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Erratum

Please note that in footnote 2, page 2, the Convention on Biological Diversity was entered into force on Dec. 29, 1993, and not on Jan. 1, 1994 as stated in the Article. President's Message to Congress Transmitting Convention on Biological Diversity TREATY DOG. 103-20 (Nov. 20, 1993).

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INTRODUCTION TO BIOLOGICAL DIVERSITY: LAW, INSTITUTIONS, AND SCIENCE

BY CATHERINE J. TINKER*

I. INTRODUCTION

Biological diversity is fundamental to human life. It is a basic feature of the way in which living organisms are structured. As such, it provides support for ecosystems, for the regulation of water and the atmosphere and the basis for agricultural production. When genetic variations are lost, therefore, not only are specific and potential properties and adaptations also lost, but with them species are diminished, ecosystems are impaired and the ability to sustain human life is damaged.

Biological and genetic resources have an inestimable value which is nevertheless difficult to quantify in economic terms. Like the atmosphere and the waters of the Earth, biological diversity has been largely taken for granted as a free good. Individual species have acquired commercial value in varying degrees as sources of pharmaceutical and other commercially-marketed products and genetic material for breeding of food crops. But only recently has there been a growing awareness of the indispensable value of the ecological systems, of which tropical forests are a notable example, which provide the sources and storehouses of these resources.

– United Nations¹

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1. *Progress Report of the Secretary-General of the Conference on Conservation of Biological Diversity*, A/Conf.151/PC/28, at 1-2 (1991).

The newest multilateral treaty in the field of environment and sustainable development enters into force 29 December, 1993: the United Nations Convention on Biological Diversity.² One hundred and sixty-seven nations signed the treaty, including the United States, and thirty-one nations had ratified the convention as of November, 1993.³ What is this treaty about, how was it negotiated, and what will it mean for states and parties to the treaty, to non-parties, and to conservation groups and local communities?

Biological diversity means "the variety of the world's organisms, including their genetic diversity and the assemblages they form...reflecting the interrelatedness of genes, species, and ecosystems."⁴ It is one of the newest and, at the same time, one of the most ancient concepts in humanity's efforts to understand and relate to nature and to survive. The concept of biodiversity includes and is closely related to biotechnology, a term which encompasses both genetic engineering of organisms through modern biotechnology and traditional cross-breeding of plants for improved food crops and domestic animals. The term "biological diversity" or "biodiversity" has been used for years in the biological sciences, especially in the work of Professor E.O. Wilson of Harvard, who has most clearly expounded the scientific basis for recognizing biodiversity.⁵

This diversity of life contains overtones from biological science, medicine, engineering, philosophy, religion, law, anthropology, linguistics, art and architecture, and potentially every field of intellectual endeavor. A scientific definition of biodiversity found on the wall of a major natural history museum refers to the:

2. Convention on Biological Diversity, 5 June 1992-30 Sept. 1993, 31 I.L.M. 818 (1992), UNEP/Bio.Div./N7-INC.5/4, (will enter into force 1 Jan. 1994) [hereinafter Biodiversity Treaty].

3. Press Release-UNEP, *The Biodiversity Treaty - In 90 Days It Will Enter Into Force*, report by the Interim Secretariat, Oct.1 (1993). Canada, China, Maldives, Marshall Islands, Mauritius, Monaco, Saint Kitts and Nevis, and Seychelles were the first to ratify as of 15 February 1993; subsequent ratifications have been received by the United Nations from Antigua/Barbuda, Armenia, Cook Islands, Ecuador, Fiji, Guinea, Japan, Mexico, Papua New Guinea, Vanuatu, Zambia, Peru, Australia, Norway, Tunisia, Saint Lucia, Bahamas, Burkina Faso, Belarus, Uganda, New Zealand, Mongolia and Philippines. Jordan also ratified the convention, but as of June 7, 1993, had not deposited an instrument of ratification at the United Nations. U.N. Doc. UNEP/Bio.Div/N7-INC.5/4 (1993).

4. WALTER REID AND KENTON MILLER, World Resources Institute, *KEEPING OPTIONS ALIVE, THE SCIENTIFIC BASIS FOR CONSERVING BIODIVERSITY*, at 3 (1989).

