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International Law of the Sea/Seed: Public Domain versus Private Commodity

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ABSTRACT

The United Nations Convention on the Law of the Sea (UNCLOS) prohibits privatization or territorial control over the deep seas. The Convention on Biological Diversity (CBD) recognizes sovereign rights over biodiversity within national territories, but the World Trade Organization (WTO) permits privatization of microorganisms and plans to incorporate seeds and plants. Yet both the high seas and biodiversity (gene pool) could be viewed as the common heritage of mankind – necessary for human life, to be shared by all.

Why are seeds legally treated so differently from the seabed, the former to be declared private property (WTO), the other remaining available to all (UNCLOS)? This study compares political contestations over jurisdiction for access and use, for benefit sharing and governance of the sea versus the seed. The conclusion discusses lessons from UNCLOS in delimitation of private property of global resources for resolving the current impasse over privatization of the gene pool between the CBD and WTO.

PUBLIC DOMAIN VERSUS PRIVATE COMMODITY

The United Nations Convention on the Law of the Seas (UNCLOS) ensured that the oceans' seabed remains part of the common heritage of mankind, which is the major international legal delimitation of private property on planet Earth. As discussed below, all have agreed to the principles restricting the domain of private property, but creating an international regime for the seabed remains a project in process. In contrast, the World Trade Organization's (WTO) approach to patenting of life forms, when fully implemented, changes international law to

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allow privatization of germplasm (seed). The legal regime promulgated by the WTO's Trade Related Intellectual Property Rights (TRIPs),[1] extends the concept of private property beyond previous international interpretations, instead of delimiting it. The Convention on Biological Diversity (CBD)[2] places germplasm under national sovereignty, therefore also rejecting a common heritage approach to the genetic commons, but for different reasons than TRIPs.

This study first discusses why the principles of natural law have been used to establish the law of the sea but not the seed. Second, it contrasts the degree of enclosure of seas versus seed. Third, the study analyzes approaches to benefit sharing for the seas and for biodiversity among UNCLOS, CBD, and TRIPS.[3] Finally, it shows the similarities and important differences in governance over the seas and seed. The conclusion discusses lessons from UNCLOS that could be utilized to try to resolve the current impasse over privatization of the genetic commons between the CBD and the WTO.

There are a number of reasons to compare international agreements related to the seas or seed, for both are vital to sustaining all life on earth. Made available by nature in abundant quantities, both water and seed are renewable resources but may also be depleted to scarcity levels. Pervasive throughout the earth's ecosystem, what happens in one part of the seas or of the gene pool can affect other interrelated parts. The seas and the gene pool lead to situations where sovereign states are dependent on one another.[4] Historically, the nations of the world have freely shared seas and seed, but now the international regime toward both is changing. Exploring how and why will inform the cross-disciplinary debates about sustaining both resources for future generations.

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1. Final Act Embodying the Results of the Uruguay Round of Multinational Trade Negotiations, April 15, 1994, GENERAL AGREEMENT ON TARIFFS AND TRADE: MULTILATERAL TRADE NEGOTIATIONS (1995), 33 I.L.M. 1125 (1995) [hereinafter WTO].

2. United Nations Convention on Biological Diversity, June 5, 1992, 31 I.L.M. 818 (enacted Dec. 29, 1993) [hereinafter CBD].

3. Although there are other international agencies addressing policy toward control over germplasm, this article focuses on the two because they define the debates. The U.N.'s Food and Agriculture Organization's (FAO) International Undertaking on Plant Genetic Resources is trying to elaborate the principles of the CBD, with some variance. The World Intellectual Property Organization (WIPO) is promoting the TRIPs regime and UPOV 1991 on plant breeders' rights is integral to enforcing TRIPs.

4. PAT MOONEY, DAG HAMMERSKJOLD FOUND., THE LAW OF THE SEED—ANOTHER DEVELOPMENT AND PLANT GENETIC RESOURCES, 1-2 DEVELOPMENT DIALOGUE 54 (1983).

NATURAL LAW AND THE COMMONS

Two principles, explicated long ago by Hugo Grotius, are central foundations to natural law but remain highly debated. Grotius recognized that discovery did not automatically confer property rights: "discovery per se gives no legal rights over things unless before the alleged discovery they were *res nullis*."[5] What was "discovered" by one people might already be "occupied" by another.

The second principle from Grotius is closely related, expressing that anything that can be used without loss to anyone else is *res omnium communis*.[6] If constituted by nature in a way that, in serving one person, it still suffices for the common use by all, it is common property. As an example, Grotius offered, "seas were forever exempt from such private ownership on account of their susceptibility to universal use."[7] Inland seas very early were carved into territorial waters by empires and kingdoms, but even after the formation of nation-states in the seventeenth century, the high seas remained available for universal navigation. Such a principle served well the mercantile desire for freedom to explore to enhance trade and allowed maritime powers to extend their domain.

A corollary to the second principle is that the entity ought to remain in perpetuity, as when it was first created by nature, thereby invoking responsibility for conservation. Everyone might have the "natural right" to access, but everyone also has the responsibility for maintenance of the common property. To pollute or destroy violates the principle. Entitlement, therefore, carries with it liability or accountability.[8] This responsibility underlies the international discourse about environmental security.

According to the natural law thesis, the universal right of access and the universal obligation for conservation to common property are so important that an individual's welfare should not be grounds for abrogating those rights. Individual or national interests must serve the higher order of protection of natural law, for that law serves all

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5. JAMES B. MORRELL, THE LAW OF THE SEA: A HISTORICAL ANALYSIS OF THE 1982 TREATY AND ITS REJECTION BY THE UNITED STATES 174 (1992).

6. *Id.*

7. *Id.*

8. S. SREENIVASA RAO, THE PUBLIC ORDER OF OCEAN RESOURCES: A CRITIQUE OF THE CONTEMPORARY LAW OF THE SEA 389, 410 (1975). Levan B. Imnadze, *Common Heritage of Mankind: A Concept of Cooperation in Our Interdependent World, in* THE LAW OF THE SEA IN THE 1990S: A FRAMEWORK FOR FURTHER COOPERATION 312, 314 (Tadao Kuribayashi & Edward Miles eds., 1992). Steven Forde, *Natural Law, Theology and Morality in Locke*, 45 AMER. J. POL. SCI. 396, 401-02 (2001).

humankind. Practical or instrumentalist arguments to deny universal access, with conservation, are not admissible as reasons to abrogate natural law. Individual or unilateral enclosure is prohibited.

ACCEPTANCE OF NATURAL LAW FOR THE HIGH SEAS

The first International Convention on the Law of the Sea, held in Paris in 1856, recognized the high seas as *res omnium communis*.[9] The Hague Conferences of 1899 and 1907 confirmed this natural law approach to the high seas, which served well the interests of the powerful who desired freedom of the seas for trade and for movement of military equipment and personnel:

> Freedom of the seas meant essentially non-regulation and *laissez-faire*, which was in the interest of the big maritime powers. This lack of law under the freedom of the seas doctrine was often used in the nineteenth century by European powers to threaten small states and obtain concessions from them or simply to subjugate them.[10]

Yet the principle of the freedom of the high seas was based on the understanding that ocean resources were inexhaustible. By the end of World War I, evidence contradicted this view and the League of Nations initiated international regulation of high seas fishing in order to avert extinction of commercially important fisheries; access was linked to preservation of the resource base so important for all humans.[11] Access was regulated not to privatize the fisheries, which remained *res omnium communis*, but to insure sufficient supplies for all.[12]

The apparent first act for enclosure of the seas was by President Harry Truman, who declared in 1945 that the United States had the exclusive right to exploit its territorial waters, defined as on or under the continental shelf.[13] From 1945 to 1957, 41 other enclosure declarations or laws were enacted by various countries.[14] In response, by 1956, land-locked countries started discussions for a United Nations Convention on

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9. MORRELL, *supra* note 5, at 182.

