

THE CONVENTION ON BIOLOGICAL DIVERSITY: SEEDS OF GREEN TRADE?*

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Karl Llewellyn, one of America's most revered legal theorists, once said there is an inherent drive, however "sluggish" or "faint-pulsed," that pushes even the most "arbitrary and wrong-headed" legal system closer to an "ideal of justice."¹ This paper applies Llewellyn's maxim in a sphere which particularly needs this brand of optimism, the sphere of international law. In particular, it reviews the Convention on Biological Diversity² for signs of a tendency toward justice—justice with both ecological and economic dimensions.

The Biodiversity Convention is one of the two legally binding international agreements signed by over 150 governments at the close of the United Nations Conference on Environment and Development. Since it was adopted in May 1992, the Convention has been signed by 168 countries and ratified or acceded to by ninety-one countries, including the European Economic Community.³ It entered into force as international law in December 1993. It thus represents a strong and growing international agreement on the need to integrate biodiversity conservation and economic development.

As an attempt to integrate environment and development into "sustainable development," the Convention—like the other agreements signed at the June 1992 Earth Summit in Rio de Janeiro—is a first try for international law. As a first try, it naturally suffers from significant flaws. Nevertheless, it offers opportunities for positive change. This article

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1. KARL LLEWELLYN, *THE BRAMBLE BUSH* 9 (1930).

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

3. See Letter from Interim Secretariat, Convention on Biological Diversity, U.N. Environment Programme (October 17, 1994) (on file with author). The United States signed the Convention in June 1993. The Administration presented the treaty to the Senate in late 1993, and the Foreign Relations Committee held a hearing in 1994, but as of October 20, 1994, the United States had not ratified the Convention.

explores the potential of the Convention's innovative combination of conservation and trade regulation.

The Convention is in a sense a trade agreement, in that it establishes the basic terms of trade in a particular commodity, "genetic resources."⁴ Genetic resources are the genetic information "of actual or potential value" contained in diverse species of plants, animals, and microorganisms.⁵

Trade in genetic resources is distinct from other trade in living things or their products. In the genetic resources trade, specimens of species and varieties of species are moved internationally for the purpose of using the genetic or chemical information they contain—in contrast to the bulk shipment of living things or their products, such as shipments of grain.⁶ This trade is critically important for the well-being of most of humanity. For example, the food security of most of the world rests on the international flow of plant genetic resources, or crop "germplasm," used to transfer and improve varieties of food crops.⁷

Genetic resources serve as the raw material for valuable biotechnology products, ranging from new food crop varieties to new pharmaceuticals. For instance, over half of the phenomenal increase in the productivity of U.S. farmers of rice, corn, potatoes and other crops over past decades is the result of the use of genetic resources in crop breeding.⁸ In another example, the "very important" anticancer drug

4. "While the Convention does not use the terms 'trade' or 'commodity,' it treats genetic resources as goods that are transferred internationally in exchange for value at the transferors' option—in other words, commodities in international trade." David R. Downes, *The Convention on Biological Diversity and the GATT*, 6 n.35, in *THE USE OF TRADE MEASURES IN SELECT MULTILATERAL ENVIRONMENTAL AGREEMENTS* (Robert Housman, et al. eds., draft, 1994) (on file with author).

5. See Convention on Biological Diversity, *supra* note 2, art. 2.

6. The genetic resources trade encompasses, for instance, (1) shipment of samples of tropical rainforest plants to industrialized countries for analysis in pharmaceutical labs for active compounds; (2) shipment of samples of traditional crop varieties for use in breeding of new plant varieties; (3) shipment of samples of genetic material for use in creating commercial products through biotechnological manipulation. It does not include bulk shipments, such as grain or fiber shipments, for uses such as food consumption or textile production. See David R. Downes, *New Diplomacy for the Biodiversity Trade*, 4 *TOURO J. TRANSNAT'L L.* 1, 3 n.4 (1993); see also JACK R. KLOPPENBURG, *FIRST THE SEED: THE POLITICAL ECONOMY OF PLANT BIOTECHNOLOGY 1942-2000* 188 (1988) ("with germplasm, the resource of interest is physical matter only insofar as it is the carrier of genetic information") (emphasis in original).

7. See LAWRENCE BUSCH ET AL., *PLANTS, POWER, AND PROFIT: SOCIAL, ECONOMIC, AND ETHICAL CONSEQUENCES OF THE NEW BIOTECHNOLOGIES* (1991); KLOPPENBURG, *supra* note 6, at 180-82.