5. *E.g.*, E.O. WILSON, *THE DIVERSITY OF LIFE* (1992).

broad array of different forms into which organisms have evolved: (1) genetic diversity: variation in genes enabling organisms to evolve and adapt to new conditions; (2) species diversity: number, types and distribution of species within an ecosystem; (3) ecosystem diversity: variety of habitats and communities that interact in a complex web of interdependent relationships.⁶

Within academia, the theoretical debate over multiculturalism⁷ may be seen as a paradigm of biodiversity: the multiplicity of stories demanding validation and inclusion mirrors the co-existence of the components of biological diversity in nature. Within legal academia, theoretical approaches developed by feminist legal theory and critical race theory scholars echo an essential element of biodiversity: difference is honored and preserved as vital to the survival of the whole, since monocultures are by nature weak and susceptible to extinction. There is an acknowledgment that *legitimacy requires diversity*, that consensus arises out of expression of the full range of views, beliefs, and values.

In the field of international law and biodiversity, the International Union for the Conservation of Nature ("IUCN" or "World Conservation Union"), a non-governmental organization composed of scientists, conservation groups world-wide, and representatives of some governments, prepared the first draft of a proposed multilateral treaty on biological diversity conservation for the United Nations Environment Programme ("UNEP") in the late 1980s. The public policy arguments regarding new law on biodiversity issues were advanced by publications from the World Resources Institute ("WRI")⁸ and the IUCN⁹ in the early 1990s. Public awareness developed late, with most of the press, non-governmental organizations and academic attention in the two or three years prior to the United Nations Conference on Environment and Development ("UNCED" or "Earth Summit") focused on the draft convention on climate change or domestic issues in national and local fora. With the completion of the

6. California Institute of Science, Golden Gate Park, San Francisco, California, as observed by the author, Jan. (1993).

7. The definition of diversity used by one major law school library collection refers to "materials on civil rights in general, racism, ethnic groups and minorities, immigrant groups, women, gays and lesbians, the physically disadvantaged, social and economic disadvantage and the structure of American society." N.Y. Univ. Sch. of Law, N.Y., N.Y., "Library Holdings on Aspects of Diversity," Feb. (1991).

8. E.g., MCNEELY ET AL., *CONSERVING THE WORLD'S BIOLOGICAL DIVERSITY*, (1990); REID ET AL., *BIODIVERSITY PROSPECTING*, (1993); MILLER, *BALANCING THE SCALES: MANAGING BIODIVERSITY AT THE BIOREGIONAL LEVEL* (forthcoming, 1993).

9. IUCN, UNEP, and WRI, *GLOBAL BIODIVERSITY STRATEGY: GUIDELINES FOR ACTION TO SAVE, STUDY, AND USE EARTH'S BIOTIC WEALTH SUSTAINABLY AND EQUITABLY*, (1992).

intergovernmental negotiations on the United Nations Convention on Biological Diversity in late May, 1992, and the opening of the treaty for signature on 4 June 1992, in Rio de Janeiro, Brazil, during the Earth Summit, interest grew in this new subject of biodiversity.¹⁰ The dual purpose of conservation of biodiversity and sustainable use of natural resources evolved in the course of debate and was recognized as an objective of the Convention on Biological Diversity and in the Agenda 21 Action Plan at UNCED. Those developing states which are the repositories of the majority of the world's natural resources and genetic variety insist on their ability to exercise their sovereign right to use their natural resources, while acknowledging their responsibility not to harm the territory of other states. Developed states in the past have sought to "lock up" these resources in protected areas and bioserves (the basis of the concept of *in situ* conservation), while extracting genes for preservation in gene banks now principally located in developed countries (*ex situ* conservation). Under the new convention, developed states accept responsibility to share the benefits of biotechnology with developing states in return for access to genetic resources.

In addition to the treaty, the Agenda 21 chapters on biodiversity and biotechnology contain an action plan to be implemented through a new institutional body, the United Nations Commission on Sustainable Development. The IUCN produced a "Global Conservation Strategy" action plan,¹¹ with a section on biodiversity. This plan favors *in situ* conservation over *ex situ* conservation as a matter of policy, and recognizes cultural diversity as a part of biodiversity.¹²

10. At the beginning of UNCED, the refusal of the United States government to sign the Convention on Biological Diversity – after playing an instrumental role in its negotiation throughout the process – created enormous amounts of publicity for the treaty, which otherwise had been virtually ignored. Suddenly the press clamored for information on a topic few understood or could explain. Reversing this decision of the Bush Administration, the Clinton Administration signed the Convention on Biological Diversity on June 4, 1993, one year after it was opened for signature.

11. The final version of the WCS was published in October, 1991. The draft was approved at the IUCN General Assembly in Perth, Australia, in November, 1990, in conjunction with UNEP and WRI. A separate publication was issued by WRI, IUCN, and UNEP in consultation with FAO and UNESCO, *see supra* note 9.