10. R.P. Arand, *Changing Concepts of Freedom of the Seas: A Historical Perspective*, *in* FREEDOM FOR THE SEAS IN THE 21ST CENTURY: OCEAN GOVERNANCE AND ENVIRONMENTAL HARMONY 72, 77 (Jon Van Dyke et al. eds., 1993).

11. MORRELL, *supra* note 5, at 176.

12. *Id.* at 177.

13. Shigeru Oda, *Some Reflections on Recent Developments in the Law of the Sea*, 27 YALE J. INT'L L. 217, 217 (2002).

14. *Id.*

the Law of the Seas (UNCLOS) to halt these national territorial claims.[15] During these discussions, the UN General Assembly in 1970 established that the use of the seas was for the benefit of humanity, equitably shared. The seabed, ocean floor, and subsoil were declared

> the common heritage of mankind....[T]he exploitation of its resources shall be carried out for the benefit of mankind as a whole, irrespective of the geographical location of states, whether landlocked or coastal, and taking into particular consideration the interests and needs of the developing countries....[It ensured] the equitable sharing [of its] benefits.[16]

Technological developments made it possible to estimate the wealth of the oceans, no longer viewed as a vast expanse of *res nullis*, but as perhaps richer than the continents, in terms of flora, fauna, and minerals. Technology made it possible to increase exponentially the amount of fish caught and the depth at which minerals could be mined. In practice, the high seas remained "free and open" (*mare liberum*) until 1995 when devastation of stocks and fishing further down the food chain awakened the most entrepreneurial to the benefits of sustainable fishing; the UN Fish Stock Agreement of 1995[17] recognizes that states must enforce the "maximum sustainable yield" (MSY) to guarantee viable stocks. Many stocks remain fished well beyond MSY, but now the principle of limiting harvests is at least recognized. Some analysts think fisheries must be brought into the common heritage of mankind in order for them to survive.[18] At this point, the common heritage of mankind principle most correctly refers to the seabed, its flora, fauna, and minerals in the subsoil, not yet the *mare liberum*.

Coral reefs, mangroves, and estuaries are now considered "among the most highly diverse, integrated and productive of the earth's

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15. *Id.*

16. The resolution passed by 108 to 0 with 14 abstentions. G.A. Res. 2749, U.N. GAOR, 25th Sess., ¶¶ 1, 7, 9, U.N. Doc. A/RES/2749(XXV) (1970), *available at* http://www.dal.ca/~wwwlaw/kindred.intllaw/Res2749.htm (last visited May 16, 2004).

17. *Agreement for the Implementation of the Provisions of the U.N. Convention on the Law of the Sea of 10 December 1982 Relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks*, U.N. Conf. on Straddling Fish Stocks & Highly Migratory Fish Stocks, 6th Sess., U.N. Doc. A/CONF.164/37 (1995, enacted Dec. 11, 2001), *available at* http://www.un.org/Depts/los/convention_agreements/texts/fish_stocks_agreement/CONF164_37.htm (last visited May 16, 2004).

18. Oda, *supra* note 13, at 220.

ecosystems."[19] An estimated 175 billion dry metric tons of minable manganese nodules, containing as many as 30 elements, including manganese, nickel, copper, and cobalt, cover about 15 percent of the deep seabed.[20] If correct, these reserves far exceed known land deposits.[21] Yet initial estimates tended to overestimate not the mineral wealth, nor necessarily the ability of technology to mine it, but the economic feasibility of such endeavors. Mining engineer John Mero predicted in 1965 that by 1985 operations would be processing 50 million tons of nodules annually.[22] However, those corporations that had seabed mining technology also had substantial invested interest in the continuing profitability of land-based minerals. Thus, mining of the seabed has not yet become a growth industry. Nevertheless, this vast potential wealth, located on the 70 percent of the earth's surface covered by the oceans,[23] is the impetus for both the attempt to privatize the ocean and the resistance to such an enclosure.

The principle of the common heritage of mankind recognizes no sovereignty and no private property over a natural resource. Article 136 of the international law of the sea[24] declared the deep seabed outside the 200-mile limit of national zones to be part of the "common heritage of mankind." The deep seabed includes the ocean floor and subsoil and their resources. Article 137 further prohibits any portion thereof to be subject to state sovereignty. Other characteristics of a common heritage are also incorporated into the Convention, with Article 143 calling for the peaceful use of the seas and the promotion of marine scientific research by all, including land-locked countries. Article 145 requires protection of the marine environment.

The common heritage principle was adopted within an international treaty mainly in recognition that high seas mineral resources are non-renewable and that fisheries and flora, although

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19. *Report of the United Nations Conference on Environment and Development*, U.N. GAOR, Annex II, Agenda Item 21, ¶ 17.72, U.N. Doc. A/Conf.151/26, (1992), *available at* http://www.un.org/documents/ga/conf151/aconf15126-2.htm (last visited May 16, 2004).

20. Jean Pierre Lévy, *The International Sea-Bed Area*, *in* A HANDBOOK ON THE NEW LAW OF THE SEA 587, 598, 602 (René-Jean Dupuy & Daniel Vignes eds., 1991). *See also* LAWRENCE JUDA, INTERNATIONAL LAW AND OCEAN USE MANAGEMENT: THE EVOLUTION OF OCEAN GOVERNANCE 188-89 (1996); MALCOLM SHAW, INTERNATIONAL LAW 339 (1986).

21. *See* JUDA, *supra* note 20, at 188.

22. John L. Mero, *A Legal Regime for Deep Sea Mining*, 7 SAN DIEGO L. REV. 488, 497 (1970). *See also* JOHN L. MERO, THE MINERAL RESOURCES OF THE SEA (1965).

23. The ocean waters' average depth is four times the average elevation of land, making the sea the largest ecosystem on earth.

24. United Nations Conference on the Law of the Sea: Final Act, Dec. 10, 1982, 1833 U.N.T.S. 3, 21 I.L.M. 1245 (1982) (also reproduced as U.N. Doc. A/CONF.62/121) [hereinafter UNCLOS].

renewable, can be quickly depleted to extinction. Minerals, flora, and fauna must be conserved to sustain the human race on earth. The goal of environmental security, therefore, was fundamental to adoption of the principle. Based on the principles of international law, discussed above, environmental security for the high seas and ocean floors takes priority over national security, economic or political: no state can use the argument that its individual survival gives it privileged or exclusive use over the oceans' natural resources. As Ambassador Chris Pinto of Sri Lanka observed, UNCLOS initiates a "new international law of cooperation,"[25] which recognizes sovereignty, but one delimited by cooperation for environmental security for all.

U.S. ROLE IN MODIFICATION OF COMMON HERITAGE

From 1958, the United States directed the discussions over the definition of territorial waters under UNCLOS.[26] Its delegations especially wanted to define the freedom of navigation, right of innocent passage, and over-flight rights in ways to facilitate the movement of its armed forces around the world. Without exception, every U.S. definition was honored in the UNCLOS final draft.

In 1970, 1971, and 1974, the United States refused two corporations, Kennecott and Deep Sea Ventures, exclusive rights to explore the seabed: "The State Department does not recognize exclusive mining rights to the mineral resources of an area beyond the limits of national jurisdiction."[27] The corporations also applied to Canada, Australia, and the United Kingdom for such jurisdiction and were denied.[28]

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25. Elizabeth Mann Borgese, *The Process of Creating an International Ocean Regime to Protect the Ocean's Resources, in* FREEDOM FOR THE SEAS IN THE 21ST CENTURY: OCEAN GOVERNANCE AND ENVIRONMENTAL HARMONY 23, 28 (Jon Van Dyke et al. eds., 1993).