8. See EXEC. REP. No. 103-30, 103d Cong., 2d Sess. stet 3 (1994).

taxol, found in the rare Pacific yew tree of forests in the northwestern United States, was recently approved for use in treating ovarian cancers.⁹

At the same time, genetic resources are the ultimate source of biodiversity. Biodiversity, the rich diversity of life forms on earth, is defined by the Convention as “the variability among living organisms from all sources, including, *inter alia*, terrestrial, marine, and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems.”¹⁰

This broad definition encompasses all types of natural habitat [and] at least some modified habitat, as well as the living organisms that make up those habitats. It also includes genetic diversity of [both domesticated and wild] species. This diversity makes up the structure of the ecosystems that support human life on earth.¹¹

The Convention is a conservation agreement, as well as a trade agreement. It recognizes that “the conservation of biological diversity is a common concern of humankind.”¹² It requires parties to take a comprehensive set of actions to conserve biodiversity—including the genetic resources that are its ultimate source—and ensure that any use of biodiversity is sustainable.

For example, parties must, “as far as possible and as appropriate,” take the following steps: make national conservation plans, programmes or strategies; integrate biodiversity protection into relevant policies and programs; inventory biodiversity within national jurisdiction; identify and monitor activities that harm biodiversity; and protect biodiversity through a range of measures, such as the creation of protected areas and regulation aimed at ensuring sustainable use.¹³

These conservation obligations frame the Convention’s trade-related provisions in a way that is unique. In addition, specific provisions

9. See Warren E. Leary, *Drug Made From Rare Tree is Approved to Treat Cancer*, N.Y. TIMES, Dec. 30, 1992 at A10, (quoting Dr. Samuel Broder, director of the U.S. National Cancer Institute).

10. See Convention on Biological Diversity, *supra* note 2, art. 2.

11. See Downes, *supra* note 4, at 1.

12. See Convention on Biological Diversity, *supra* note 2, pmb., paras. 3, 14.

13. *Id.* arts. 6, 7, 8(a), 8(c), 10.

of the Convention on “indigenous and local communities” have significant implications for international trade.

This article reviews the Convention’s innovative structure and elements, with an eye toward two routes toward positive change. First, it discusses how the Convention could be implemented by Convention parties. Second, it notes the extent to which the Convention improves on other trade agreements, and thus could serve as precedent for the minimum standard for future agreements.¹⁴

Parts I and II of this article provide background for these arguments. Part I provides background on the genetic resources trade. Part II discusses the ecological dimension of justice, by examining briefly some basic concepts of the new discipline of ecological economics.

Part III of this article discusses how the Convention puts trade in an ecological context. The Convention is the first international trade agreement that places trade squarely within the context of the surrounding ecosystems, rather than tacking on the environment as an afterthought. For instance, it requires that the entire economic process of using genetic resources be environmentally sound, all the way from gathering the raw material to the use of the final product.

Part IV discusses the provisions of the Convention that acknowledge the value of “economic diversity.” Articles 8(j) and 10 require governments to protect sustainable uses of biological resources by nonindustrial, small-scale economies. In this respect, the Convention acknowledges that these types of economies are more likely to integrate economics into the local ecosystem than are economies tied into the international trading system. Recognizing that such economies may sometimes have better prospects for achieving sustainable development than does the international trading system, the Convention requires parties to take measures to protect them against threats; conflicting economic uses are a principal threat.

The Convention’s provisions establish minimum, not maximum standards. They are too general and limited to be final goals. Instead, they are starting points, seeds that must grow and reproduce. They can

14. Because the Convention is usually thought of as an environmental rather than a trade agreement, it will probably be a political challenge to persuade decision-makers—especially trade policy-makers—that the Convention should serve as precedent in the area of trade policy. As a legal matter, however, the Convention is clearly intended to regulate trade. *See* Downes, *supra* note 4, at 6-7, 17-18.

do this in three ways. First, they will serve as the basis for implementation through national laws. Second, they can serve as the basis for future agreements among Convention parties, whether they are amendments to the Convention, protocols—i.e. follow-up treaties elaborating on the Convention, or resolutions of the Conference of the Parties. Finally, they could serve as precedent for the contents of future independent trade agreements. To ensure that they are starting, rather than ending, points will require mustering and coordinating political action, legal argument, policy analysis and scientific research.

