural Resources and Traditional Knowledge*, 11 *ST. JOHN’S J. LEGAL COMMENT*, 431, 437 n.39 (1996).

Proponents of TRIPs have also suggested that LDCs could exploit TRIPs by securing IPRs in their knowledge of PGRs.<sup>102</sup> This argument fails because it does not recognize that TRIPs is constructed on the basis of a particular free market model that accords property rights to the products of "invention" but does not recognize property rights in PGRs or in the knowledge of indigenous communities.<sup>103</sup>

Professor Oddi provides the greatest clarity on this point. His work reviews the justifications offered by DCs for TRIPs and concludes that TRIPs represents a shift in the prevailing theory of patents from an instrumentalist form of "reward" theory to a "natural rights" theory.<sup>104</sup> The reward theory is based on the principle that the patent is a "reward" granted by the state to inventors that is meant to induce more invention. Conversely, the "natural rights" theory suggests that inventors have some normative right to the products of their labor.<sup>105</sup> The patent is a mechanism the State uses to codify that right.<sup>106</sup>

Corporations turned to these normative arguments when it became apparent that the proposition that the international piracy of their goods was stifling the research and development of new innovations was unpersuasive. By claiming that "inventors" have natural rights in their work, DCs could defend TRIPs on the principle that because inventors have a natural right to their intellectual property, the right is, by definition,

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(arguing that "intellectual property pirating fuels development").

102. See, e.g., Hanning, *supra* note 6 (exploring ways in which indigenous communities might be able to secure IPRs in their knowledge within the western patent system).

103. "Raw germplasm" would be considered a "product of nature," which would not be patentable in the western system. For a detailed explanation of the natural-product exemption, see, for example, Kadidal, *supra* note 31, at 237-44. There are other reasons why patent applications for germplasm would be rejected. First, courts would probably determine that there is no element of "novelty" or "newness." Second, because the plants have been used, in some cases for centuries, the "non-obviousness" requirement would present a formidable barrier. Third, patent law requires that the subject of the patent be "capable of industrial application." Indigenous communities would have a difficult time demonstrating the industrial applications of their products. Fourth, patented inventions must be "reproducible." Germplasm may not be reproducible in the way that the western system requires. Fifth, many patents may be denied because of publication. Under United States patent law if an invention has been published it is considered to be in the public domain and obvious. Many products used by indigenous communities have been documented in print by ethnobiologists.

For a more detailed explanation of the restraints on the patenting of germplasm, see Roht-Arriaza *supra* note 19 at 936-942. But see, Sarma, *supra* note 12, at 128, for evidence that some indigenous communities are succeeding in getting patents for their "inventions." Whether or not there is room for some IPRs to be granted to indigenous communities for their knowledge, the bulk of the evidence suggests that indigenous communities will, by in large, be severely disadvantaged within the western IP system.

104. Samuel Oddi, *TRIPS - Natural Rights and a "Polite Form of Imperialism,"* 29 VAND. J. TRANSNAT'L L. 415 (1996).

105. See, e.g., Oddi, *supra* note 104, at 426-27 ("In contradistinction to being based upon positive law – constitutional or statutory – natural rights, being an entitlement to personhood or rationally following from higher principles, devolve from a higher source."); Boyle, *supra* note 18, at 119-43 (arguing that the current international IP regime is obsessed with the concept of "authorship" and distinguishing the ways in which this model hurts indigenous communities while protecting inventors from DCs).

106. See Oddi, *supra* note 104, at 455-58.

territorially universal.<sup>107</sup> Article 27 of TRIPs, which deals with patentable subject matter, is particularly reflective of this line of reasoning.<sup>108</sup>

The “natural rights” theory does not allow LDCs to collect rents from their PGRs because the germplasm is not an “invention” and therefore LDCs do not have a normative right to it. Even if one were to recognize that much of the germplasm used by DCs in developing commercial end products is not “raw,” but rather is often the product of centuries of selection and natural breeding by indigenous communities, the “inventorship” model is based on individual, rather than collective, knowledge and ownership.<sup>109</sup>

Not only are the potential advantages of TRIPs meager for LDCs, there are serious disadvantages. Initially, the TRIPs agreement leads to the decreased availability of socially beneficial goods because it forces countries to recognize the validity of patents in products that have not been the subjects of patent protection in those countries. Ergo, products such as pharmaceuticals, which could previously be reverse engineered by corporations in LDCs and sold as generics at affordable prices,<sup>110</sup> will no longer be available. Additionally, TRIPs does not have “work the patent” requirements.<sup>111</sup> Therefore, a corporation is not obliged to market a product in a country in order to maintain its monopoly right there. Thus, multinational corporations who chose not to market a product in a given country may nonetheless prevent others from pirating the product within that market. The net effect of the regime forces individuals in LDCs to import the products at exorbitant prices, thereby effectively denying them access to the goods.

At the macroscopic level the current international regime is also sub-optimal for LDCs because it forces them to consume their natural resources instead of conserving them. Commentators and policy makers in DCs are often quick to criticize LDCs for their consumption strategies without appreciating that politicians in LDCs face a dilemma. On the one hand, they may have a desire to conserve global public goods and to appease DCs who pressure them to conserve. On the other hand, they face increasing internal pressure to pursue consumption strategies that

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107. *Id.*, at 432. Professor Oddi points out several flaws in this line of reasoning, including the fact that if it is true that there are natural rights in patents, the patents should not be time limited. However, he notes that:

Whatever may be the merits or failings of the philosophical underpinnings of a natural rights theory of intellectual property and of patents in particular, this theory has the greatest rhetorical power in convincing the world community to sacrifice country-by-country traditional instrumentalist control over intellectual property to a more universal world standard as dictated by TRIPs.

*Id.* at 18.

108. *See, e.g.*, Oddi, *supra* note 104, at 440.

109. *See, e.g.*, BOYLE, *supra* note 18, at 128-130; Tejera, *supra* note 51, at 974.

110. The Indian Patent Act, for example, did not include patents for pharmaceutical products. For a more thorough analysis of the Indian patent system and the exclusion of pharmaceuticals, see Sarma, *supra* note 12, at 132-33. *See also* Weissman, *supra* note 44, at 1072 (noting that Brazil and Argentina used to exclude pharmaceuticals).

111. *See infra* notes 183-84 and accompanying text.

maximize economic rents and raise the standard of living for their populations. In many LDCs, expanding populations and poverty force politicians to find ways to generate wealth.<sup>112</sup> Because these countries do not have the capital to invest in infrastructure and other development projects, they are often forced to generate rents through deforestation.<sup>113</sup> Deforestation as a *solution*, however, is a *band-aid*. Without alternative sources of wealth, populations will continue to grow,<sup>114</sup> and pressure on governments to destroy forests will swell.<sup>115</sup> In order to break this cycle, the international community must develop a new international regime that makes conservation *profitable* for LDCs.

Economic motivation is crucial because even if governments in LDCs were to ignore the pressure from local communities to deforest and instead were to employ command and control strategies to limit consumption, they would most probably fail. The rationale for this conclusion is that the enforcement of laws prohibiting deforestation is nearly impossible if locals are not cooperative.<sup>116</sup> If the international community could design a regime that would make conservation profitable for LDCs, they would give national governments both an incentive, and the resources with which, to pursue effective conservation strategies. Given the ineffectualness of command and control, state governments hoping to conserve their PGRs for bio-prospectors would be motivated to allocate rents in a way that would provide economic incentives to indigenous communities not to deforest. These strategies could potentially include the direct distribution of rents to communities who help bio-prospectors identify valuable PGRs, education of indigenous communities relating to sustainable agricultural

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112. See, e.g., BECHER, *supra* note 5, at 34-35.

113. See, e.g., Roger W. Findley, *Legal and Economic Incentives for the Sustainable Use of Rainforests* 32 TEX. INT'L L.J. 17, 19 (1997) ("Companies seeking to expand their mining, logging, ranching and other activities into Indian lands were supported in 1996 by politicians who said there was no other source of employment for the expanding population.")

114. See, e.g., CARL SAGAN ET AL., ENVIRONMENT IN PERIL 202, 225 (Anthony B. Wolbarst ed., 1991), cited in Sharma, *supra* note 68, at 32 (arguing the merits of the theory of "demographic transition," namely that the rate of population growth declines substantially when the prosperity of a population increases); David J. Rapport, *Biosphere in Distress*, 15 WORLD AND I, Apr. 1, 2000, at 142.