26. Because discussions to formulate UNCLOS extended from 1958 to 1994 and the United States still offers new interpretations, this section cannot address all of the diplomatic efforts by many experts. For more thorough discussions of the changing discourse, see ROSS D. ECKERT, THE ENCLOSURE OF THE OCEAN RESOURCES: ECONOMICS AND THE LAW OF THE SEA (1979); FREEDOM FOR THE SEAS IN THE 21ST CENTURY: OCEAN GOVERNANCE AND ENVIRONMENTAL HARMONY (Jon Van Dyke et al. eds., 1993); CLYDE SANGER, ORDERING THE OCEANS: THE MAKING OF THE LAW OF THE SEA (1986); J.M. Spectar, *Elephants, Donkeys, or Other Creatures? Presidential Election Cycles and International Law of the Global Commons*, 15 AM. U. INT'L. L. REV., 975 (2000).

27. MARKUS G. SCHMIDT, COMMON HERITAGE OR COMMON BURDEN? 37 (1989) (quoting U.S. Department of State Statement on Claim of Exclusive Mining Rights by Deepsea Ventures, Inc., 14 ILM. 66 (1975)).

28. *Id.*

The Reagan Administration, however, introduced the argument that freedom of the high seas, recognized by all for navigation, could be extended to the exploitation of minerals,[29] ensuring that seabed minerals were open to all on a "first come" basis. Developing countries, which had no technology to mine the seabed, refused this interpretation, most eloquently expressed by the Indonesian negotiator Hasjim Djalal:

> It is no longer possible to regard the seabed resources as free for all under the disguise of the freedom of the sea. In fact, it has never been regarded as such....To contend that the principles of the common heritage of mankind permits the exploitation of the deep seabed only by those who are capable of exploiting it is, to say the least, illogical and unjust. Such a contention would lead to the colonization of the international seabed and its resources solely by those who currently have the technology, financial capacity and organizational ability to do so. This interpretation would obviously only benefit private companies and Industrialized countries, thereby making a mockery of the principle of common heritage of mankind.[30]

During the years of the debate, the United States and other industrialized countries refused to submit to the treaty until it formally entered into force, thereby allowing mining of the seabed solely for private profit. Any delaying tactics in submitting to compromise rewarded those private interests. Industrialized nations also refused the principle of *jus cogens* for the Convention. *Jus Cogens* would have ensured that any treaty abrogating norms of the Convention would be void. But the rejection of the principle meant that the Convention can be derogated by any other treaty.

Negotiations were recommenced in 1990 to revise the seabed provisions. The subsequent amendments in Part XI are the most significant in modifying the original intent of the Convention. The United States insisted that current seabed mining claims be honored and not be subject to the international regulatory authority. Further, the United States won the demand to eliminate any responsibility to transfer or share technology with other countries.[31] The U.S. State Department

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29. *See* Hasjim Djalal, *Law of the Sea Conference: Other Alternatives for Seabed Mining?*, 3 N.Y.L. SCH. J. INT'L & COMP. L. 39, 42–43 (1981).

30. *Id.* at 43–44.

31. Erin Clancy, *The Tragedy of the Global Commons*, 5 IND. J. GLOBAL LEGAL STUD. 601, 612 (1998); Ctr. for Defense Info., *The Law of the Sea*, 29 DEFENSE MONITOR 4 (Feb. 2000), *available at* http://www.cdi.org/dm/2000/issue2/law-of-sea.html (last visited May 16, 2004).

concluded, "Early adherence by the United States to the Convention and the Agreement [Part XI] is important to maintain a stable legal regime for all uses of the sea....Maintenance of such stability is vital to the United States' national security and economic strength."[32]

Open for signing since 1982, UNCLOS was finally signed by President Clinton in 1994, mainly because of the Part XI amendments.[33] UNCLOS came into force in November 1994, without U.S. ratification. The United States had a provisional right (1994-1998) to participate in administering UNCLOS, but is now barred from membership on the Law of the Sea Tribunal and the Continental Shelf Commission, and it can no longer name members to arbitration panels.[34]

REJECTION OF NATURAL LAW FOR SEED

The protracted discussions over use of the seas' natural resources meant that the industrialized nations ignored many of the provisions and continued to advance explorations and to fish beyond sustainability; the United States cited the lack of a treaty to validate unilateral action.[35] Further, "free access for all" privileged those who had the technology to access deep waters, resulting in inequitable harvesting of the seas' resources

Given the difficulty of bringing the United States and other industrialized countries to honor UNCLOS, those involved in formulating the Convention on Biological Diversity (CBD) decided that the common heritage principle left natural resources open for the taking.[36] Instead, the CBD placed biodiversity under national sovereignty, enlisting the power of individual states to join the international authority in preserving global biodiversity.[37]

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32. BUREAU OF OCEANS & INT'L ENVTL. & SCI. AFF., U.S. DEP'T OF STATE, FACT SHEET: U.S. OCEANS POLICY AND THE LAW OF THE SEA CONVENTION (May 28, 1998), *at* http://www.state.gov/www/global/oes/oceans/fs_oceans_los.html (last visited May 16, 2004) [hereinafter FACT SHEET: U.S. OCEANS POLICY].

33. Ctr. for Defense Info., *supra* note 31

34. *Id.*

35. ANTONIO CASSESE, INTERNATIONAL LAW IN A DIVIDED WORLD 385 (1986).

36. Christopher C. Joyner, *Biodiversity in the Marine Environment: Resource Implications for the Law of the Sea*, 28 VAND. J. TRANSNAT'L L. 635, 648-49 (1995).

37. The United States initiated the discussions for the CBD in 1987 by proposing to the UN Environmental Program (UNEP) Governing Council that a group begin work on a global convention on biological diversity in order to rationalize relations among various secretariats representing multiple international conservation agreements. By 1989, the United States was strongly disputing the suggestion to include biotechnology; developing countries replied that, if biotechnology were excluded, they would oppose any new convention. PAMELA S. CHASEK, EARTH NEGOTIATIONS: ANALYZING THIRTY YEARS OF

The gene pool may be the "common heritage" of all peoples, but the approach taken by the CBD recognizes that specific seeds, and their improvement over centuries, can be traced to specific indigenous communities.[38] Without care and preservation of knowledge about the seeds, humanity would suffer a lower quality of life in terms of food and medicine. Further, seed defines the identity of indigenous peoples, for myths and creation stories incorporate native seed. Indigenous peoples have preserved seed varieties and improved them for local conditions; they have freely exchanged seeds, with the information about their use for food, medicine, or industry, thereby transforming local varieties into global biodiversity. Respecting seed as integral to identity of a people and to sustenance, the CBD recognized the importance of national governments in seed exchange and preservation.

At the same time, however, the Trade Related Intellectual Property Rights (TRIPs) of the WTO allows and promotes principles opposite those of the CBD. It too rejects the common heritage approach of UNCLOS but for contrary reasons. Negotiated between the United States and the European Union,[39] with the rest of the world not full participants, the industrial powers rejected the delimitation of private property enshrined in UNCLOS. Arguing that innovation is driven by the profit motive, the corporate and state powers demanded that discoveries involving recombinant DNA (rDNA) be declared "intellectual property," admissible for patenting. This approach applied to microorganisms (mainly bacteria) and biological processes, allowing for the patenting of life. The TRIPs called for extending intellectual property protection over biotechnological changes to plants by 2000 but

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ENVIRONMENTAL DIPLOMACY 117-18 (2001); *see generally* FIONA MCCONNELL, THE BIODIVERSITY CONVENTION: A NEGOTIATING HISTORY (1996).