I. BACKGROUND ON THE GENETIC RESOURCES TRADE

The practice of deriving useful products such as drugs from chemical compounds (“biochemicals”) found in wild plants, animals, fungi and microorganisms began in prehistory, and many drugs in the contemporary pharmacopeia were originally found in nature, or are analogues developed from chemicals found in nature.¹⁵ Similarly, farmers have used the genetic variety in traditional crop varieties and their wild relatives—often termed “plant genetic resources”—to breed improved varieties since the earliest stages of agriculture, and modern plant breeders continue to depend on this legacy.¹⁶ While the classic prospecting case involves a flowering plant from a tropical rainforest, a wide range of biota are potential sources of products, including insects, bacteria, fungi, and marine organisms from a variety of ecosystems.¹⁷

This vast but dwindling storehouse of biodiversity can serve as a source not only of medicines and crop varieties but also foods, food colorings, enzymes, flavoring agents, pesticides, and other products.¹⁸ The genetic diversity in this storehouse is actually and potentially valuable as raw material for plant breeding and newer forms of genetic engineering. The commercial payoffs for seed, pharmaceutical and other

15. See Walter V. Reid et al., *A New Lease On Life*, in BIODIVERSITY PROSPECTING USING GENETIC RESOURCES FOR SUSTAINABLE DEVELOPMENT 1, 1-52 (1993); see James A. Duke, *Tropical Botanical Extractives*, in SUSTAINABLE HARVEST AND MARKETING OF RAIN FOREST PRODUCTS 53-62 (Mark Plotkin & Lisa Famolare eds., 1992); Mark J. Plotkin, *The Outlook for New Agricultural and Industrial Products from the Tropics*, in BIODIVERSITY 106-16 (Edward O. Wilson ed., 1988).

16. See Reid et al., *supra* note 15; see generally CARY FOWLER & PAT MOONEY, SHATTERING: FOOD, POLITICS, AND THE LOSS OF GENETIC DIVERSITY (1990).

17. See GLOBAL MARINE BIOLOGICAL DIVERSITY: A STRATEGY FOR BUILDING CONSERVATION INTO DECISION MAKING (Elliot A. Norse ed., 1993); see Reid et al., *supra* note 15.

18. See Duke, *supra* note 15; Plotkin, *supra* note 15.

industries have been and will continue to be enormous, and the benefits to humanity, through improved quality and quantity of medicine, crops, foods and other goods, have been and will be incalculable.¹⁹

In the past, genetic resources and traditional knowledge about the useful qualities of flora or fauna have often been perceived as free goods. Plant genetic resources, for instance, were sometimes termed the “common heritage” of humanity.²⁰ This perspective reflects the informal process of exchange, extending over thousands of years, by which the main food crops have diffused throughout the world.

As drug development and crop breeding became large-scale commercial enterprises, industry often developed lucrative commercial products, while paying little or nothing for its access to and use of valuable genetic resources or traditional knowledge. Because no compensation flowed back to the providers of raw material and traditional knowledge, commercialization created no additional incentive for conservation.²¹ With the expansion of intellectual property protection (through various types of patents or plant breeders’ rights) over genetically manipulated commercial products, critics have argued that this expansion renders it increasingly inequitable that traditional farmers and indigenous peoples cannot protect their own current or historical investment in informal innovation and conservation through analogous property rights or other mechanisms.²²

Recent technological and economic trends have intensified both the interest in biodiversity prospecting and the broader controversy over benefit sharing. Advances in technology make it easier and faster to screen biological samples for substances with pharmacological activity.²³ Advancing techniques for genetic manipulation also promise to enhance the demand for genetic resources.²⁴ For instance, industry is developing biotechnological applications based on thermophilic bacteria from the geysers of Yellowstone Park and from deep-sea hot springs, a far cry

19. See Duke, *supra* note 15, Fowler & Mooney, *supra* note 16; KLOPPENBURG, *supra* note 6, at 188.

20. See KLOPPENBURG, *supra* note 6, at 152.

21. See Walter V. Reid, GENETIC RESOURCES AND SUSTAINABLE AGRICULTURE: CREATING INCENTIVES FOR LOCAL INNOVATION AND ADAPTATION 20 (1992); Roger A. Sedjo, *Property Rights, Genetic Resources, and Biotechnological Change*, J.L. & ECON. 35, 199-213 (1992).

22. See Fowler & Mooney, *supra* note 16.

23. See Reid et al., *supra* note 15.

24. See *id.*

from the classic case of crop genetic resources.²⁵ Meanwhile, the seed and pharmaceutical industries have become increasingly concentrated, increasingly global, increasingly reliant on high technology, and increasingly aggressive about maximizing the scope of intellectual property protection over new products.²⁶

Most of the world's biodiversity as it is currently measured is found in the tropics,²⁷ and most of the genetic resources used to date as raw material for agricultural advances, as well as many of those used in the pharmaceutical and other sectors, have originated in developing countries.²⁸ On the other hand, most of the existing technological capacity for commercial use of the genetic resources found in biodiversity is in the industrialized countries of the temperate zones.²⁹

In the Biodiversity Convention, the industrialized "North" and the developing "South" attempted to balance equitably access to genetic resources, with access to its benefits, such as biotechnology. Thus, the Biodiversity Convention expresses some of the basic principles that should govern the genetic resources trade, although in general and qualified terms.