[P]opulation booms in Asia and Africa have greatly aggravated the problems of poverty, nutritional deficiency, and inadequate hygienic facilities there. Today, despite the "green" revolution, two-fifths of the world's population of six billion suffer from chronic malnutrition. Nearly half the total population live on a per-capita income of under two dollars per day. In addition, 1.3 billion people live without clean water, 2 billion without proper sanitation, and 2 billion without electricity.

115. See e.g., Sharma, *supra* note 68, at 6-7 (noting that population growth leads to biodiversity loss in LDCs because it increases the need for food production and shelter which then leads to deforestation).

116. There are several reasons for this conclusion; forests are very vast and hard to patrol, resources are scarce, and local politicians are not likely to cooperate. See, Roht-Arriaza, *supra* note 19, at 928-29 ("[There is] an emerging view that indigenous and local communities can and must be involved in resource conservation efforts. . . . In part, this shift in views arises from increasing stress on *incentives, rather than sanctions*, as a key tool in resource conservation.") (emphasis added).

techniques,<sup>117</sup> infrastructure development, and improved education:<sup>118</sup> All of which would probably help limit population growth.

The way in which the current international regime measures wealth also increases pressure on LDCs to consume rather than conserve. Activities such as logging and agriculture generate rents that nations can add to their Gross Domestic Products ("GDP"). The international monetary system "rewards" those countries that progressively increase their GDPs.<sup>119</sup> Given the fact that many LDCs rely on these international funds, and given that, as it stands, conservation cannot be factored into the GDP, nations have an additional incentive to consume rather than conserve.

Despite being sub-optimal for LDCs over the *long term*, the current international legal regime forces the hand of leaders in LDCs to choose consumption strategies over conservation strategies because they are most profitable in the *short term*. Through the lens of the LDC, this choice will, with time, result in burgeoning populations,<sup>120</sup> a shrinking supply of resources for consumption, and decreased access to technological "innovations."

### C. The Regime is Sub-Optimal from the DC Perspective

Given the distribution of power in the international community and the dominance of DCs, this subsection is perhaps the most important from an instrumentalist point of view. To simply point out that DC policies are pillaging the LDCs, while of value in the academy and on the fringes of politics, does not usually go all that far in effectuating change. However, a closer look at the current international regime proves that it is also sub-optimal for DCs.

While it is true that DCs may reap greater profits in the *short term* by expanding the geographic scope of their patent protection, the destruction of the PGRs, the ecosystems that are home to them, and the indigenous

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117. See, generally, BECHER, *supra* note 5, at 38-40.

118. While there is no guarantee that the government will use any of these tactics, changing the incentive structure certainly increases the probability that governments will respond in this manner.

119. See, e.g., BECHER, *supra* note 5, at 33-34.

A productive country sells something to other countries, either raw goods (such as tree trunks, minerals mined from the earth, or an agricultural product in an unprocessed form) or manufactured or processed goods . . . Traditional economic ratings do not include the value of intact ecosystems and their resources, the functions they perform to maintain global health, or the compounds that will eventually be discovered there and will prove to be of great economic worth.

Findley, *supra* note 113, at 21 ("A further disincentive to the conservation of rainforests is the traditional system of national income and asset accounts used to compute national gross domestic product (GDP) and, to a significant degree, to measure the success of national governments and their economic policies.")

120. This assumes, of course, that the government will not employ methods such as the family planning policies used by the government of China to limit the growth of the population.

communities that preserve valuable knowledge, will eventually backfire. Initially, the strategy will dry up the pipeline for new products because corporations will have fewer PGRs to research.<sup>121</sup> Additionally, the very stability of the world's ecosystem will be threatened by the continued depletion of the global public goods, such as oxygen, upon which we rely for global health.

Therefore, DCs too have an incentive to move towards an international regime that promotes conservation. Because that means foregoing some of the short-term profits that come from the current regime, the transition will not be easy. But, I am not a rational choice theorist in the purest sense. While I do believe that politicians are self-interested and will thus try to maximize short-term utility, I do not subscribe to the theory, that normative considerations and a desire to "look out for" future generations, plays no part in their decision-making. The key is to "make it close." So, proposing solutions that would entail a dismantling of the entire IP regime, are to my mind not within the realm of realistic solutions. The IBPO model, as I hope to show, is one that is a true "compromise" solution that addresses the normative injustices present within the current regime, encourages conservation, and at the same time is within the realm of what can be accomplished by politicians.

#### D. Summation

Part III lays the foundation for the IBPO. It proves that the status quo is inferior for everyone involved and sets the stage for the argument in Part IV that a compromise solution where both LDCs and DCs have some property claims to the products derived from PGRs is the system to which we should aspire.

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121. Sarma, *supra* note 12, at 112 ("[U]nless land is conserved, not only will indigenous groups suffer, but so will transnational corporations and lesser developed countries because they will not be able to exploit indigenous knowledge, since the knowledge would ultimately become extinct.").

Some might argue that with time and technological advances corporations will no longer need raw germplasm and will be able to produce pharmaceuticals and other products synthetically, thereby eliminating the need for the preservation of biological resources. The problem with this argument is that it ignores what many scientists have learned to be empirically true. Natural species have evolved elegant mechanisms to adapt to their ecosystems. Reproducing the centuries of "work" done by evolution, in a lab, has proven to be extremely difficult. There is no reason to believe that new technologies will displace the value of nature's work. For a scientific account of why bio-prospecting will continue to be a valuable practice as opposed to chemical synthesis, see, Kadidal, *supra* note 31, 223 n.12. See also Huft, *supra* note 12, at 1679 ("It has recently become apparent to many pharmaceutical companies . . . that the imagination of synthetic chemists is far less creative than that of nature . . ."); Tanglely, *supra* note 28 (describing ways in which technological advances are being combined with bio-prospecting).

#### IV. THE POSITIVE CASE FOR THE INTERNATIONAL BIOTECHNOLOGY PATENT OFFICE (IBPO)

##### A. PGRs as Limited Common Property

While scholars and policy makers have heretofore proposed a number of amendments to the current international regime,<sup>122</sup> none of them succeeds in striking a workable balance between innovation and conservation. The difficulty with the majority of approaches is that they fail to acknowledge this tradeoff and attempt to identify *one rightful owner*. In this Part, I put forward the argument that *both* LDCs and DCs have property claims in products derived from PGRs. Therefore, the question to be resolved is not, which is more important, but rather, how can both be recognized.

Using the work of Professor Carol Rose as a starting point, I propose that PGRs should be treated as limited common property ("LCP"), instead of as global public goods. LCP is property that is common within a group, but private property to anyone outside of that group.<sup>123</sup> This property theory most closely approximates the principles articulated by Articles 15 and 16 of the CBD.<sup>124</sup> As discussed in Part II, the patent provisions of TRIPs have, in essence, trumped Articles 15 and 16. Consequently, PGRs continue to be treated in the international legal regime as the "common heritage of mankind" or as global public goods. The problem that is readily apparent, but generally not dealt with by scholars, is that *neither* the DCs nor LDCs should own the *entirety* of the property right. My proposal is that there is a way in which we do not have to choose one or the other, but rather can recognize the property interests of both groups. Before detailing the provisions of the International Biotechnology Patent Office model, and how it accomplishes this goal, it is important to get a clearer sense of the way in which property rights are distributed in the current international regime.

In the status quo, not all PGRs are treated as the "common heritage of mankind." Only "raw" PGRs have been classified as such. Once corporations develop commercial products from these PGRs, whether they are pesticides, seeds, pharmaceuticals, or other products with economic value, these *end products* are no longer considered the "common heritage of mankind." Via the patent system, those products become "inventions" and the inventors are rewarded with an individual property right. The current international regime allocates *all* of the property rights, and therefore, *all of the rents* derived from PGRs, to the corporation who develops the end product. Thus, it is the DCs, who have the R & D budgets and know-how

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122. See *infra* Part V, for a discussion of these alternatives and reasons why they are inferior.

123. See Rose, *supra* note 13, at 132.

124. See *supra* notes 77-79.

to “create” these end products, that are awarded the property rights, whereas the LDCs who pay for the conservation (by not consuming) of the PGRs, without which the end products could not be developed, are not conferred any rights.

This allocation of property rights is problematic because it does not reward the entity that makes the initial investment. This regime is the equivalent of asking a country *A* to deposit liquid assets into a bank account so that another country *B* can invest them and collect interest on them without having a duty to share any of the profits with the country that deposited the funds. An efficient property regime would reward *B* for its skill in earning interest on the initial deposit, but would also allocate some of the rents to country *A* as compensation for making the initial investment. If the former property scheme were adopted as a rule, country *A* would have no incentive to invest its liquid assets into the account and would instead spend it, or invest it, on its own.