38. CBD, *supra* note 2, pmbl. and art. 8(j).

39. Thirteen major U.S. corporations formed the Intellectual Property Committee to lobby for a comprehensive intellectual property rights (IPRs) agreement within the WTO. The industry hails the TRIPs agreement as a great success in seed development, with the corporations obtaining the protection they wanted. A representative from Monsanto stated, "What I have described to you is absolutely unprecedented in GATT. Industry has identified a major problem [IPRs] in international trade. It crafted a solution, reduced it to a concrete proposal [TRIPs] and sold it to our own and other governments." Susan K. Sell, *The Origins of a Trade-Based Approach to Intellectual Property Protection*, 17 SCI. COMM. 163, 181 (1995).

The 13 corporations were the following: Monsanto, DuPont, (chemical); Bristol-Myers, Johnson & Johnson, Merck, Pfizer (pharmaceuticals); IBM, Hewlett-Packard, GM (computers); GE, Rockwell, FMC Corp (aerospace); Warner Communications (entertainment). ROBIN PISTORIUS & JEROEN VAN WIJK, THE EXPLOITATION OF PLANT GENETIC INFORMATION—POLITICAL STRATEGIES IN CROP DEVELOPMENT 155 (1999).

has not been implemented yet because of resistance by the international community.

Although patenting of life forms dated back to 1980 for the United States,[40] it was not until 1995 and the WTO that such a cultural legal peculiarity was extended to the world.[41] For the global community, TRIPs transformed scientific discoveries within nature into patentable commodities, privatized for profit for 20 years. Whether or not the discovery would benefit humanity as a whole became secondary, reversing the approach of UNCLOS.

At the same time, TRIPs did not extend patent rights over plants improved in the farmers' fields; that transformation was considered natural and unstable and, therefore, unpatentable. Such plants, according to the logic of the industrial powers, remained part of the genetic commons and was available to all, free for the taking. Thus, what is altered in a biotech lab is patentable; what is altered in the fields is not. Applying patent laws designed for inventions to genetically modified organisms (GMOs), first ruled by the landmark 1980 U.S. Supreme Court case of *Diamond v. Chakrabarty*,[42] gave property rights to corporations for what they did have, biotech genetic modifications. It left what they did not have, biodiversity, open and free to all.

The promoters of TRIPs also prefer one universal international law over intellectual property law to facilitate global trade. Various national codes, with highly variable provisions for conditions for a patent, length of a patent, and licensing of technology, were declared as blockages to trade; having to respond to various patent laws reduced profit. Previously, the life of a patent could be anywhere from five to 30 years, depending on the economic or cultural importance of the item, but TRIPs set a universal duration. Patenting puts the innovation into the public domain but gives the corporation monopoly ownership for 20 years, thereby guaranteeing profit.

The TRIPs law also departs from previous legal practice in that it reverses the burden of proof. Around the world, the innovator had the burden of proving that his/her invention had been stolen or copied. Under TRIPs, the innovator can merely accuse another of stealing intellectual property and the accused must prove she/he did not. Such a reversal gives an advantage to the patent holder, who no longer has to

40. Diamond v. Chakrabarty, 447 U.S. 303 (1980).

41. Marjorie Cohn, *The WTO: A New World Government Dedicated to the Principle that Property Interests Are More Sacred Than Human Rights*, 57 GUILD PRAC. 134, 139 (2000). CHRISTOPHER MAY, A GLOBAL POLITICAL ECONOMY OF INTELLECTUAL PROPERTY RIGHTS: THE NEW ENCLOSURES? (2000).

42. *Diamond*, 447 U.S. 303.

gather evidence to sustain the accusation; the alleged "copier" is "guilty" until proven innocent.

Environmental security, central to the law of the sea, is not even addressed by TRIPs. Patenting of life forms such as bacteria is viewed as innovative in creating new species and thereby increasing biodiversity. Patenting, however, could also be considered another form of enclosure.

ENCLOSURES

Discussion of the width of national jurisdiction waters along coastlines went from three to 12 to 200 nautical miles during the various UNCLOS meetings.[43] Compromise recognized territorial sovereignty to 12 nautical miles and coastal state jurisdiction to 200 and designated the Exclusive Economic Zone (EEZ).[44] The EEZs allowed coastal states specific and limited rights without recognition of sovereignty and, most importantly, recognized the legitimate rights of other states in the area. By insisting on the 200 nautical miles (about 234 land miles), the United States gained jurisdiction over more territory than any other country when UNCLOS was accepted.[45] Creation of the EEZs brought 35 percent of the high seas under national jurisdiction for the first time in human history.[46] The creation of EEZs was heralded as both a success and a failure: states did not gain sovereignty over EEZs, only national jurisdiction, which brought responsibility as well as rights. At least now, individual states would have to work to provide environmental security (*e.g.*, protection against overexploitation) within their new domains. Others noted that about 99 percent of the catch of the world's fisheries is taken within EEZ waters,[47] thereby putting boundaries on what had been a common pool.[48]

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43. UNCLOS, *supra* note 24.

44. *Id.*

45. The United States gained domain over 4.82 millions of nautical square miles; France, 2.86; Australia 2.41; Indonesia, 1.57; New Zealand, 1.41; United Kingdom, 1.34; Canada, 1.29; Japan, 1.13. The United States further demanded, and won, rights for economic purposes over the full extent of the continental shelf, if it extended beyond the 200 nautical miles. SANGER, supra note 26, at 66.

46. *Id.* at 67.

47. BRIAN GROOMBRIDGE & MARTIN D. JENKINS, GLOBAL BIODIVERSITY: EARTH'S LIVING RESOURCES IN THE 21ST CENTURY 176 (2000); WILLIAM T. BURKE, THE NEW INTERNATIONAL LAW OF FISHERIES: UNCLOS 1982 AND BEYOND (1994).

48. Debates have begun to clarify the concepts of open pool resources, common pool resources, and common heritage. Open pool refers to resources that are unregulated and are located where efforts to exclude multiple users would be very costly. This approach to resource use assumes similar assets and skills, similar ability to access/use, and similar discount rates and cultural values. The commons or common pool resources, in contrast, are held in trust by a community of users and benefits are shared. Customs/traditions

The creation of EEZs signified that the industrial countries recognized they could not claim the rest of the high seas. By accepting the EEZ limits, the governments conceded to the principle that the rest of the oceans were not national territory or private property. Others in the negotiations felt that acceptance of the common heritage of mankind beyond the 200-mile limit came at too high a price. Giving nations sovereignty over a third of the high seas, the portion most accessible to current technology for fishing and mining, was a concession for preserving the rest of the two-thirds.

The enclosure for microorganisms, projected for seed and plants, may be far more extensive. The international law allowing patenting of microorganisms and biological processes encloses living forms.[49] If a bacterium is modified in a minimal way, that life form can be privatized, with all others excluded from access to it, unless a royalty fee is paid. This could be considered the beginning of international acceptance of the enclosure of biodiversity for individual gain. With plants freely reproducing themselves, patenting is needed to restrict their distribution sufficiently to engender profit.[50] Yet enclosure (privatizing) of seeds/plants will threaten that very heritage, for biodiversity has thrived on the practice of free exchange of genetic material, both within nature and by humans. Private, individual property rights over germplasm limits availability and may be detrimental to variety.[51]

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regulate use and, therefore, outsiders may be excluded. The common heritage of mankind is a principle affirming that the resource remain available to all humans, not to be privately owned, such as outer space and celestial bodies and deep seabeds. Elinor Ostrom, *Reformulating the Commons, in* PROTECTING THE COMMONS: A FRAMEWORK FOR RESOURCE MANAGEMENT IN THE AMERICAS 17 (Joanna Burger et al. eds., 2001).