II. ECOLOGICAL ECONOMICS AND JUSTICE

Arguably, justice has an ecological dimension, and an economic dimension as well. From the environmentalist perspective, the current legal system, and the political economy of which it is a part and which it reinforces, are "arbitrary and wrongheaded" in an ecological sense.

This political economy permits actors to avoid accountability for the costs they inflict upon the environment. It also allocates both resources and wastes unfairly among human beings, including future

25. See, e.g., Anne Simon Moffat, *Microbial Mining Boosts the Environment, Bottom Line*, 264 *SCIENCE* 778 (1994) (describing biotechnological research on use of bacteria from variety of sources to process mineral ores); Michael Milstein, *Yellowstone Managers Eye Profits From Hot Microbes*, 264 *SCIENCE* 655 (1994) (discussing potential uses in biological research and industrial processes of thermophilic bacteria found in hot springs in United States' Yellowstone National Park); William J. Broad, *Strange Oases in Sea Depths Offer Map to Riches*, *N.Y. TIMES*, Nov. 16, 1993, at C1 (describing commercial applications in genetic engineering techniques of genetic resources from hyperthermophilic bacteria found in hot springs of deep sea bed).

26. See BUSCH et al., *supra* note 7.

27. See EDWARD O. WILSON, *THE DIVERSITY OF LIFE* 197-98 (1992).

28. See KLOPPENBURG, *supra* note 6, at 181.

29. See BUSCH et al., *supra* note 7.

generations. It seeks to avoid hard decisions about distribution by constant growth, which in turn threatens ecological stability and long-term human survival and prosperity. The prosperity that (some of) the current generation enjoys puts the health and livelihood of others—including not only future generations but some alive today—at risk. Some would argue that the system discriminates unfairly against other living beings as well.

The flaws in the existing system reflect fundamental misconceptions about the relationship of economy and the ecosystem. “[I]n the neoclassical [economic] view the economy contains the ecosystem.”³⁰ Thus, “the ecosystem is not the containing natural matrix of the economy but just one more sector within the all-inclusive economy waiting for its due allocation of resources according to individual willingness to pay for its service or product.”³¹ To the extent that mainstream economists recognize the environment, they see it as the locus of “external,” and therefore unimportant, costs and benefits, although some concede that these externalities should be “internalized” into the economic system.

Ecological economists argue that this theory turns reality inside out. The truth is that “the ecosystem contains the economy,” rather than the other way around.³² The ecosystem supplies the economy with “a throughput of matter-energy,” without which the economy could not survive.³³ This throughput is defined by ecological mechanisms, not by “individual willingness to pay.”³⁴

So far, however, the deep structure of Western legal systems, including international law, remains largely uninformed and unreformed by our growing knowledge of ecological principles. Consequently, environmental regulation, whether international or domestic, is either an overlay or an exception to underlying rules.

In the U.S., for instance, basic legal rights and duties relating to the economic activities that damage the environment are defined in terms of the common law and corporate law. Terms such as private property, contract, tort, and limited shareholder liability are considered

30. HERMAN E. DALY & KENNETH N. TOWNSEND, VALUING THE EARTH: ECONOMICS, ECOLOGY, ETHICS 3 (1993).

31. *Id.*

32. *Id.*

33. *Id.*

34. *Id.*

fundamental. In contrast, environmental laws, no matter how soundly based on public health and environmental values, are perceived as superimposed restrictions on the inherent freedom of citizens and corporations.

The result is a perverse reversal. Anti-environmentalists, like those in the so-called wise use movement, defend the liberty of legal constructs like the limited-liability corporation as if it were natural law, while they vilify government attempts to respond to the laws of nature as if they were arbitrary decrees of a foreign crown.

Classic international law largely shares these limitations. Environmental agreements, like other treaties, are seen as constraints on the inherent power of nation states to do as they please. Most international trade agreements define trade as an unambiguous social good that should be encouraged without any reference to environmental concerns. On the positive side, however, general international law appears to be evolving to include ecological principles.³⁵

In sum, the current system artificially fragments interrelated human activities along frontiers of geopolitics and generations.³⁶ It arbitrarily divorces human activities from their ecological context. And it artificially excludes large categories of people from decision-making.

A case in point is the notorious clear-cutting of the biodiversity-rich forests in Sarawak, one of the states of Malaysia. The forests have been the homes, larders, and pharmacies of the indigenous people for generations. Timber companies are razing the forests under leases issued by allegedly corrupt state officials. "Most of the logs [have gone] to Japan, where they are made into plywood, used once as molds for concrete, and then burned."³⁷ Currently, there is no legal or political channel through which the native people now living—let alone their descendants—can call to account the consumers, the timber companies, or the Sarawak officials who are profiting from the destruction of their homelands, cultures, economies, and sources of subsistence.³⁸

35. See generally DAVID HUNTER et al., CONCEPTS AND PRINCIPLES OF INTERNATIONAL ENVIRONMENTAL LAW: AN INTRODUCTION (1994).