While this outcome seems obvious, there is very little difference between this hypothetical and the way in which PGRs are treated in the current international legal regime. LDCs who make the *initial investment* by conserving PGRs are not rewarded for that investment. Amendments to the status-quo regime must be such that both the “depositor” and the “investor” are accorded property rights in the profits earned.

There is little doubt that, under international law, nations have property rights in their natural resources. Nations typically derive rents from the sale of natural resources such as timber, minerals, and oil. These goods are considered private goods and thus States have property rights in them. On the other hand, nations cannot sell the oxygen that their trees produce, because it is a global public good rather than a private good.<sup>125</sup>

Most scholars who have considered the question of how PGRs should be treated have concluded that PGRs have some elements of private goods but that they are also very similar to prototypical public goods. For example, Roger Sedjo contends that “genetic resources have elements of both public and private goods. . . . Phenotypes are subject to rivalry in consumption . . . [however,] [g]enotypes exhibit non-rivalry—in the sense that one person’s consumption does not affect the amount available to others.”<sup>126</sup> While this analysis is valuable, it does not take the next step,

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125. The problem with most pure public goods is boundary setting. In other words, there is no way to allocate the property right to any individual entity. For example no entity can “own” the oxygen that anyone breathes, or the water in the oceans. Presumably, plant genetic resources do not have a boundary setting problem. Nonetheless, they have been treated as global public goods in international law.

126. Sedjo, *supra* note 32, at 200-01.

A phenotype is the outward expression of physical characteristics. A genotype is the set of genetic information contained in the cells of a living organism. The genotype, in conjunction with environmental factors, determines what a living organism’s phenotype will be. Roger Sedjo uses the term’s phenotype and genotype to express the idea that when a logger consumes a tree for lumber, the tree has been consumed for its phenotype, or, the outward physical expression of its genes. When the same tree is used as a sample from which DNA is extracted and then developed into pesticide, the tree is used for its genotype. In the first case, where the tree is used for lumber, no one else can use the same tree for lumber

which is to define that middle ground between public and private property and develop structures to recognize that middle ground.

As an initial matter, it is important to note that the scholars who contend that PGRs should be treated analogously to public goods because they are non-depleting fail to factor the IP system into their analysis. The first person that is able to use the genotype in a way that incorporates it into a patent gains a monopoly over the sale of that end-product. While others could still *technically* use the genotype, the ways in which they can use it are severely limited by the monopoly right granted to the “inventor.” In this sense PGRs *are* depleting.<sup>127</sup>

Genetic resources, even though they are different from oil, minerals, timber and other “hard” resources because they are *physically* non-depleting,<sup>128</sup> share many of the characteristics that prompt us to grant property rights to those “hard” resources in the first place. Property scholars have argued that property rights are one of the ways in which legal societies avoid the “tragedy of the commons.” As the analysis in Part II demonstrates, PGRs suffer from this problem. Therefore, property rights might theoretically be created as a solvency mechanism. In that sense, the PGRs are no different from oil, minerals, or trees. Additionally, as the analysis above suggests, their use is rivalrous in the sense that once the first person uses the resource in an end-product and patents the product, the economic value of the PGR decreases significantly. If PGRs are thought of as lottery tickets, each time somebody discovers a ticket, they make sure that no one else collects the profits from that ticket.

Thus, the more fundamental question is—who owns the tickets?, and who should get a share of the winnings? In the case of land that may hold minerals or oil, international law grants the bundle of property rights to the host nation. In the case of plants that may hold valuable genetic resources, international law grants the right to the first person to gain a patent in an end-product.<sup>129</sup> This system of unitary allocation is illogical and, as demonstrated in Part II, fails to solve the “tragedy of the commons” in PGRs. As Carol Rose notes, “certain property claims do not make it onto our property radar screen, or appear only dimly there. At best this pattern creates an imbalance in favor of the kinds of claims we do recognize, while at worst it may foster violence and dissipate wealth.”<sup>130</sup>

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because the resource has been physically depleted. In the case of a tree being sampled for its genotype, as second person could sample the tree and then use that sample to develop a pesticide as well. Thus, the use of the phenotype is depleting, while the use of the genotype is non-depleting.

127. See, e.g., Odek, *supra* note 12, at 156 (“[with regard to genetic resources] the value of the whole is present in even minimal amounts.”).

128. See, e.g., Huft, *supra* note 12, at 1726-27; Sharma, *supra* note 68, at 28.

129. Just because the western “inventors” add *value* does not deny the property right of the host nations. Building upon the comparison to oil, just because a western inventor develops a process for refining and using the oil for commercial purposes, does not deny the country of origin a right to recover compensation for oil extracted as a natural resource. In some sense, both the “inventor” and the host nation have a property claim in the oil that is commercially sold.

130. Rose, *supra* note 13, at 143.

Agreeing with this analysis, many have suggested treating PGRs as private goods. Most of these proposals have been primarily normative and few have attempted to explain the pragmatic implications of such a choice. A system that would treat PGRs as pure private goods would fail because it would be difficult to determine some principled way in which to allocate the property rights amongst individuals within a state,<sup>131</sup> and it would not give the government an incentive to promote policies that would increase conservation.<sup>132</sup> Realizing this, most pragmatic scholars treat these arguments as a sword against the normativists. However, there is a third alternative—limited common property.

As limited common property, no individual owner within a country has to be identified in order to create and recognize a property right; instead, the right could be granted to the government.<sup>133</sup> Many scholars who have written on the topic have proposed that granting property rights to governments would be sub-optimal. They argue that some corrupt

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131. Granting individual's or indigenous communities property rights in PGRs is extremely problematic, for several reasons. First it is not clear how the rights would be fairly allocated amongst and within the indigenous communities. As Michael Huft notes:

[T]he knowledge of medicinal plants also has characteristic distribution patterns across traditional societies. Some plants may be known only to a single healer or a single village within a region, while others may be known to shamans and herbalists in more than one tribe in a region. Still others are known throughout entire countries of subcontinental areas. The determination of the distribution of the knowledge held in societies is complicated, however, by the problem of identifying the group of people who hold the knowledge.

Huft, *supra* note 12, at 1702-03. Second, even if an individual or community were to have property rights, it is not clear that the property right would be a sufficient incentive for conservation. PGRs are like lottery tickets. The vast majority of PGRs will turn out to be of no commercial value. But the ones that do have value will have tremendous commercial value. Thus, suppose that a community is granted property rights over 100 acres of land. The mathematical probability that a bio-prospector will find a ticket in that area might be in the order of 1 in 1000. Even though the rents, if a ticket were found, would be much greater than the rents from consumption, many communities may opt for the "sure thing" given the small probability of finding a successful product and the time it might take to actually earn returns. If the property right were vested in the country, however, the land area would be maximized. This maximizes the chances of finding "a lottery ticket" and therefore makes conservation a more rational choice. It also allows cross-subsidization. Therefore, the government can compensate a community that is not fortunate enough to have a "lucky ticket" for conserving, nonetheless. This allows the community to satisfy its short-term needs, while waiting for a ticket to be discovered within their community. See, e.g., Craig D. Jacoby & Charles Weiss, *Recognizing Property Rights in Traditional Biocultural Knowledge*, 16 STAN. EVNTL. L.J. 74, 87 (1997) ("If resource providers could charge for their resources, their compensation would likely be limited by market forces reflecting the small chance that any given sample will lead to a marketable product and the expensive research and development process required to commercialize products.").

132. Even if there were a way in which property rights could be equitably allocated to individuals or communities and even if the individuals and/or communities were to have an incentive to conserve, bypassing the government is a poor strategic decision. Ultimately, it is the government in many LDCs that will make decisions such as whether or not loggers can log a certain area of the rain forest. If conservation is not profitable for the government, the government has an incentive to consume, rather than conserve.

133. Treating PGRs as LCP and granting the property rights to the States would not preclude them from designing internal systems to allocate those rents.

governments in LDCs might simply keep the rents and not distribute them to the indigenous communities that live in the forests and whose knowledge in many cases helped the bio-prospectors make their discoveries.<sup>134</sup> This argument ignores the fact that, whatever the motivation of the elites, it would be illogical for the State to act in this manner. If governments did not reward indigenous communities for conservation and for their contributions to bio-prospectors, conservation efforts at the local level would fail for the reasons detailed in Part II (namely, the ineffectiveness of command and control enforcement, and the need to generate wealth in order to curb population growth).<sup>135</sup> In this sense, PGRs are different from goods such as oil and minerals because the government needs the *cooperation* of indigenous communities to ensure that they are conserved.<sup>136</sup>

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134. Naomi Roht-Arriaza gives four reasons why property rights should not be entrusted with the State but rather should be granted to indigenous communities: first, states don't generally protect the rights of indigenous communities; second, there is no evidence that the benefits will be distributed to indigenous communities; third, the money will be lost in the bureaucracy; and fourth, resources are most likely to be conserved if communities are invested and involved in their stewardship. See Roht-Arriaza, *supra* note 19, at 948.