12. IUCN, UNEP, and WRI, *supra* note 7, at 3. The U.S. Citizens' Network on UNCED Working Group Report, Biodiversity: *The Foundation for Earth's System of Life*, also considers human culture as part of biodiversity. "Like other aspects of biodiversity, cultural diversity is a foundation of human existence today and a resource for adapting to changing conditions. Cultural diversity is manifested by diversity in language, religion, land management practices, art, music, social structure, crop selection, diet, and any number of other attributes of human society." Unfortunately, this definition fails to identify the particular role of women in defining and carrying culture. *See Draft Decision on Women in Environment and Development, Cross-cutting Issues*, U.N. Doc. A/Conf.151/PC/L.40 (1991).

TEN PRINCIPLES FOR CONSERVING BIODIVERSITY¹³

These ten principles have guided the individuals and institutions involved in development of the Global Biodiversity Strategy.

1. Every form of life is unique, and warrants respect from humanity.
2. Biodiversity conservation is an investment that yields substantial local, national, and global benefits.
3. The costs and benefits of biodiversity conservation should be shared more equitably among nations and among people within nations.
4. As part of the larger effort to achieve sustainable development, conserving biodiversity requires fundamental changes in patterns and practices of economic development worldwide.
5. Increased funding for biodiversity conservation will not, by itself, slow biodiversity loss. Policy and institutional reforms are needed to create the conditions under which increased funding can be effective.
6. Priorities for biodiversity conservation differ when viewed from local, national, and global perspectives; all are legitimate, and should be taken into account. All countries and communities also have a vested interest in conserving their biodiversity; the focus should not be exclusively on a few species-rich ecosystems or countries.
7. Biodiversity conservation can be sustained only if public awareness and concern are substantially heightened, and if policy-makers have access to reliable information upon which to base policy choices.
8. Action to conserve biodiversity must be planned and implemented at a scale determined by ecological and social criteria. The focus of activity must be where people live and work, as well as in protected wildland areas.
9. Cultural diversity is closely linked to biodiversity. Humanity's collective knowledge of biodiversity and its use and management rests in cultural diversity; conversely, conserving biodiversity often helps strengthen cultural integrity and values.
10. Increased public participation, respect for basic human rights, improved popular access to education and information, and greater institutional accountability are essential elements of biodiversity conservation.

13. WRI, IUCN, UNEP, GLOBAL BIODIVERSITY STRATEGY: POLICY-MAKERS' GUIDE, 21 (1992).

The natural environment has been variously perceived at different times and in different cultures and geographical or climate zones as a hostile force to be conquered;¹⁴ as a pure realm of spiritual and aesthetic inspiration to be enshrined and honored;¹⁵ as a source of basic necessities of life and ultimately of death;¹⁶ and as a source of "free" goods to be exploited by the fastest, strongest and most economically powerful.¹⁷ Western science viewed natural resources as raw materials for the industrial revolution in the last century; newer scientific theories and fields of study such as conservation biology¹⁸ and deep ecology¹⁹ draw on a vision of nature as interdependent parts, all necessary to the survival of the whole in which human beings are only a small part.

II. THE UNITED NATIONS CONVENTION ON BIOLOGICAL DIVERSITY

As the World Charter for Nature recognized in 1982, "life depends on the uninterrupted functioning of natural systems which ensure the supply of energy and nutrients."²⁰ Biodiversity loss is caused by human activity, generally

14. *See, e.g.*, the westward expansion by the white pioneers in the United States of America in the nineteenth century as described in the classic historical account by Frederick Turner, the "Turner thesis" of the American West, FREDERICK J. TURNER, *THE FRONTIER IN AMERICAN HISTORY* (Holt, Rinehart and Winston, pubs.)(1962).

15. The Romantic tradition in Western Europe and its later emulation in the Americas epitomizes this type of glorification of nature; one of its practical manifestations was the creation of national parks and recreation areas. *See, e.g.*, JOHANN WOLFGANG VON GOETHE, *THE SORROWS OF YOUNG WERTHER*, (The Scholartis Press, pubs., 1929).

16. The teachings of many indigenous peoples emphasize human connections to the gods which take the form of natural forces and animals. *See, e.g.*, HYEMEYOHSTS STORM, *SEVEN ARROWS*, (Harper & Row, pubs., 1st ed. 1972).

17. Again to consider an example from the history of the American West, the story of fortunes made and laws written to encourage the exploitation of natural resources: water, timber, oil, and minerals. *See, e.g.*, WALLACE STEGNER & CHARLES F. WILKINSON, *CROSSING THE NEXT MERIDIAN: LAND, WATER, AND THE FUTURE OF THE WEST*, (1992).

18. Conservation biology is a school of thought which emphasizes management of wildlife and parks, as opposed to "preservation," an approach which prohibits human activity. Conservation is compatible with sustainable development, whereas complete preservation may not be.