36. See David R. Downes, *Don't Blame It On Rio*, ENVTL. FORUM, May-June 1992, at 17.

37. *Id.*

38. While domestic laws require assessment of the environmental impact of proposed development schemes, the government and private companies reportedly ignore these requirements.

In relatively democratic societies such as the U.S., the problems may be more subtle but are nevertheless severe. For instance, the timber company that clearcuts a forest has no obligation to the fishers downstream whose livelihoods are lost when silt from the eroding hillside ruins spawning grounds.³⁹ Nor is it likely that today's oil companies or automobile drivers will ever have to account to future generations who may live in a much poorer and more dangerous world, because of global warming caused by current burning of fossil fuels.

III. PUTTING TRADE IN THE CONTEXT OF ECOLOGY

A review of the Convention reveals several points at which the text flips the conventional legal view and puts international law and economics into an ecological framework. First, the Preamble acknowledges that both biodiversity and its "components" have many values in addition to economic value, including "ecological, genetic, social, . . . scientific, educational, cultural, recreational and aesthetic values," as well as "intrinsic" value. (While it establishes no obligations, the Preamble recites factual findings on which all Convention Parties agreed.)

The preamble also recognizes that biodiversity is "importan[t] . . . for evolution and for maintaining life sustaining systems of the biosphere." In addition, it recognizes "the close and traditional dependence of many indigenous and local communities embodying traditional lifestyles on biological resources," and notes that conservation and sustainable use of biodiversity are of "critical importance for meeting the food, health and other needs of the growing world population."

Both the preamble and Article 9 note that *in situ* conservation—i.e., conservation of biodiversity where it is found, within living ecosystems—is the primary means of conservation, while *ex situ* measures—conservation of specific species or varieties in artificial settings such as zoos and seed banks—are ancillary. This goes against the notion that biodiversity is to be conserved merely as a raw material for biotechnology, since that purpose could be satisfied, at least in the

See MS.M. Mohd. Idris, Sarawak Update (Sept. 4,1993) (available on Econet network, "hr.indigenous" conference, topic 511).

39. See generally CHARLES V. BARBER ET AL., BREAKING THE LOG JAM: OBSTACLES TO FOREST POLICY REFORM IN INDONESIA AND THE U.S. (1994).

short term, through *ex situ* collections of cells, seeds, tissues and organisms.

In other words, the Convention goes beyond the narrow economic value of biodiversity in the form of traded genetic resources. Biodiversity provides many goods and services outside of markets, which make up the “life sustaining systems of the biosphere.” These nonmarket values are irreplaceable with today’s technologies, and it is unlikely that human societies will have the resources to replace them, even with new technologies, at any time in the foreseeable future.

Within this ecological context, the Convention evidences broad acceptance—in general and somewhat qualified terms—of certain basic principles that will serve as an international legal framework for the genetic resources trade. The Convention affirms each nation’s power to control access to its genetic resources, establishes the principle that commercial benefits from genetic resources, including technology, must be shared equitably, and provides that countries should take part in research on their genetic resources.⁴⁰

Admittedly, the emphasis on commercial trade is heavy. But the text makes clear that the goal is not any trade, but sustainable trade. First, the very emphasis on the genetic resources trade reflects an inclination toward sustainability, since collecting of samples from biodiversity-rich ecosystems for the information they contain generally causes much less damage than the usual alternative, habitat conversion for other activities such as farming, logging, or ranching.

Second, the provisions for equitable sharing of benefits reflect in part the intent to increase the economic incentives to biodiversity-rich countries to conserve their natural heritage.⁴¹

40. See Convention on Biological Diversity, *supra* note 2, arts. 15, 16, 19. Under Article 15, each party must “endeavor to create conditions that facilitate access for other parties to its genetic resources, on ‘mutually agreed terms.’” *Id.* art. 15, para. 2. Access must be with the “prior informed consent” of the source country, and that country may impose reasonable restrictions on access as long as they are consistent with the Convention’s objectives. *Id.* A party that obtains and uses another party’s genetic resources must arrange for “fair sharing” of its benefits, including transfer of biotechnology that uses genetic resources (such as genetically engineered food crops). Technology transfer must be “under fair and most favorable terms,” while providing for “adequate and effective protection of intellectual property rights.” *Id.* art. 16.

41. See, e.g., BIODIPLOMACY: GENETIC RESOURCES AND INTERNATIONAL RELATIONS 311, 313-14 (Vicente Sanchez & Calestous Juma eds., 1994).