49. WTO, *supra* note 1, annex 1C, art. 27.3b.

50. Two other methods of restricting plant fecundity are also being pursued by the biotech industry. The "terminator seed," a plant genetically modified (GM) to produce no offspring, was recalled after public outrage at creating sterile plants so the seed would have to be purchased each year. However, research is continuing on the technology and the next generations may appear on the market. Second, farmers in the United States and Canada have filed law suits accusing the seed companies of purposefully contaminating their fields with pollen from GM plants; these strains are often more virile than commercial hybrids and quickly can take over a field. International trade already recognizes that "genetically modified free" shipments of grain are two percent (not zero percent) GM grain, an acknowledgement of the genetic pollution of world grain reserves. Of course, GM seed must be purchased every year.

51. FIKRET BERKES, SACRED ECOLOGY: TRADITIONAL ECOLOGICAL KNOWLEDGE AND RESOURCE MANAGEMENT 31-32 (1999); FOOD & AGRIC. ORG., INTERNATIONAL TECHNICAL CONFERENCE ON PLANT GENETIC RESOURCES REPORT ON THE STATE OF THE WORLD'S PLANT GENETIC RESOURCES FOR FOOD AND AGRICULTURE 15-16 (June 17-23, 1996); GLOBAL BIODIVERSITY ASSESSMENT (V.H. Heywood ed., 1995); Hope Shand, *Intellectual Property, in* FATAL HARVEST: THE TRAGEDY OF INDUSTRIAL AGRICULTURE 321 (Andrew Kimbrell ed.,

The unwillingness to exchange is particularly notable because the biotechnology industry relies on the free availability of germplasm from developing countries.[52] TRIPs allows the industry to access germplasm (seeds) from around the world, change one gene or less, and then privatize the specie without acknowledgement of any kind to the original keepers of the seed.[53] It is as if the insertion of one gene can erase thousands of years of development of a plant. Ignoring science, the legal interpretation is that the organism is reducible to, or defined by, one gene. As summarized in an Organization for Economic Co-operation and Development (OECD) report, "It is underlined that modern biotechnology has depended from its beginning on an appropriate legal framework."[54] The legal depiction presented by TRIPs was earlier evident in the first Bush administration's (1988–1992) strong objection to article 19 of the CBD because it provides the right to benefit, by the party supplying the original genetic resources, from the resulting biotechnological product. The CBD does not define the benefits but signifies the right.

In contrast to UNCLOS, which encloses just 35 percent of the oceans, both TRIPs (private property) and the CBD (national territory) could result in the enclosure of the entire genetic commons of nature. TRIPs does not address the necessity to preserve the genetic commons; as analyzed below, the CBD tries to preserve it by putting it under national sovereignty and calling for its protection as a shared venture between the state and local communities. The CBD trusts neither the national governments nor the local community to preserve biodiversity alone, both having shown themselves capable of selling natural resources to any bidder. Instead, it sets up a required partnership of the state with its communities in the "benefit-sharing" principle.

2002); TIMOTHY SWANSON, THE ECONOMICS OF ENVIRONMENTAL DEGRADATION: TRAGEDY FOR THE COMMONS? (1996).

52. Among the top 150 prescribed drugs in the United States, 56 percent contain compounds attributable to plants and animals, a contribution that may be translated into an economic value of at least $80 billion per year. The UNEP study goes on to estimate, "In addition to direct use benefits, there are enormous other less tangible benefits to be derived from natural ecosystems....A recent global review...produced a first-order approximation of some $33 trillion per year as the total value attributable to natural ecosystems, this being twice the global economy as expressed by the sum of gross national products ($18 trillion per year). GROOMBRIDGE & JENKINS, *supra* note 47, at 69.

53. Andrew Mushita & Carol Thompson, *Patenting Biodiversity? Rejecting WTO/TRIPs in Southern Africa*, 2 GLOBAL ENVT'L POL. 65, 71–75 (2001).

54. Klaus Bosselmann, *Plants and Politics: The International Legal Regime Concerning Biotechnology and Biodiversity*, 7 COLO. J. INT'L. ENVTL. L. & POL'Y 111, 128 (1996).

BENEFIT SHARING

Equal rights involve equal responsibility for all nations to maintain the resources of the sea as their common heritage. In earlier drafts, it was required that those who have the technological capacity to mine the high seas would share that knowledge for the benefit of all.[55] It was this provision that delayed the U.S. signing from 1982 to 1994, until that requirement was removed.[56] If the high seas are a common heritage, then access should be available to all and technology is key to that access. Sharing the technology, according to the majority of the world's governments, would assure access to all and, thereby, benefit all. The world community would have the technology by which to monitor conservation of the natural resources and to engage in scientific research to advance knowledge.

Those who had the technology viewed the high seas as a commodity and wanted to maintain a competitive edge, even though they were forbidden to privatize any resources beyond the 200-mile limit. With the amendment of Part XI, the United States won in its refusal to accept the "objectionable mandatory transfer of technology provisions."[57] Developing countries, however, viewed not sharing the technology as another form of enclosure, effectively limiting access for the poor to about 46 percent of the globe's surface.[58] These two antithetical and contested points of view both still prevail, "since the sharing of resources is a matter of equity and politics, and thus, not subject to judicial determination. There exists, as yet, no regime that can control or manage these elements."[59] One principle has held that all states, including land-locked states, retain a right to conduct marine scientific research "exclusively for peaceful purposes." Coastal states have a right to regulate, authorize, and conduct marine scientific research in their EEZs, but should "in normal circumstances" grant consent to conduct research to others.[60]

The CBD follows UNCLOS in asking for benefit sharing of the uses of biodiversity.[61] Similarly, developing countries, led by China, India, and Brazil, argued that the CBD allows them access to bio-

55. UNCLOS, *supra* note 24.

56. ANTONIO CASSESE, INTERNATIONAL LAW IN A DIVIDED WORLD 387 (1986). *See also* Ctr. for Defense Info., *supra* note 31.

57. FACT SHEET: U.S. OCEANS POLICY, *supra* note 32, at 5.

58. José Luis Vallarta, *Law of the Sea: Secrets of the Deep*, 36 (No. 4) UN CHRONICLE, 1999, at 6, 7.

59. Oda, *supra* note 13, at 220.

60. UNCLOS, *supra* note 24, arts. 143, 145.

61. CBD, *supra* note 2, art. 1, 31 I.L.M., at 823.

technology that would enable them to exploit their own biological resources.[62] The compromise became a call for the transfer of technology and for "fair and equitable sharing of the benefits" when knowledge and resources are exchanged.[63] In addition, the CBD requires prior informed consent (PIC) of the *local* community for access to a bio-resource, not just the central state, which could sell off vital resources for a pittance.[64] All stakeholders must mutually consent.[65] Materials collected before the formation of the CBD in 1992 are not covered.