135. See *supra* note 116 and accompanying text.

136. Under the most pessimistic view, a corrupt government would keep all of the rents for its own short-term gain. There are two responses that can be made to this scenario. The first is that in this case, little can be done. Some might suggest circumventing the government and granting royalties directly to the people. The problem with this argument is that the proposed *solution* doesn't take into account the problem. If the government is completely corrupt and interested in short-term individual gain only, it is implausible that it would not intervene in such a scheme. Second, if one assumes that the government is corrupt but wants to maximize its long-term prosperity, then the allocation of rents to the government might not be a poor strategic move. This argument seems counterintuitive. However, it is important to remember that plant genetic resources are not like oil in one important sense—their value is in their genotype and not in their phenotype. A corrupt government could keep all the rents from the international sale of oil without the fear that indigenous communities would deplete the oil. Empirical evidence suggests, however, that command and control policies to enforce conservation over vast areas of land are almost impossible. See *id.* They are also not very effective at controlling population growth. Therefore, without cooperating with indigenous communities, even the most corrupt and authoritarian governments will have a hard time preventing deforestation. Thus, if the corrupt government wants to maximize its long-term rents, it would have an incentive to distribute some of the rents within the indigenous communities. See, e.g., Tilford, *supra* note 22, at 441 (“Conservation is much more efficient if locals stand to benefit. The genetic resource issue in particular does not conjure up images of countries so fat from compensation received that they can afford to fend off an unwilling populace from the resource preserves.”).

Additionally, if the elites value long-term profits, the prospect of keeping *all* of the profits from commercial end products derived from PGRs, as opposed to a small part of the profits, will be an incentive to invest in technological development. See Daniel J. Goldstein, *Molecular Biology and the Protection of Germplasm: A Matter of National Security*, in SEEDS AND SOVEREIGNTY *supra* note 3, at 327-29 (arguing that even if national elites reap short-term gains from bioprospecting royalties, they realize the tremendous upside that could be had in the long run if they were to patent the technologies themselves, and therefore they may invest in scientific research and technology in order to realize those larger gains).

### B. The IBPO as a LCP Solution

Establishing that PGRs should be treated as LCP is a starting point. The challenge is to take this theoretical argument and to devise a structural solution that will allow this right to have meaning. Allocating rents to two entities for the "same" property is complex, but it is the challenge of this Note. Proposals made thus far in the literature do not take this step.

The reasons scholars articulate for why PGRs are different from other "hard resources" illustrate my point. There are three principal arguments made along these lines: (1) PGRs once they are discovered, can be synthesized in the laboratory,<sup>137</sup> (2) the value of the property is hard to measure because it is not proportional to the amount used<sup>138</sup> and, (3) it would be prohibitively expensive for countries to monitor their plants and ensure that they were not being used by bio-prospectors.<sup>139</sup> While these are all good points, the conclusion drawn from these arguments is that there must be no property right in PGRs. That conclusion is erroneous. What these arguments suggest is not that there is no property right, but rather that the property rights, if they exist, are hard to enforce within the current international legal regime.

All of these problems can be solved by a system that recognizes a property right in PGRs and *allocates compensation at the "back end."* This is true because the use of the property does not necessarily hurt the host nation until it is incorporated into an end-product that is patented. In other words, the property right is only valuable when the property is used to derive commercial profit. If the property is used and not patented, it remains in the "global commons" and there is no reason for the host country to want to exercise its property claim over the PGRs. On the other hand, if the property is being incorporated into an end-product that is patented, presumably for future commercial use, and is therefore being taken out of the global commons, then the host nation should be compensated as the initial investors. Therefore, a contractual duty to allocate a portion of the profits derived from a patent based on PGRs should be attached to a grant of a patent right. Drawing back to the example of the deposited funds, the country that makes the deposits has a property claim over some of the profits made by the investing country.

This "back end" system would allow both the host country and the "inventor" from the DC to have a property right in the product. One could conceivably create a system in which every country would agree to take the contribution of PGRs into account when granting a patent on an end-product derived from a PGR, and to force patent holders to pay a royalty to the host country. Such a system would be inefficient and very difficult to enforce because each state would have a strong incentive to protect its

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137. See, e.g., Huft, *supra* note 12, at 1726-27.

138. See *id.*

139. See, e.g., Jacoby & Weiss, *supra* note 131, at 93 (noting that the costs of policing and patrolling the borders in order to ensure that genetic resources were not stolen would be excessively expensive).

nationals by violating the law.

Therefore, I propose that all biotechnology patents in which the end-product is derived from a PGR should be referred by domestic patent offices to an International Biotechnology Patent Office (IBPO) that will be created by an international treaty. All signatory nations would agree to refer any biotechnology patent applications for end products derived from PGRs to the IBPO. The basic framework for the IBPO would be as follows:<sup>140</sup>

1. The IBPO will grant patents to end products derived from PGRs applying standards similar to the ones used in the United States and Europe.
2. All nations will agree to honor and enforce the decisions made by the IBPO in their national courts.
3. The IBPO will take into account the contributions of PGRs in the development of biotechnology products and will determine a royalty to be paid to LDCs based on the contribution made by the PGR to the final product. The royalty will be greater if indigenous communities contributed knowledge to the bio-prospectors.
4. The IBPO will have its own standards that will be established in its charter, and an arbitral body will settle disputes. The IBPO will sustain itself financially based on the fees that will be collected when patent applications are filed.

I propose that the IBPO should, with time, work to add the following provisions:

5. The IBPO will test the ecological danger of a biotechnological product before granting a patent. Using a process similar to the one used by the FDA for the approval of pharmaceuticals in the United States, the IBPO will conduct research tests to test the ecological safety of the product.<sup>141</sup> The IBPO will not only require an approval process for pharmaceuticals, but also for other bio-engineered products such as agricultural products. Given the destruction that these products may cause when

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140. The IBPO would apply prospectively and would not be retroactive to any patents filed before the date upon which it was operational and prepared to handle patent applications.

141. States would be allowed to enact higher standards domestically but will not be allowed to approve products that have been rejected as ecologically unsafe by the IBPO regulatory agency.

introduced into an ecosystem, it is important that there be some global regulation and approval process for bio-engineered products to ensure their safety.<sup>142</sup>

6. In order to maintain a patent right in a country the patent holder must make the goods available for sale in that nation.

### C. Problems and Explanations

Convincing rational political leaders to cede authority to an international patent office for a set of patents that are as important a part of the economy as biotechnology patents are to the economies of the DCs will no doubt be difficult. As Professor Gutterman notes:

Resolving the "North-South" debate regarding IP rights will necessarily demand a good deal of political courage from all parties. Little doubt exists that cooperation with foreign concerns, however well meaning, can be extremely dangerous for political leaders in many developing countries. Similarly, a program perceived as drawing funds and jobs outside of developed countries like the United States. . . . will surely draw criticism from a variety of interests. Nonetheless, such a long term investment must be made on both sides if the theoretical relationship between economic development and the sanctity of IP rights is finally to be realized.<sup>143</sup>

Even though the ratification of the IBPO would expend a great deal of political capital, it presents the best compromise solution available to both LDCs and DCs. It allows DCs to have strong worldwide patent protection for their products, while allowing LDCs who provided the PGRs, and often a part of the knowledge, to collect some of the rents. This system would allow corporations to file one patent instead of incurring the transaction

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142. While a full discussion of the ecological dangers that may stem from the overzealous granting of patents to biotechnological inventions is beyond the scope of this Note, this is a critical issue that deserves more thoughtful analysis in the literature and amongst policy makers. See, e.g., Tilford, *supra* note 22, at 393-97 (suggesting that advances in biotechnology will ultimately cause more harm than good because gene erosion will ultimately break down food security); Ritchie et al., *supra* note 101, at 446-7 (describing a project at a major American University in which a biotechnological product in its final stages of development was found to be destructive to the Nitrogen cycle of plants and could have led to widespread decertification if it had been introduced into the environment). But see, e.g., Jacoby & Weiss, *supra* note 138, at 86 (arguing that biotechnology has increased crop yields thus decreasing the food shortage and lessening pressure for deforestation).

143. Gutterman, *supra* note 37, at 139.

costs of going from country to country.<sup>144</sup> While it does force them to share some of their profits in the short term, it increases the chances that LDCs will enforce their property rights in their own jurisdiction.