Perhaps most important, the Convention addresses the environmental impact of the economic process in which trade occurs, at each stage. The Convention recognizes that collecting of samples of genetic resources is only the “first stage in a process of production that extends from rainforests and coral reefs to drugstores, [farms,] factories and supermarkets.”⁴² Very likely, the products will include genetically engineered organisms (GMOs), engineered living thing with new properties—and with new and possibly very serious environmental impacts.⁴³

Thus, for the beginning of the process, the Convention provides that if countries permit collecting for the genetic resources trade, they must take measures, “as far as possible and as appropriate,” to minimize the harm to biodiversity, as with any other use of biological resources.⁴⁴

The Convention also covers later stages of the process, providing that a party may gain access to another party’s genetic resources only for “environmentally sound uses.”⁴⁵ Furthermore, all parties must provide for the “biosafety” of biotechnology, by taking steps to control the risks of use and release of genetically modified organisms (GMOs), which are among the likely products of the genetic resources trade.⁴⁶

Finally, parties are to encourage transfer of biotechnologies to other parties only where those technologies “do not cause significant damage to the environment” (Article 16, ¶ 1). In addition, the Convention recognizes a version of the precautionary principle, noting that “where there is a threat of significant reduction or loss of [biodiversity], lack of full scientific certainty should not be used as a

42. David Downes & Chris Wold, *Biodiversity Prospecting: Rules of the Game*, 44 *BIO SCI* 381, 382 (1994) (citing Madhav Godgil & Fikret Berkes, *Traditional Resource Management Systems*, 18 *RESOURCE MGMT. & OPTIMIZATION* 127-41 (1991)).

43. See generally JANE RISSLER & MARGARET MELLON, *PERILS AMIDST THE PROMISE: ECOLOGICAL RISKS OF TRANSGENIC CROPS IN A GLOBAL MARKET* (1993); OFFICE OF TECHNOLOGICAL ASSESSMENT, U.S. CONGRESS, *HARMFUL NON-INDIGENOUS SPECIES IN THE UNITED STATES* (1993); SHELDON KRIMSKY, *BIOTECHNICS AND SOCIETY: THE RISE OF INDUSTRIAL GENETICS* (1991).

44. Convention on Biological Diversity, *supra* note 2, art. 10, para. Êb.

45. *Id.* art. 15(2).

46. *Id.* art. 8, para. g. The Convention also recognizes that the world may need international “biosafety” standards to minimize the pressure from each nation’s industry to gain a competitive advantage by lowering biosafety standards and thereby externalizing environmental risks. Thus, it provides that the parties shall discuss at future meetings whether to draft a protocol—a related but new treaty—that establishes international biosafety standards. *Id.* art. 19, para. 3.

reason for postponing measures to avoid or minimize such a threat.” *See* Preamble.

This “cradle-to-grave” sense of ecological responsibility is unprecedented in international law. So is the Convention’s principle that trade, if conducted with respect for its ecological context, can be sustainable.

Previous environmental agreements dealing with trade carve out environmental exceptions for narrow bands of the world trade spectrum. For instance, the Convention on International Trade in Endangered Species bars trade in specimens of listed endangered species, and the Montreal Protocol imposes trade sanctions against nonparties that do not control production of substances that deplete the ozone layer. The Basel Convention limits trade in substances that are by definition environmentally harmful.

The Convention, in contrast, restructures the underlying framework of trade, regulating the entire economic process on ecological principles. It goes without saying that this general approach is a step ahead of the NAFTA, where environmental impacts are addressed only in a side agreement. It is far ahead of the GATT, including the outcome of the Uruguay Round, for which the environment does not exist, except insofar as measures to protect it might be deemed barriers to unrestricted trade.

IV. RECOGNIZING ECONOMIC DIVERSITY

For generations, many indigenous and traditional cultures of hunters, gatherers, farmers and pastoralists have based their economies “on the biological resources in local biodiversity rich ecosystems, while avoiding the extensive biodiversity loss characteristic of industrial society and its associated patterns of natural resources extraction and mechanized agriculture.”⁴⁷ Certain provisions of the Convention—in particular, articles 8(j) and 10—show a glimmering of recognition that such economies, which are often largely independent of global or national

47. Downes & Wold, *supra* note 42; *see generally* Margery L. Oldfield & Janis B. Alcorn, *Conservation of Traditional Agroecosystems*, in *BIODIVERSITY: CULTURE, CONSERVATION, AND ECODEVELOPMENT* (1991); GARY NABHAN, *ENDURING SEEDS: NATIVE AMERICAN AGRICULTURE AND WILD PLANT CONSERVATION* (1989).

market economies, should be protected, where their use of biological resources has a relatively low impact on biodiversity.