Neither the CBD nor UNCLOS has fully defined benefit sharing, but discussions prioritize sharing knowledge and funds for research and development. Discussions have progressed for the CBD, where the need for exchange is more mutual: the North desires access to the biodiversity of South countries, while the South would like access to technology. Of course, all would like to share profits from any practical uses of the resources. The discussion addresses fees for access to germplasm, royalties, profit sharing (much more than the estimated zero to five percent currently offered),[66] technology, and funds for development.[67]

A report on benefit sharing under the CBD, prepared for the European Commission by the Kew Royal Botanical Gardens, is the most comprehensive approach to understanding the various stakeholders in the exchange of benefit-sharing. The study conducted 193 interviews[68] of representatives from industry, governments, universities, and research institutes, including genebanks. Their findings disclosed that most companies only had a "rudimentary grasp" of the basic objectives of the CBD and only a few were aware of the objective of benefit sharing.[69] Further, few companies had developed policies in response to the CBD; those staff who said there was a policy relating to the acquisition of materials said it could not be disclosed to the public. Several did agree that changes were occurring in business practices as a result of the CBD:

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62. CHASEK, *supra* note 37, at 119–20. *See generally* VICENTE SÁNCHEZ & CALESTOUS JUMA, BIODIPLOMACY: GENETIC RESOURCES AND INTERNATIONAL RELATIONS (1994).

63. CBD, *supra* note 2, art. 1, 31 I.L.M., at 823.

64. *Id.* arts. 15, 16, 31 I.L.M., at 828–29.

65. *Id.*

66. L.T. Chitsike, Food & Agric. Org., Policy and Legislative Guidelines on Benefit Sharing, Paper Presented at Workshop on Developing *Sui Generis* National Policies That Emphasize Community, Farmers' and Breeders' Rights, Zimbabwe (Oct. 29–Nov. 1, 2000); KERRY TEN KATE & SARAH A. LAIRD, THE COMMERCIAL USE OF BIODIVERSITY: ACCESS TO GENETIC RESOURCES AND BENEFIT-SHARING 64, 109, 177, 251 (1999).

67. Seventh Meeting of the Conference of the Parties to the Convention on Biological Diversity, Kuala Lumpur (Feb. 9–20, 2004), *available at* www.biodiv.org/meetings/cop-7/default.asp (last visited May 22, 2004).

68. TEN KATE & LAIRD, *supra* note 66, at 11.

69. *Id.* at 295.

a decrease in corporate collection activities, greater recourse to materials from *ex situ* collections, and an increased role for brokers to negotiate benefit-sharing relationships.[70]

The country with the most powerful biotech corporations has not ratified the CBD, as it has not yet ratified UNCLOS. One reason offered by the United States for refusing to sign in 1992 was that bio-prospecting contracts, such as the one between Merck and INBio in Costa Rica, would obviate the need for an international treaty. From this point of view, benefit sharing should be left up to individual contractors (corporate and community), not promoted by government interference (joint ventures). Others, even those involved in bio-prospecting, view an international treaty as a necessary guideline for the prospecting.[71]

GOVERNANCE

The International Seabed Authority (ISBA) is the supreme authority of UNCLOS to control all the activities of exploration and exploitation, with the seabed held in trust by the Authority for all humanity.[72] The Assembly of the Authority includes all contracting states while the Council consists of 36 states selected in accordance with specific criteria to guarantee representation of diverse interests: four members who consume or import more than two percent of minerals from the deep seas (Area), four members most involved in the conduct of activities of the Area, six members from developing countries, 18 members elected to ensure equitable geographical distribution of seats on the Council.[73]

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70. *Id.* at 303, 312.

71. *See generally* WALTER V. REID ET AL., BIODIVERSITY PROSPECTING: USING GENETIC RESOURCES FOR SUSTAINABLE DEVELOPMENT (1993); Peter Drahos, *Indigenous Knowledge, Intellectual Property and Biopiracy: Is a Global Bio-collecting Society the Answer?*, 22 EUR. INTELL. PROP. REV. 245 (2000).

72. This brief comparison cannot elaborate all the legal complexities in the ISBA or WTO. Please refer to the following for more thorough analyses of one or the other: Barry Hart Dubner, *Recent Developments in the International Law of the Sea*, 33 INT'L LAW. 627 (1999); Lakshman Guruswamy, *The Promise of the United Nations Convention on the Law of the Sea (UNCLOS): Justice in Trade and Environmental Disputes*, 25 ECOLOGY L.Q. 189 (1998); Jonathan L. Hafetz, *Fostering Protection of the Marine Environment and Economic Development: Article 121(3) of the Third Law of the Sea Convention*, 15 AM. U. INT'L L. REV. 583 (2000); Gary N. Horlick, *Dispute Resolution Mechanism: Will the United States Play by the Rules?*, 29 J. WORLD TRADE 163 (1995); John Warren Kindt, *Dispute Settlement in International Environmental Issues: The Model Provided by the 1982 Convention on the Law of the Sea*, 22 VAND. J. TRANSNAT'L L. 1097 (1989); Norio Komuro, *The WTO Dispute Settlement Mechanism: Coverage and Procedures of the WTO Understanding*, 29 J. WORLD TRADE 5 (1995).

73. UNCLOS, *supra* note 24, art. 161, 21 I.L.M., at 1300–01.

The ISBA holds property rights over submarine material for humanity, meaning first, it acts as a trustee on behalf of humanity as a whole and second, it may not relinquish control nor rights.[74] As a trustee, it may engage in joint ventures with corporations to mine the deep seabed (also a concession to the United States) for a period of 25 years.[75] Similar to the CBD, the Convention calls for sharing of benefits from the mining but does not attempt to specify what that might be. However, the Convention seeks distributive justice by restricting potential deep seabed miners and setting affirmative action to benefit non-mining states. One idea was that each proposed collaboration would submit two areas of equal value and the Authority would approve one as a "work site" and the other as a "reserved site," which would only be exploited for the benefit of developing states.[76]

Under Part XI, the United States changed its own previous legal ruling, mentioned above, and asserted the right to mine the ocean beyond its national jurisdiction according to its domestic laws. After the provisions of July 1994 to modify Part XI, states no longer have an obligation to finance mining activities of the Enterprise, the operating arm of the ISBA. Curtailing the ability of the Enterprise to conduct mining without commercial support, this proviso fosters joint ventures. As Jose Vallarta, the Permanent Representative of Mexico to the ISBA, stated:

> The task of those who work today in the field of the ISBA is to achieve the universality of the United Nations Convention on the Law of the Sea with the effective participation of the industrialized world....We are still in the process of creating an international regime for the deep seabed through the activities of the ISBA and its organs.[77]

The ISBA has responsibility for coordination and regulation of many activities occurring every day: seabed exploration, mapping, research on the ocean floor, and development of technologies. Indeed, it has the powers to carry them out itself. Elizabeth Borgese, a participant in the UN Law of the Sea conferences, points out that, in the 1970s, private corporations were active in seabed mining. She concludes, "They failed." By the 1990s, the actors became "states, state companies, and state-assisted companies," mainly because the private sector alone is "unable to move ahead on what used to be called 'sound commercial

74. SHAW, *supra* note 20, at 389
75. *Id.*
76. *Id.*
77. Vallarta, *supra* note 58, at 7.

principles.'"[78] Joint ventures of private and public enterprises are also active. The ISBA coordinates all of them.