Additionally, in the long term it increases the chances that they will have a continuous supply of PGRs with which to develop profitable end-products. LDCs will benefit by receiving rents in recognition of their property rights in PGRs. These rents will boost their Gross Domestic Product and give them a stronger incentive to devise strategies to conserve PGRs.

From the perspective of the "global community" the proposed system will increase conservation and help preserve biodiversity. It will also foster the continued innovation and development of new end-products derived from PGRs such as pharmaceuticals.

The model I have proposed is by no means complete. Many of the unanswered questions will have to be worked out by governments through negotiation and compromise. There are a few issues, however, that should be addressed here.

Initially, the IBPO will have to overcome certain collective action problems. The first problem will be bringing all of the states together to act cooperatively. A collective action problem arises if nations "hold out" and refuse to sign the treaty unless certain concessions are made to them. Because the system can't succeed unless states participate, there is an incentive to defect out of any coalition that might form. This concern is valid but can be overcome.

The nations can be brought together to negotiate the IBPO in a round of GATT negotiations. Because the formation of the IBPO would necessitate the replacement of the TRIPs, it would be appropriate to use GATT negotiations as a forum for the implementation of the IBPO. If the IBPO were to be implemented as an amendment to TRIPs, it would be tied to the GATT. Just as TRIPs succeeded because it was wrapped up in GATT, the IBPO can follow the same course. One could argue that tying the IBPO to the GATT where DCs have more bargaining power will lead to an agreement biased in favor of DCs. While this argument has merit, it

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144. See, e.g., Scalise & Nugent, *supra* note 43, at 105 (noting that there are tremendous costs associated with filing, and prosecuting patents in multiple jurisdictions with different rules and that "[t]he proposition that a uniform system for recognizing international patent rights would reduce a great deal of the waste and inefficiency is unchallenged"); Michael North, Note, *The U.S. Expansion of Patentable Subject Matter: Creating a Competitive Advantage for Multinational Companies?*, 18 B.U. INT'L L.J. 111, 114-15 (2000) (arguing for a uniform patentable subject matter standard for Japan, Europe and the United States); Sherwood, *supra* note 99, at 522-28 (noting that patent offices in many LDCs are ill equipped, have poorly trained personnel, and have other disadvantages that will make it extremely difficult for them to scale up to the sophisticated system that compliance with TRIPs requires). Sherwood also notes that the system is inefficient because countries that invest resources in conducting technical examinations for patents, could save money if someone else were to do the research for them. *Id.* at 527. The IBPO helps LDCs by removing the burden of having to invest in a sophisticated biotechnology patent infrastructure, and it helps the DCs by ensuring that they will have a neutral forum that is well staffed and well equipped to process their application in a timely, efficient, and equitable manner.

must be qualified by the fact that the IBPO is, by definition, a compromise solution. If the DCs want to leverage their bargaining power to get more favorable terms for themselves, they will not give up TRIPs. If we start with the supposition that DCs realize that TRIPs is a sub-optimal solution, then we can assume that they will not over-leverage their bargaining power to create an imbalanced IBPO agreement.

With regard to who would make the initial monetary investment to establish the IBPO, employing a contribution system that would collect funds in an escrow during a transition period can solve the problem. The transition period will be necessary to allow nations to modify their domestic systems in order to comply with the terms of the treaty. During that period, after a treaty has been signed but before the office receives its first patent application, an escrow account would be set up into which a fixed fee would have to be deposited. The fee would be uniform across nations and would be charged to a corporation each time that it sought a patent in any state for an end-product derived from PGRs.<sup>145</sup> The money from the escrow could then be used to finance the creation of the IBPO and to fund it to the point where it was self-sustaining. A group of leaders could be assembled, representing various signatory nations, to oversee the implementation of the IBPO. This scheme ensures that no state "free rides" off of the investment of any other state.

A second potential issue that deserves attention is how the IBPO will be governed. The rules for the IBPO, including the patent standards, will be established by the treaty and amended by subsequent rounds of the GATT. The administrators and the patent examiners should be selected from diverse jurisdictions and trained in the guidelines of the IBPO. The treaty will establish their compensation. Initially they will be paid by the escrowed funds and later by the filing fees. In order to ensure that there is no bias, the name of the corporation and its national origin will be left off of the patent application when the examiner is reviewing it. Additionally, a corporation that is denied a patent will be given reasons why the patent was denied and will have the opportunity either to re-file and/or to appeal. There will be an appellate body made up of a diverse membership representing both LDCs and DCs. Appeals could be designed similar to most international commercial arbitrations in which panels of three arbitrators from diverse jurisdictions hear the appeal and make a binding decision. Additionally, since granting a patent to the end-product would represent a net gain for both the DCs and LDCs (because they both profit from the granting of a patent), bias in favor of, or against, granting patents should not become an issue.

A third issue is enforcement. States will have to enforce the decisions of the IBPO by cracking down on pirates, guarantee that patent applications filed for products derived from PGRs are forwarded to the IBPO, and ensure that royalties are paid in adherence with the IBPO rules.

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145. If one corporation filed for a patent on the same product in multiple countries, they would be required to pay the fee each time.

States could be coerced into complying with these enforcement duties by the threat of penalties and sanctions within the IBPO itself, and, if necessary, by tying in the WTO. This formidable punishment would serve as a strong incentive for states to comply.

One final issue that should be discussed is the pricing model. The IBPO will be entrusted with the responsibility of determining the royalty rates that should be paid to host nations. This duty will be challenging. The market prices most property. In other words, when there is a single owner who has control over his property right, he can sell the property for its market value. The way in which this international system has been designed, both LDCs and DCs are accorded property rights in the end-products. However, both do not have *control*. Thus, the IBPO, and not the market, has the responsibility of pricing the value of the property right. In order to be fair and maintain consistency, there should be a relatively narrow "royalty range" or band, that would differ from patent to patent.<sup>146</sup> The royalty rate should be a percentage of the revenues<sup>147</sup> collected on a certain product, for the duration of the patent. Thus, the more the end product earns as it is sold on the market, the more the initial investors, or LDCs, collect.<sup>148</sup>

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146. The range is kept narrow first because it is assumed that most bio-prospectors relied on some form of indigenous knowledge and second because a narrow range minimizes the potential for bias.

147. I use percentage of revenues instead of percentage of profits because determining how much profit was made by a particular product would pose more of an actuarial mess.

148. The IBPO would initially hire expert accountants and economists to determine what the royalty range should be. Those individuals would be entrusted to develop a model that would incorporate several variables including the following: the average of the total rents collected from all "conservation" activities by LDCs in the status quo, the average of the total rents collected from all "consumption" activities, and the level of expected profit that induces corporations to develop end products from PGRs. Calculating each of these variables would be very complex. One way in which to make the calculations would be to standardize the pricing to a given area. For example, the group would attempt to determine how much a State can earn by consuming the next acre of land, *A*, then determine how much they can earn by saving that acre (without deriving rents from PGRs), *B*. Next, they would attempt to calculate the chance that that acre would have a valuable PGR, *C*, and then they would determine the average revenues earned on a PGR that receives a patent, *D*. If *X* is the "royalty range," the formula to determine *X* would be as follows:  $A - B < (C)(D)(X)$ . If *X* is such that this equation is satisfied, LDCs would have an incentive to conserve, rather than consume. The reason *X* is a range, and not a set rate, is because those "inventions" that relied heavily on indigenous knowledge should have to pay a higher royalty rate than those that did not rely on an indigenous knowledge because the LDC has made a greater "investment." The royalty rate should be higher if the indigenous communities have contributed to the invention because their contributions have saved the corporation time and money, and because their contributions are "labor" that should be rewarded. See, e.g., Odek, *supra* note 12, at 155; Sarma, *supra* note 12, at 113.

If it turns out that *X* is so large so as to create a disincentive to corporations to invest in the development of end-products derived from PGRs, DCs will have to cooperate with LDCs to adjust *B*. By arguing that *B* should be adjusted, I am suggesting that the governments of DCs will have to provide economic incentives to LDCs to conserve, in addition to the incentives stemming from the IBPO model. These incentives, such as debt-for-nature swaps, would increase *B*, thereby making *X* smaller. Given that corporations have a strong incentive in the status quo to bio-prospect and develop products despite the fact that their products are pirated in many LDCs, it is not likely that their incentives will decrease

It is important here to note that other mechanisms that compensate LDCs for conservation cannot be successful *replacements* for the IBPO model. Initially, they are normatively inferior in that they allow the pillaging of indigenous knowledge to continue without compensation. Additionally, it has been empirically proven that alternatives such as debt-for-nature swaps, which require DCs to forgive loans to LDCs in exchange for conservation, have been very difficult, if not impossible, to execute successfully. Such measures are not market mechanisms and require *government to government* transfers, rather than *corporation to government* transfers.