Diverse genetic resources, as they exist today in the hands of farmers, pastoralists, hunters and gatherers, are not only valuable as raw materials for the manufacture of new commercial commodities, such as new crop varieties, tissue cultures, genetically engineered plants, animals and microorganisms. They are also essential as the means of production and reproduction in local economies that are relatively well integrated into local ecosystems.⁴⁸ In addition to serving as the source of development of new crop varieties, diversity in the form of multicropping and interweaving of farms and gardens with wild areas provides stable returns in the face of climactic variation, crop disease, and other changes, while also producing a range of valuable products.

In these economies, local people depend on a wide range of ecological and economic values of genetic resources. Their gardens, farms and surrounding areas include many different species and many varieties of species, which provide long-term stability as well as many products and services.

The value of genetic and other biological resources on larger-scale markets understates their value as means of production in local ecosystems/economies.⁴⁹ In those local systems, they also produce for subsistence and small markets. As one commentator has put it, for these economies, diversity is "the basis and foundation of production and economic activity, not merely an 'input.'"⁵⁰ Diverse biological resources also produce nonmarketable ecological services, such as protection of water quality and flood control.

Other trade agreements, such as GATT and NAFTA, are deliberately intended as legal tools for maintaining and expanding the field of operations for the expanding global economy. They help corporations move commodities to the most lucrative market for consumption, and move capital to the cheapest site for production. Values of the environment and the community that are not commodified receive no consideration.

48. See, e.g., BARBER et al., *supra* note 39; JOHN DIXON & PAUL B. SHERMAN, ECONOMICS OF PROTECTED AREAS 186-88 (1990).

49. See DIXON & SHERMAN, *supra* note 48.

50. Vandana Shiva, *Biodiversity, Biotechnology and Profits*, in BIODIVERSITY: SOCIAL AND ECOLOGICAL PERSPECTIVES 43, 44 (1991).

As has been explained, this conventional approach to trade is inherently unsustainable. It depends on constant expansion of extraction of resources and consumption and production of goods, which brings it up against fixed ecological constraints.⁵¹

At the global level, this increase in extraction, consumption and production correlates with an increase in the average distance between consumers and producers.⁵² No longer sharing a community, they share fewer immediate or long-term ecological costs or benefits. Separated by thousands of miles, their social connection is reduced to a minimum. It consists primarily of the economic relationship of the transfer of a commodity for value, plus a legal connection through a trade law regime requires nothing except deregulation of trade. In this situation, it is difficult, if not impossible, for any actor to hold others accountable for environmental costs.

In contrast, many local economies are accustomed to operating within the constraints of local ecosystems. Producers and consumers are more likely to live close to the means of production and thus are less able to escape “externalized” effects. Sometimes they are the same individuals, or have bonds of kinship or marriage, and in any case they tend to live close together in the same community. Thus, they find it harder to avoid accounting for environmental impacts. While these communities may engage in long-distance trade, and may have done so for centuries, they may have developed traditions that minimize its impact on their environments.

This is not to romanticize non-Western or nonindustrial cultures. They, too, cause biodiversity loss, especially as their populations grow. And they, too, often seek some of the benefits of the industrial economy. But their traditional economies and styles of life are in many cases far more consistent with conservation than those of industrial society, and the

51. See Herman E. Daly, *Introduction to Essays Toward a Steady-State Economy*, in VALUING THE EARTH, *supra* note 30, at 11, 14-15, 38. Thus, Daly suggests that we speak of “deregulated international commerce” rather than “free trade,” reminding us that deregulation is not intrinsically good. See Herman E. Daly, *Problems with Free Trade: Neoclassical and Steady-State Perspectives*, in TRADE AND THE ENVIRONMENT: LAW, ECONOMICS, AND POLICY 147, 151 (Durwood Zaelke et al. eds., 1993). Some level of regulation is necessary to ensure that actors internalize costs, that the system operates at a scale that does not endanger the global ecology, and that distribution of benefits remains within an equitable range. *Id.*

52. See MADHAV GADGIL & RAMACHANDRA GUHA, THIS FISSURED LAND: AN ECOLOGICAL HISTORY OF INDIA 52 (1992).

Convention to some extent recognizes this. In the context of international trade, that is a major step forward.

Two provisions of the Convention explicitly recognize the potential value of traditional ways for conservation. First, Article 8(j) of the Biodiversity Convention requires countries, “as far as possible and as appropriate,” to take measures to “respect, preserve and maintain knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles relevant for conservation and sustainable use.”⁵³ Second, Article 10 requires countries to “[p]rotect and encourage customary use of biological resources in accordance with traditional cultural practices that are compatible with conservation or sustainable use.”⁵⁴

Articles 8(j) and 10 of the Convention counterbalance the emphasis of Articles 15, 16 and 19 on the role of genetic resources as commodities for the genetic resources trade. Rather than defining openings for the global economy to make inroads on other economies, they affirm the potential value of these local and subsistence economies, and require governments to acknowledge that value.