The International Tribunal for the Law of the Sea, established by UNCLOS, provides the forum for the peaceful settlement of disputes. Its major caseload tends to be arbitration over detention of ships and their crews for fishing unlawfully (*e.g.*, over-fishing) or other violations within the EEZs. The Tribunal decides the terms of release of the crews and ships (*e.g.*, posting of bonds) while a case proceeds. Arbitration is compulsory in most categories of disputes, but some cases are taken to the International Court of Justice (*e.g.*, maritime delimitation). In 2000, the parties to UNCLOS established a trust fund, similar to that used by the ICJ, "to assist states in proceedings before the Tribunal" in order to overcome financial impediments to seeking judicial arbitration of disputes.[79]

For germplasm or biodiversity, TRIPs is similar to the CBD in only one way: it enlists the power of individual states for enforcement. As the states must exercise their sovereignty over biodiversity for the CBD, individual states must enforce the TRIPs. Lack of enforcement mechanisms has long been a problem in deterring violation of international protocols and treaties. WIPO (World Intellectual Property Authority) has existed for over 100 years, but its enforcement is weak or non-existent. Now national governments, as members of the WTO, must provide enforcement mechanisms that are fair, equitable, and inexpensive against infringement of intellectual property rights.[80] "Both civil and criminal judicial procedures have been prescribed," giving national courts the power to grant injunctions, assess damages, destroy offending property without compensation, and award penalty payments to the rights holder.[81] Articles 51 through 61 stipulate various border controls.

Disputes over interpretation of TRIPs, however, fall under the jurisdiction of the Dispute Settlement Body (DSB) of the WTO. Following procedures of administrative arbitration, the DSB comprises three

78. Elisabeth Mann Borgese, *A Response to Dr. Artemy A. Saguirian*, *in* FREEDOM FOR THE SEAS IN THE 21ST CENTURY: OCEAN GOVERNANCE AND ENVIRONMENTAL HARMONY 388, 390 (Jon Van Dyke et al. eds., 1993).

79. Houston Putnam Lowry, *Recent Developments in the International Law of the Sea*, 35 INT'L LAW. 787, 791 (2001).

80. Frederick S. Ringo, *The Trade-Related Aspects of Intellectual Property Rights Agreement in the GATT and Legal Implications for Sub-Saharan Africa*, 28 J. WORLD TRADE 121, 135 (Dec. 1994).

81. BHAGIRATH LAL DAS, THE WORLD TRADE ORGANISATION: A GUIDE TO THE FRAMEWORK FOR INTERNATIONAL TRADE 388-89 (1999).

members per case, appointed by the Secretariat of the WTO.[82] Complaints are submitted in writing to a panel and rebuttal is both written and oral.[83] The panel recommends to the DSB, which gives a ruling; either party may appeal the result to an appellate board.[84] Finally, if compliance to the appellate ruling is not forthcoming, formal arbitration may be requested but those results are binding.[85]

What is more exact than previous trade arbitration under the Uruguay Round of the General Agreement on Trade and Tariffs (GATT) are specific time limits for each stage, from submission of arguments in writing to rebuttals, to written rulings by the panel and DSB, through appeals and arbitration. That process is allowed one year and compliance must be within 18 months of the original complaint.[86] The panel and DSB proceedings are confidential unless a party releases its own brief to the public; neither party nor its representative may cross-examine the other.[87] Members of the panel and DSB are to act in their individual capacities, not as representatives of any government or agency.[88]

This administrative, rather than juridical, approach to arbitration was implemented to expedite compromise for quicker resolution of conflict.[89] There has been much controversy over the dispute settlement process, however, mainly because of its confidentiality and the composition of the panels and DSB. Developing countries argue that transparency of all proceedings is necessary for due process.[90] Contending that rulings can be very political in selecting what "expertise" to advocate, developing countries argue that few decisions are simply administrative. Perhaps more importantly, there is no provision in the WTO about conflict of interest of panel or DSB members.[91] Therefore, experts on technical matters may have professional experience or national interest that obscures alternative

82. WTO, *supra* note 1, art. XIII. *See also* DAS, *supra* note 81, at 410-19; Carrie P. Smith, *Patenting Life: The Potential and the Pitfalls of Using the WTO to Globalize Intellectual Property Rights*, 26 N.C. J. INT'L L. & COM. REG. 143, 167-69 (2000); LORI WALLACH & MICHELLE SFORZA, PUBLIC CITIZEN'S GLOBAL TRADE WATCH, WHOSE TRADE ORGANIZATION?: CORPORATE GLOBALIZATION AND THE EROSION OF DEMOCRACY 194-213 (1999); Horlick, *supra* note 72; Komuro, *supra* note 72, at 45.

83. WTO, *supra* note 1, art. XV.

84. *Id.* art. XVII.

85. *Id.* art. XXII.

86. *Id.* arts. XX, XXI.

87. *Id.* art. XVIII.

88. *Id.* art. VIII.

89. *Id.*

90. *Id.*

91. Guruswamy, *supra* note 72, at 222-33.

interpretations; none has to be a lawyer. For example, so far every dispute over whether a national environmental law is a "barrier to trade" has been ruled in favor of the country advocating "free" trade, an approach that reduces national standards for environmental protection. In the realm of patenting, rulings have favored parties claiming "intellectual property rights," interpreted much more broadly than most national laws. Critics of this dispute settlement process say rulings that set precedence will affect the public interest in everything from environmental security to public health to food security.

The ultimate relief is retaliation for the trade offenses, which is not a practical measure for smaller, weaker economies against larger, stronger economies. Retaliation can cross trade sectors, meaning, if the offense is in the area of services, measures can be taken to restrict or embargo trade in goods; if the offense is in minerals, retaliation can occur in coffee or bananas, whatever will most hurt the "offender." For a highly diverse economy—every developed country—retaliation might hurt a sector but probably not the whole economy. For developing economies with indispensable, narrow export sectors, retaliation could be economically debilitating.

In the area of dumping of goods, the Panel can only determine if the importing Member evaluated the "facts" accurately; it cannot recommend compliance. As Das states, "This is a serious curtailment of the role of the panels. It is particularly significant because a very large proportion of disputes in recent years has been about dumping." If this limitation is extended to other areas, as is proposed, "it will make the whole dispute settlement process almost totally ineffective."[92] Further, there is no special dispensation for developing countries in adjudicating dumping charges.

A major difference between the International Tribunal of the Law of the Sea and the Dispute Settlement Board of the WTO is the difference between a court of law and an administrative court. Critics of the latter claim that secrecy, lack of guidelines for conflicts of interest, and trade retaliation as the main redress for grievances all favor the industrialized countries. The DSB treats all members as equals, when, in fact, developing countries' capacity is much less than that of powerful economies, from presenting expert documentation to enacting trade retaliation measures awarded by a favorable adjudication. From the point of view of developing countries, industrialized economies are very much "first among equals" in the WTO.

92. *Id.* at 223.

A major weakness of the CBD is that it has no enforcement mechanism. The individual states must devise legislation and its implementation to protect their biodiversity. Several South countries have begun drafting such legislation, mainly to offer an alternative to TRIPs. The continent of Africa, as one example, is quite advanced in designing its own approach. Scientists, nongovernmental agencies, and government officials have been key in drafting the model legislation for the African Union as resistance to the promotion of TRIPs. In July 2001, the ministers of agriculture of all of Africa accepted the model legislation as a means to overcome the inequities of TRIPs.[93] The model contains not only plant breeders' rights, but also farmers' rights[94] and community rights. Recognizing the role of communities in breeding new varieties, conserving varieties, and sustaining food supplies, it requires prior informed consent of local communities for access and use of local resources. Most important, it fully recognizes the role of women in preserving biodiversity and requires their full participation in any decisions about access, exchange, or use.

The draft African model legislation proposes to transform the rights politically recognized by the CBD into legal rights via national legislation. Enhancement of plant genetic resources by local farmers and communities will be legally recognized and protected.[95] Not content to rely solely on central governments, whose budgets have been reduced by specific programs or by the general trend to diminish the size of the public sector, the model legislation calls for community, as well as national, registry of improved varieties.[96] The model advocates that local community trusts be in charge of any funds gained from the commercial use of biodiversity.[97] The legislation tries to reduce corrupting power

93. ORG. OF AFR. UNITY, AFRICAN MODEL LEGISLATION FOR THE PROTECTION OF THE RIGHTS OF LOCAL COMMUNITIES, FARMERS AND BREEDERS, AND FOR THE REGULATION OF ACCESS TO BIOLOGICAL RESOURCES (2000). Mushita & Thompson, *supra* note 53.