This is problematic for two reasons. First, it faces a tremendous collective action problem. Determining which DC should have to exchange debt-for-nature, and how much of a burden each should each bear is nearly impossible given the compelling incentive to free-ride.<sup>149</sup> The second problem that these arrangements create is political. Even though these monetary incentives would be a way for DCs to pay for *their share* of global public goods, they are perceived by the electorate and by many politicians as *charity*. As such, they are politically unpopular within the DCs.<sup>150</sup>

#### V. WHY THE IBPO IS A SUPERIOR POLICY OPTION

Before concluding that the IBPO is the superior policy option, it is important to critique the other proposals for reform that have been forwarded by scholars and policy makers. There have been almost as many different proposals as there have been articles written on this issue. Since many of these proposals are slight variations on each other, the focus of this Part will be to concentrate on the general themes that can be found in the literature.

##### A. Direct Contracting

The first proposed alternative is for nations, or indigenous groups, to directly contract with corporations wishing to bio-prospect on their lands. This alternative is based on the Coasean theory of "internalizing externalities" through direct negotiation.<sup>151</sup> An inefficient market outcome due to the existence of externalities may be corrected through negotiation amongst the affected parties if the transaction costs are not prohibitive. Proponents of this model might argue that the IBPO is an unnecessary "middle man."

While this alternative is appealing because it relies upon the market

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significantly under the new regime.

149. See, e.g., Stone, *supra* note 11 at 594 ("There are, however, many impediments . . . that hinder cooperative solutions to public goods provisions, particularly where, as in the international arena, there is no authoritative central authority.").

150. See, e.g., Tilford, *supra* note 22, at 443 (noting that transfer programs are perceived as "foreign aid" and that there is little political will for such actions).

151. See generally R. H. Coase, *The Problem of Social Cost*, 3 J.L. & ECON. 1 (1960).

and circumvents the need for an international regulatory framework such as the IBPO, it is problematic for several reasons. The primary concern that this approach brings to the fore is one that is common to Coasean contracts—while Coasean contracts do “internalize the externalities,” they do not account for the distribution of rents within the contractual relationship.<sup>152</sup> Given the combination of the economic strength and experience of many multinationals and the relative inexperience and need for short-term economic help of many LDCs, most contracts of this nature will be heavily biased in favor of the corporations.<sup>153</sup> The consequence is that while the multinational may gain the opportunity to bio-prospect in a small portion of land, from the perspective of the nation-state, the incentives for consumption will probably remain higher than the incentives for a conservation strategy. The distributional inequality also exists with respect to knowledge. The multinational corporation, because of its familiarity with the commercial market and the potential value of certain resources, will inevitably know more about what they are “purchasing” than the government with whom they are negotiating.<sup>154</sup>

One could argue that this inequality in bargaining power will be balanced, in part, by competition amongst purchasers. However, even if LDCs did attempt to leverage their land to different bio-prospectors, their ability to do so would be limited. Most of the world’s PGRs have still not been researched. As a consequence, if one LDC tries to contract at a high price, another LDC can draw away the multinational by offering a lower price.<sup>155</sup> The only way to solve this collective action problem would be for LDCs to form a coalition, much like OPEC.<sup>156</sup> The transaction costs of forming this kind of coalition would be high and the incentive for any individual nation to defect would be greater than the incentive to stay in the coalition.<sup>157</sup> As a consequence, the costs of devising an enforcement mechanism to keep countries in the coalition would be high.<sup>158</sup>

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152. See Robert Coase, *The Cost of Coase*, 11 J. LEGAL STUD. 1 (1982).

153. See, e.g., Roht-Arriaza, *supra* note 4, at 960 (“[P]arties to the deal have vastly different resources, abilities to bargain, and abilities to enforce the provisions of any agreement.”).

154. See, e.g., *id.* at 960; Odek, *supra* note 12, at 170-71.

These problems are particularly profound if the property rights are granted to indigenous communities. In those cases, the indigenous communities will be greatly disadvantaged in bargaining power vis-à-vis the large multinationals. Additionally, the private contracts, if they are negotiated with indigenous communities, leave open the question of who should negotiate on behalf of the community and who should receive the rewards. This is especially problematic in situations where the genetic resource, such as the Neem tree, can be found in many communities.

155. See, e.g., Bosselmann, *supra* note 38, at 144 (“[F]aced with paying for germplasm, biotechnology companies may seek out LDCs that are less strict in their control over access to germplasm.”).

156. OPEC is the Organization of Petroleum Exporting Countries; an intergovernmental organization that that helps determine the conditions for the export of oil. There have been some attempts made to form genetic cartels of this sort. The Cartagena Agreement on Access to Genetic Resources was signed between the nations of Bolivia, Columbia, Venezuela, Ecuador and Peru. The agreement requires prospectors to negotiate agreements before prospecting in any of the countries. See Tilford, *supra* note 22, at 437.

157. See, e.g., *id.* at 437-40.

158. See *id.*

There are also other transaction costs that make the market solution problematic. Given the political instability in many LDCs, multinationals may be afraid of making up-front commitments.<sup>159</sup> If making a deal requires a company to commit resources up-front, they would presumably be very wary of negotiating with a government that was, in their opinion, corrupt or unstable for fear of losing their investment in the event of political instability.

Those who advocate the Coasean approach usually rebut these arguments by suggesting that the Merck-INBio agreement is empirical evidence that the market approach can be successful.<sup>160</sup> The Merck-INBio agreement was signed between Merck, a pharmaceutical giant, and INBio, a Costa Rican private non-profit institute created by the Costa Rican government.<sup>161</sup> The deal was structured to allow Merck scientists to take extracts from plants, insects, and microorganisms in exchange for technology transfers and royalty payments. While the exact terms of the deal are not public,<sup>162</sup> there has been a great deal of speculation as to what the terms of the agreement were, with many commentators suggesting that the Costa Rican government did not get a "fair bargain."<sup>163</sup>

Even if one was to ignore the distributional problems in the Merck-INBio agreement, Costa Rica is not representative of many LDCs. Costa Rica has an adult literacy rate of ninety eight percent, a well-developed business and scientific community, has been committed to environmental conservation, and has had a stable democratic government throughout the twentieth century.<sup>164</sup> These factors lower the transaction costs of an agreement.<sup>165</sup> It is not surprising, therefore, that the Merck-INBio agreement has not been followed up by many new agreements.

The third problem with these agreements is that they have been limited

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159. It is known that Merck paid approximately one million dollars up front as a prospector's fee in its deal with INBio. *See, e.g., Kadidal, supra* note 31, at 233.

160. While Merck/INBio is the most prevalently cited example, there have been other agreements between DCs and LDCs. *See, e.g., Tilford, supra* note 22, at 431. The problems with the Merck/INBio deal also infect these other agreements.

161. *See, e.g., Parlange, supra* note 4, at 42.

162. The royalty rate is generally assumed to be somewhere between one and three percent.

163. *See, e.g., SHIVA, supra* note 96, at 76 ("[P]ayments are supposed to build research capacity in the source country. But when Merck supplied chemical extraction equipment to the University of Costa Rica, it ensured that it has exclusive commercial use of those facilities. The capacity building is thus held 'captive' by the financing corporation and is not available for the wider national interest in the source country."); *Tilford, supra* note 22, at 432-33 (noting that Merck's reluctance to give Costa Rica technology that would allow it to conduct its own research is a product of Merck's reluctance to "create in Costa Rica a full partner and potential future competitor possessing its own resource base"); *Kadidal, supra* note 31, at 235 ("All things considered, a deal as one sided as Merck's appears to be the result of a severe imbalance in bargaining power."). *But see* Sharma, *supra* note 68, at 30 (describing the agreement as a successful operation of market forces).

164. *See* Tilford, *supra* note 22, at 433.

165. *See, e.g., id.*, at 433 ("These conditions might buy for Costa Rica what other countries simply cannot afford: the time and inclination to wait, to bypass immediate resource-depleting income to gamble on future, possibly larger returns. Equitable or not, the Merck/INBio deal might have little chance of surviving in most other developing countries.").

to pharmaceutical bio-prospecting. Yet, as this Note has shown, there are many other products, such as seeds, chemicals, and pesticides, which are also developed using bio-prospecting techniques. States would presumably have to contract with these corporations as well. This presents two issues. Initially, as an empirical matter, there is no evidence that any non-pharmaceutical companies have made such arrangements with LDCs. Additionally, it is unclear how more than one corporation may be able to bio-prospect in a given area if they are searching for different types of products.