Coupled with Article 11—which requires parties to create economic incentives for conservation—⁵⁵ these provisions argue for reforms to help local communities defend rights, resources, and subsistence. There are a range of possible reforms.

To satisfy the mandate of article 10, governments should extend legal recognition and protection to traditional systems of property rights, such as communal regulation of access to common resources, village taboos on use of sacred groves, or local control of land. Implementing 10 and 8(j) along with 11, they should also offer various incentives—including tax breaks or grants—to subsistence farmers to use traditional farming methods that include diversity of crops, traditional crop varieties, and surrounding wild or semi-domesticated flora and fauna.

To help local and indigenous communities share in a greater proportion of the benefits of the sustainable use of genetic resources, as mandated by article 8(j), governments should recognize the legal right of communities to make and enforce contracts for access to resources with commercial firms, so that the communities would have a chance to reap a

53. Convention on Biological Diversity, *supra* note 2, art. 8(j).

54. *Id.* art. 10.

55. *Id.* art. 11.

larger share of the benefits. Governments should also explore whether it is necessary to create new types of intellectual property rights to be held by indigenous and local communities over their genetic resources and knowledge about them. They could also consider affording legal protection to trademarks or certificates of origin for sustainable produced traditional products, permitting communities to profit from sustainable use without facing unfair competition from misleadingly similar products that are not traditional and may not be sustainable.

Another option would be to provide grants to local and indigenous communities to conduct (possibly in partnership with scientists) assessments of the sustainability of traditional practices, or to develop small-scale sustainable enterprises based on traditional uses that are sustainable. Finally, governments could also implement these provisions by reforming systems of national accounting to account for a larger proportion of the value of nonmarket ecological values as well as local market and subsistence values of biodiversity-rich ecosystems.

The dynamic tension between global trade and local sustainability appears even within Article 8(j), in that it includes a clause requiring parties to “promote [the] wider application” of indigenous and local communities’ knowledge, innovations and practices that are relevant to sustainable use.⁵⁶ This clause implies that governments are to bring local resources into larger-scale trade. As has been explained, however, this exploitation must be done sustainably, and could serve as an incentive to maintain traditional sustainable practices.

In addition, 8(j) also requires that governments obtain the indigenous and traditional communities’ approval for this use, and that they encourage fair sharing of benefits with those communities. If governments permit genetic resources trade to intrude on these cultures, they should make sure that the intrusion is sustainable and that the local people share in the benefits.

There is a danger that governments will use Articles 8(j) and 10 as excuses for unsustainable exploitation. Thus, it will be important to

56. *Id.* art. 8(j). Indigenous and local communities’ “sophisticated and detailed knowledge of the uses of local biota” can provide leads for discovery of valuable compounds. *See* Downes & Wold, *supra* note 42, at 382; *see also* Reid et al., *supra* note 15; Plotkin, *supra* note 15. Such communities are also responsible for past and present informal innovation in developing “folk varieties” or “land races” of crops, improving crop productivity and enriching plant genetic resources over millennia. KLOPPENBURG, *supra* note 6, at 185-86.

ensure that the terms “indigenous and local,” “community,” “customary,” “traditional,” and “conservation and sustainable use” are interpreted strictly. This will be an important task for lawyers, but it will be at least as important to put the Convention in the hands of local and indigenous communities through training and education, so that they can do their own interpreting.

It might also be worth investigating whether the protections in Articles 8(j) and 10 for “local” communities, “traditional” lifestyles and “customary” uses could also be applied to centralized industrial economies to protect remnants of nonmarket or local uses. What could be more traditional in the United States than the household garden or the family farm? What could be more “customary” or “local” than the farmers’ market? To a significant extent, these kinds of activities may be associated with greater biodiversity, not to mention their other values for health, food cost and security, and social ties in local communities.⁵⁷ From this perspective, the Biodiversity Convention could help our society move closer to sustainability through what Ivan Illich terms “modern subsistence.”⁵⁸ Through economic activity, supplementary to markets, society could reintegrate ecological values currently externalized by the market economy. Through implementation of the Biodiversity Convention, nations may explore these possibilities.

57. See, e.g., WENDELL BERRY, *THE GIFT OF GOOD LAND* 167 (1981).

58. “The term ‘subsistence economy’ is now generally used only to designate group survival which is marginal to market dependence and in which people make what they use by means of traditional tools and within an inherited, often unexamined, social organization. I propose to recover the term by speaking about modern subsistence. Let us call modern subsistence the style of life that prevails in a postindustrial economy in which people have succeeded in reducing their market dependence, and have done so by protecting—by political means—a social infrastructure” IVAN ILLICH, *TOWARD A HISTORY OF NEEDS* 52 (1977).