94. Farmers' Rights were formulated in 1989 by the FAO. The rights were not defined in a legal sense, because the term was considered political. They are

> rights arising from the past, present and future contribution of farmers in conserving, improving and making available plant genetic resources, particularly those in the centres of origin/diversity. These rights are vested in the international community, as trustee for present and future generations of farmers, for the purpose of ensuring full benefits to farmers, and supporting the continuation of their contributions.

Bella Mpofu, Food & Agric. Org., Farmers' and Breeders' Rights, 9, paper presented at workshop on Developing *Sui Generis* National Policies, Zimbabwe (Oct. 29-Nov.1 2000). *See also* A. Patricia Kameri-Mbote & Philippe Cullet, *Agro-Biodiversity and International Law – A Conceptual Framework*, 11 J. ENVTL. L. 257 (1999).

95. Mpofu, *supra* note 94.

96. *Id.*

97. *Id.*

over a natural resource by calling for both national and local control; it is not idealistic in assuming either the central government or local community will automatically employ genetic resources for the public good but, rather, requires that control be a shared responsibility.

The draft African model legislation is one example of how national sovereignty over bio-resources might be implemented, for the proposed African intellectual property protection legislation promotes principles from the CBD while emphasizing local solutions.[98] It is important to note that Africa has chosen a continental approach, encouraging each government to pass the model legislation, with minor national adaptation, to unify its interpretation and strengthen its enforcement. Vulnerable economically, and with national boundaries that reflect European history more than African bio-regions, this continent provides the initiative that can serve as an example to other developing regions.

THE WAY FORWARD

As a summary, the chart below offers a quick comparison of important provisions of the United Nations Convention on the Law of the Seas (UNCLOS), the Trade Related Intellectual Property Rights (TRIPs) and the Convention on Biological Diversity (CBD). As discussed above, access to the sea and seed ranges from delimitation of private property under UNCLOS to allowing full privatization under TRIPs to reaffirming national control under the CBD. The extent of the enclosure against access is most serious for TRIPs and could potentially be legalized for all seeds and plants. Sustainable use of resources is a priority for UNCLOS and the CBD but is not even mentioned in TRIPs. Similarly, while it has been left undefined, both UNCLOS and the CBD promote benefit sharing, while TRIPs does not mention it. TRIPs is also the most narrow in its approach to rights, mainly recognizing individual rights. UNCLOS is the most ambitious with its principle of the common heritage of mankind giving equal rights to all beyond the exclusive economic zones (EEZs) of 200 nautical miles. The CBD enshrines community and farmers' rights (social group rights) as privileged over individual rights for seeds and plants, which belong to the common heritage of local communities. Finally, UNCLOS employs an international authority as well as legal adjudication for governance. TRIPs relies on national enforcement, with dispute settlements to follow

98. Interview with Joseph Matowanyika, Director, FAO-LinKS (Local Indigenous Knowledge Systems) in Harare, Zimbabwe (Aug. 23, 2000). Interview with Barry McCarter, General Manager, Seed Co. in Harare, Zimbabwe (May 24, 2001).

administrative panels' rulings that are arrived at without full disclosure or the ability to cross-examine the opponent. The CBD also relies on national enforcement` with the condition that prior informed consent must come from the communities who cultivated the plant. "National" enforcement, therefore, is modified by the proviso that local communities participate in drafting agreements about seed exchange and benefit sharing, including devising local community trusts.

TABLE I: COMPARISON OF TREATIES FOR SEA/SEED

	UNCLOS	TRIPS	CBD
Access to Sea/Seed	International Delimitation of private property	Privatization Promoted	National Sovereignty
Enclosure	200 nautical miles along coastlines	Patents or similar stringent property protection on microorganisms-to be extended to seed	National domain over biodiversity
Sustainable Use of Sea/Seed	Priority - common heritage over private/national Interests	Not mentioned - prioritizes private over public interest	Priority - prioritizes public over private interest
Benefit Sharing	Promotes technology transfers	None	Promotes technology transfers Equitable sharing of innovations
Rights	Equal access to all beyond 200 nm	Private Property - only individual rights recognized	Community and farmers' rights equal to individual
Governance	Legal adjudication ISBA	Administrative adjudication National enforcement	PIC required of both community/ government National enforcement

(Compiled by author)
ISBA - International Seabed Authority
PIC - Prior Informed Consent

What are the lessons from UNCLOS for the sharing of biodiversity? How can the impasse between TRIPs and the CBD be resolved? By treating the deep seabed as the common heritage for all humanity, UNCLOS delimits the rule of private property; the deep seas cannot be privatized simply because an enterprise has the technical knowledge for prospecting. Representing the link that ties all humanity, no matter what land mass one inhabits, the deep seas are conserved for all. Because of the difficulties in implementing UNCLOS, however, those who wanted to delimit privatization of the gene pool reaffirmed that

biodiversity was integral to national sovereignty; indigenous bio-resources would be regulated under national laws.

The United States, however, refused to ratify the CBD and industrialized nations actively pursue bioprospecting under terms that accrue much more profit to the biotechnology corporation than to the original cultivators of the seed. Slight modification of a resource is valued more than improvement of a strain for centuries. Among members of the WTO, economic arguments about "adequate" compensation for discovery continue to conflict with arguments about conservation and sharing, rather than enclosing, biodiversity. One side claims that only with privatization will genetic discoveries, advancing medicine and food production, continue; others argue that changing one gene in a living organism, which has been cultivated over centuries, does not merit owning that life form. Such enclosure will delay, not promote, innovations for medicine and agriculture. These debates have forestalled any further development of TRIPs beyond patenting of microorganisms.

South countries, such as the 53 nations in the Africa Union, are advancing the way forward by legislating national laws for protecting, while at the same time sharing, biodiversity as advocated by the CDB. Such an approach delimits individual private property by affirming community rights over biodiversity, in shared jurisdiction with national governments. Another initiative among non-governmental organizations revives the international discussion that the gene pool, like the seabed, belongs to the common heritage of mankind:

> the intrinsic value of the Earth's gene pool...precedes its utility and commercial value....[T]he Earth's gene pool, in all its biological forms and manifestations, exists in nature and, therefore, must not be claimed as intellectual property even if purified and synthesized in the laboratory....Therefore, the nations of the world declare the Earth's gene pool...to be a global commons, to be protected and nurtured by all peoples and further declare that genes and the products they code for, in their natural, purified or synthesized form...will not be allowed to be claimed as commercially negotiable genetic information or intellectual property by governments, commercial enterprises, other institutions or individuals.[99]

99. Treaty Initiative to Share the Genetic Commons (Consortium of Civil Soc'y Orgs.), Draft Treaty to Share the Genetic Commons (2002), *available at* http://www.etcgroup.org/article.asp?newsid=7 (last visited May 16, 2004).

Only in the preliminary stages of discussion in international fora, such as the Johannesburg Summit, ten years post-Rio (August 2002), this proposed treaty renews the debates over equity in the use of "common heritage" resources. As this discourse continues, legal interpretation and political experience from UNCLOS will become relevant for clarifying key issues, especially debates over private versus community versus public property over resources necessary to sustain all human life. An international law of the seed will develop dynamically, from shared use and adjudication, as is the international law of the sea.