Fourth, there are enforcement problems. If an LDC contracts with several corporations in several different states, it will have to bear the cost of monitoring its agreement worldwide. Even when a violation is detected, the LDC would be forced to litigate its claims in a state in which the corporate entity has assets. Not only would this litigation be costly, but there would also be a great deal of uncertainty stemming from the fact that national courts will inevitably be biased in favor of their nationals.

Finally, it may not be a coincidence that the Merck agreement "appeared on the scene at the same time as the Rio Convention."<sup>166</sup> Merck, as a large pharmaceutical corporation, had a great deal to lose if the United States were to accept the terms of the CBD. Therefore, the agreement with INBio may have been an aberration; an exception designed to demonstrate that market mechanisms were solving that which governments were looking to regulate.<sup>167</sup> David Tilford notes that

[O]ne gets the sense at present that their magnanimity is fueled more by a desire for good publicity than out of necessity. U.S. industry continues to stand in a uniquely dual situation: they go hunting in Convention territory, but retire with their spoils to the last bastion of common heritage.<sup>168</sup>

#### B. Granting IPRs to Government's or Indigenous Communities

The second general category of reform proposals suggests that IPRs in raw germplasm should be granted to either indigenous communities<sup>169</sup> or

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166. Kadidal, *supra* note 31, at 232.

167. Richard Godown, President of the International Biotechnology Association in reference to the Convention on Biological Diversity argued that the Merck/INBio agreement was possible without the Convention's "enormous slug of mandatory contract language." See Tilford, *supra* note 22, at 432.

168. *Id.* at 431-32.

169. See, e.g., Roht-Arriaza, *supra* note 19 (arguing that indigenous communities should be granted IP rights in germplasm); Huft, *supra* note 12 (arguing that the US patent model may be adaptable to incorporate indigenous communities as co-inventors).

For specific criticisms of Huft's joint inventor proposal, see Jacoby & Weiss, *supra* note 131, at 98, who argue that "if the contribution to the innovation was merely providing knowledge that was in the public domain, the contribution may not merit inventorship status.

state governments.<sup>170</sup> Assigning IPRs to germplasm is an inferior solution for several reasons.

First, the standards for “intellectual contribution” would be difficult to determine. Therefore, establishing a set of principles for separating that germplasm to which IPRs should be assigned from non-patentable germplasm would be extremely difficult and, to my mind, arbitrary.

Second, if PGRs were patented they would presumably last for a fixed period of time, probably not more than the seventeen-year term granted in the current international regime. Thus, in the best-case scenario, the proposal would create a seventeen-year moratorium during which IPRs in PGRs would be recognized. After the end of the seventeen-year period, however, all of the world’s PGRs would fall back into the public domain.

Third, it is not clear who the rightful *owners* of the IPRs should be. The IPRs model is designed with the assumption that an individual or individual entity will own the IPR. The majority of scholars who have proposed granting IPRs to germplasm have suggested that the State not be entrusted with these rights.<sup>171</sup> Aside from the problems with bypassing the State discussed in Part III, and to which I will return shortly, it is not clear whether the IPRs should be held by indigenous communities as a group, the leaders of those communities, the individuals within the communities who might have filed for the patent, or the individuals most knowledgeable with the use of the plant (such as shamans for medicinal plants, or farmers for other agricultural plants).<sup>172</sup>

The fourth difficulty that an IPR system presents has to do with transaction costs. The management of IPRs is difficult. Patents are only valuable in the commercial sense in two ways; if they are sold or licensed to another owner, or if they are used to prevent entry by competitors into a defined commercial market. Given that LDCs generally lack the technology to turn their germplasm into marketable end-products,<sup>173</sup> their only option for extracting rents from their IPRs would be to sell their

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Second, a contributor must demonstrate a conceptual connection between the information provided by the contributor and the ultimate end use of the innovation.”

170. See, e.g., Kadidal, *supra* note 31 (arguing that the Rio Convention should be interpreted to grant IP rights to LDCs by amending patent law to eliminate the distinctions within the western patent system that make the patenting of germplasm difficult).

171. See e.g., Odek, *supra* note 12, at 36; Kadidal, *supra* note 31. The problem with giving all of the intellectual property rights to the national government is that it assumes bio-prospecting is a constant. See Kadidal, *supra* note 31, at 258 (“we must assume that most pharmaceutical biodiversity resources would be developed regardless of the scope of Rio patents.”). If a pharmaceutical company bioprospects, discovers that a plant may be valuable and then tries to purchase the IPR from the national government, the government will be able to hold out for a very high price. This would be a tremendous disincentive to the pharmaceutical and biotechnology companies considering bio-prospecting. If they attempt to bargain up-front, before doing any research, by purchasing the patent rights to all of the plants in a given area, all of the problems with private contracts become applicable. See *supra* notes 160-179 and accompanying text.

172. See, e.g., Arriaza, *supra* note 19, at 957.

173. If they did have this technology, they would be producing more end-products than they are producing in the status quo.

patents.<sup>174</sup> If the State were to be granted the IPR, all of the problems that applied to Coasean private contracting arrangements would apply here.

Alternatively, if an individual or group of individuals could be identified as owners of the IPR, the differentials in bargaining power between the indigenous groups and corporations would superimpose themselves onto these contracts as well. In addition, indigenous communities, or individuals, would probably benefit less from the IPR than they would from deforestation. If indigenous communities were to have IPRs in germplasm, they would likely have to shift many, if not all, of their scarce resources to pay for the patent litigation.<sup>175</sup>

Most germplasm turns out not to be commercially valuable.<sup>176</sup> Yet, this knowledge usually only becomes known after a great deal of research and development. Because indigenous communities do not have these R&D capabilities, they would have to secure IPRs in a great deal of their germplasm in order to ensure that any germplasm that turned out to be commercially valuable would have been patented. This would burden communities with an astronomical up-front cost. In addition, even if the IPRs of the indigenous communities were infringed by bio-prospectors, it would be very difficult for indigenous communities to monitor and detect the violations. It would be even more arduous for them to bear the cost of litigating their complaints. The combination of these two factors suggests that owning IPRs in PGRs would probably be less beneficial to indigenous communities than scholars have recognized.

One could argue that these transactional problems could be sidestepped by adopting a default rule in which all PGRs are assumed to be patented upon the signing of an international treaty. The most obvious problem with this "solution" is the expiration problem already discussed. Namely, that the treaty would therefore become a seventeen-year moratorium after which all PGRs would fall back into the public domain.

### C. The Private Property Model

One proposal that is a slight variation on these last two models is introduced by Jacoby and Weiss.<sup>177</sup> These scholars, recognizing some of the aforementioned limitations of proposals to allocate IPRs to indigenous communities, suggest that *traditional property rights* be allocated to these

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174. See Kadidal, *supra* note 31, at 236 ("[A] drug company could protect its investments in specific biodiversity research by negotiating an exclusive licensing agreement with an LDC that would allow the company to enjoin its competitors from using that genetic resource."). In rejecting the Merck/INBio option, Kadidal concludes that the problem with Merck-INBio is "a severe imbalance in bargaining power." Kadidal fails to explain why the same differential in bargaining power that makes prospecting contracts inferior would not apply to the system in which the nations would hold IPRs. With respect to bargaining power, there is little difference between the two systems.

175. See generally, Roht-Arriaza, *supra* note 19, at 957.

176. See, e.g., McCabe, *supra* note 46, at 48 (noting that even after research and development, only one in five thousand pharmaceutical products will ever reach the market).

177. Jacoby & Weiss, *supra* note 131, at 101-08.

communities. Hence, PGRs would be treated much like oil, timber and minerals. Under their proposed scheme, indigenous communities would register their knowledge in an international databank. A multinational wishing to use a PGR in the development of an end product would consult the registry. If the PGR had been registered, the corporation would have to pay for the use of the PGR.

While theoretically appealing, this proposal is unconvincing for several reasons, many of which have already been discussed. First, under this model, the initial entity to register the germplasm would hold the property right. It is not clear whether an individual, group of individuals, or the indigenous community as a whole, should register the PGR. This is particularly problematic when a plant is known to a large group of people but is registered by one of those individuals to the exclusion of the others. Second, the transaction costs discussed above would still plague this arrangement. Third, Jacoby and Weiss do not explain how "fair rates" would be negotiated between the multinationals and the communities. Therefore, the problems associated with Coasean contracts would not necessarily be circumvented by this scheme. Fourth, the proposal does not encourage conservation. The reasons articulated above for why granting indigenous communities IPRs would not encourage them to conserve are equally applicable here.

Finally, the scheme is troubling because it purports to circumvent the State. As this paper has argued in several places, this maneuver is counterproductive. If conservation is to replace consumption, it is imperative that States collect rents from conservation. While the support of indigenous communities is an essential component of successful conservation efforts, circumventing the State will not ensure that the governments will prefer conservation strategies. Ultimately, decisions such as whether or not a large logging company can log a portion of a forest, are decisions that are made by the State. If the governments cede to loggers and subsequently allow industries to develop the cleared land, they can collect rents—rents that they cannot collect when they are circumvented by policies that grant property rights, intellectual or otherwise, to indigenous people. Aside from this purely economic argument, policies that circumvent the State could potentially anger leaders of LDCs and ultimately frustrate other conservation efforts.

#### D. Back to the FAO Undertaking

Another thesis that has been forwarded by many scholars would return the international regime to the principles of the original FAO Undertaking and eliminate all IPRs in PGRs and any products derived from them.<sup>178</sup> There are several reasons why this approach is inferior. The most important of which are that (1) it would be nearly impossible to achieve politically, (2) it would create a tremendous disincentive to

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178. See, e.g., SHIVA, *supra* note 96, at 1-4.

research and develop end-products,<sup>179</sup> and (3) since no one would profit from conservation, it would fail to provide LDCs an economic incentive to conserve. While these theorists have offered many compelling normative arguments for their proposals, such as the need to undo the "commodification of life," the purpose of this Note is to think creatively about possible solutions in the context of politics, and not to imagine the most idealistic or utopian world and then describe it.

#### E. Incrementalism

The last general category of proposals that I wish to consider are ones that do not involve large-scale restructuring, but rather more incremental changes within the current international legal regime. While each proposal has some merit, none of them alone, or in combination, would be superior to the IBPO model.

One proposal that has been forwarded is price controls, which would allow LDCs to set price limits on patented products.<sup>180</sup> Price controls are problematic because there would be no standardized way to determine what the price for a product should be. Therefore, LDCs may set the price too low thereby nullifying the effect of patent protections. As a consequence, DCs would be highly unlikely to agree to a scheme in which LDCs would be allowed to independently price products for sale within their own borders. Additionally, corporations may simply choose not to export the product at that price.<sup>181</sup>

Another proposal would enact a compulsory licensing scheme. A compulsory licensing system is one in which a corporation is forced to license their patented product to a corporation within another country that will then sell the product in that country while sharing some of its profits with the parent company. While compulsory licensing is within the scope of TRIPs, there are severe restrictions on the LDCs' use of such licensing.<sup>182</sup> Even if these could be relaxed in an amendment to TRIPs, the problem of who determines the terms of the license becomes a barrier to feasibility. In addition, part of the thrust for TRIPs was the effort to limit compulsory licensing schemes; thus, it would be very difficult to get DCs to agree to this proposal.

Another proposal, one which I argue should eventually be incorporated into the IBPO treaty, is a "work the patent" rule.<sup>183</sup> This rule

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179. See, e.g., McCabe, *supra* note 46, at 65-7; Michael L. Doane, *TRIPs and International Intellectual Property Protection in an Age of Advancing Technology*, 9 AM. U. J. INT'L L. & POL'Y 465, 470 (1994).

180. See, e.g., McCabe, *supra* note 46 at 60; Weissman, *supra* note 44, at 1074.

181. See, e.g., Ileana Dominguez-Urban, *Harmonization in the Regulation of Pharmaceutical Research and Human Rights: The Need to Think Globally*, 30 CORNELL INT'L L.J., 245, 247 n.8 (1997).

182. See TRIPs Agreement, *supra* note 35, art. 31.

183. See, e.g., Ritchie, *supra* note 101, at 439 (noting that 80% of patents in Third World countries are owned by foreigners and of those 95% are not utilized in the countries).

would require corporations to market and sell the patented product in a country in order to maintain patent protection in that country. This prevents the situation where a company develops a socially beneficial product, gains a patent in a country, and then does not, for any number of reasons, market and sell the products in that country. A work the patent rule would force the company to either make the products available for sale or to allow its patent to expire.<sup>184</sup>

#### F. Summation

In summary, the IBPO is a superior model to those discussed in the literature to this date. Proposals such as Coasean contracts and creating IPRs in PGRs contemplate property rights regimes that would transform PGRs from public goods to private goods. While each model has its particular difficulties, there are two overarching problems that are applicable to each of the proposals. First, treating PGRs as private property requires the system to identify an individual owner. Even if this hurdle is overcome, a second remains—if a PGR becomes a private good owned by an entity *A*, the entity *B* that wants to produce an end product using the PGR has to purchase that good from *A*. While theoretically appealing, the outcomes will be skewed in favor of DCs because these deals will be struck in a market in which *B* will have tremendous leverage over *A* and will therefore be able to purchase the rights to the PGRs at prices that will not reflect the level of investment made by LDCs. The IBPO serves as a “middle man” that ensures that a *fair price*<sup>185</sup> is set. It does so by treating PGRs as LCP rather than pure private property. Proposals that advocate dismantling the entire system of intellectual property, on the other hand, are not pragmatic solutions to a pressing problem that deserves more structural scrutiny.

#### VI. CONCLUSION: THE IBPO IN NORMATIVE CONTEXT

I began in the introduction and in Part I by noting that there were two ways in which to answer the macro-question, “Why change?”—a normative answer and a positive answer. I concluded Part I by arguing that the serious policy proposals that seek to alter fundamental aspects of the status-quo regime must provide more than normative justifications. It is my hope that this Note has provided both. Before concluding, I want to return briefly to the human rights and development concerns raised explicitly at the onset and alluded to throughout the Note.

Given the growth of “knowledge-based” industries, the current

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184. The reason why this proposal is limited has to do directly with its enforceability. A corporation could market and sell a product at a high price to a small segment of the population. Ways in which to control these abuses are beyond the scope of this paper.

185. The fair price is meant to refer to the price that would promote the most efficient outcomes. See *supra* Part III.

international IP regime has potentially broad implications for human rights in developing countries. The question that this Note has attempted to address is: What is the best way to approach these issues? In other words, what can be done to negotiate a solution that maximizes the development prospects of the LDCs, and at the same time protects the development concerns of LDCs and prevents the violation of the human rights of indigenous communities? The attempt has been made with the assumption that simply pointing out the normative flaws of the positions taken by the DCs and arguing that their advocates should completely abandon the current IP regime is unrealistic.

The IBPO is my solution to this pressing problem. It is my aspiration that it will engender fruitful thought and discussion both in scholastic and policy circles. One might challenge the proposal by suggesting that it is not sufficiently "liberal" and does not go far enough. Perhaps that point is valid. Some may argue that the only satisfactory normative solution to the situation is for the current regime to be completely replaced. While I agree that those challenges and critiques do shed light on past and present injustices, in putting my pragmatic pen to this endeavor it is not my purpose to reject those critiques, but rather to incorporate them within a conception of a viable structural proposal.

The IBPO system modifies the status quo by recognizing the property rights of *both* DCs and LDCs. From a normative perspective, the IBPO says to the nations of the LDC:

The conservation of environmental habitats is central to the continued production of global public goods such as oxygen. Additionally, PGRs are valuable resources that will help produce many commercial end-products. The conservation of these resources and the knowledge of indigenous communities are vital to the continued production of end-products and to our survival as a species. Therefore, the rents we collect from the commercial sale of these products will be shared with you. This system is not based on *charity* but as recognition for your *investment* and the principle that you should not have to bear the entire burden of subsidizing global public goods necessary for human survival.

Most scholars and policy makers that have attempted to devise solutions to the problem of PGRs have missed this "compromise solution." Instead, they have generally proposed systems that replace the current regime with a system in which PGRs are treated as private goods. This paper has attempted to prove the shortcomings of this approach. I have suggested that a new model needs to be developed treating PGRs as limited common property. This new international regime would be administered by an International Biotechnology Patent Office. This office would be responsible for allocating all patents, worldwide, for end-

products derived from PGRs. By centralizing the function of granting IPRs, the model allows a condition to be placed on the patent; namely that LDCs must be compensated for their investment into the end-product. Thus, this model allows both the property rights of the DCs and LDCs to be recognized.

The failure to act with pragmatic solutions will result in the continued destruction of habitats, the uncompensated use of indigenous knowledge and escalating tensions between DCs and LDCs. It is, however, in the interests of both groups to reorient their stances. The goal of this Note has been to propose an alternative with the aspiration of proving that it is both tenable and normatively superior. Adopting it will certainly take political will and courage. Hopefully, leaders of DCs will have the fortitude to realize that the long-term security of the ecosystem, the human rights of indigenous communities and the development of LDCs are also worthwhile goals.