19. Deep ecology encompasses New Age thinkers and ecofeminists who find a strong connection with the Earth Mother, female spirituality and goddess worship.

20. World Charter for Nature, G.A. Res. 7, U.N. GAOR, 37th Sess., Supp. No. 57, intro. at 17 (1982).

connected to economic growth and development activities which pollute and destroy fragile ecosystems and habitats.²¹ The Biodiversity Treaty was designed to combat this loss.

In contrast to earlier environmental treaties, such as the Vienna Convention on the Protection of the Ozone Layer, the Convention on Biological Diversity is not a "framework" convention, which requires further elaboration to become operational. It is a specific treaty with duties and obligations structured within a fully-operational system. The Ozone Convention required subsequent protocols to set standards for emission controls on specific gases, without which there was no meaningful way to determine a nation's compliance with the treaty. The Convention on Biological Diversity contains duties to conserve and sustainably use biological diversity and to share the benefits of biodiversity. These duties do not require the adoption of lists or schedules for nations to know what they must do to comply with the treaty in relation to designated species, genes and habitats. Rather, a broad ecosystem approach is adopted, suitable to the broad subject matter of the treaty, instead of adopting a narrow focus on specific species or protected areas. The treaty recognizes economic and social inequalities between developed and developing nations and creates a system of differentiated responsibilities to achieve the Convention's objectives. Significantly, both developed and developing nations signatory to the treaty accept responsibility for the conservation and sustainable use of biological diversity and sharing the benefits of biodiversity; and each group of nations is understood to have something of value that the other needs.

The treaty breaks significant new ground in several ways. It codifies Principle 21 of the Stockholm Declaration of 1972, which balances rights to use resources against responsibility not to cause environmental harm, thereby rendering the principle part of binding international law. The treaty also expressly recognizes economic and social inequalities between developed and developing countries, creating a system of differentiated responsibilities. Both provisions are unique in a binding document of international environmental law. Public participation is specifically called for in the treaty from scientists, non-governmental organizations and local communities in monitoring and implementation of the treaty. A major mapping project is mandated to identify species, genes, and ecosystems worldwide.

The treaty itself is in two parts, separately negotiated: the first part concerns conservation and sustainable use of biological and genetic resources, and the second part addresses technology transfer and sharing of benefits. This new environmental treaty adopts a broad ecosystem approach as opposed to one focused on individual species; it avoids the use of lists of endangered or

21. The treaty defines biological diversity in Article 2 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," *supra* note 2, Art. 2.

protected species.²² Once the treaty has entered into force, additional protocols (which will need to be separately ratified by nations) may be subsequently adopted to detail additional operational matters or to clarify the application of the Convention's provisions regarding financial mechanisms, intellectual property rights, or biosafety.

Preserving species alone is not enough to protect biological diversity. Biologists and ecologists have discovered the importance of ecosystems: as corridors linking necessary habitats to support endangered species of birds, animals or plants, and as rich depositories of bacteria, microorganisms and species not yet identified by humans and having potential uses not yet imagined for the earth's people. Measuring value only by utility to human beings is limited. The intrinsic value of ecosystems and life forms has also been recognized, a factor in the valuation of loss of biodiversity.²³ This larger question of the degree of harm done or the cost of the loss of biological diversity becomes important in decision-making and risk analysis; the implications are present also for any future liability and compensation regime. At the present stage of development on this issue, the best course is to adopt a preventive approach. Implementing the precautionary principle does not require absolute scientific certainty on the nature of harm, before steps are taken to preserve an area or species or to prevent human activity which will alter the area before the activity is fully studied and understood.

Balancing of interests on a global level is found in the new United Nations Convention on Biological Diversity, the first attempt to codify international law on the protection of biological diversity, other than those limited to endangered species or specific types of pollution, flora or fauna.²⁴ The treaty represents a general commitment to the conservation and sustainable use of biological diversity, using the following definitions:

biological diversity: the variability among living organisms from all sources including, i.e., 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.

22. France, supported by many environmental NGOs, led the unsuccessful drive in the treaty negotiations to copy other environmental treaties such as CITES and the Ramsar Convention which list endangered species. The argument against the use of lists was based on the desire to create an ecosystem- or habitat-based treaty and the hope of avoiding divisive politicking over which species or habitats located in which nations are to be listed as more endangered or threatened than others.

23. WRI, GLOBAL BIODIVERSITY STRATEGY (1992).

24. *E.g.*, Convention on the International Trade in Endangered Species, 12 I.L.M. 1085 (1973), or the treaties on oil pollution at sea.

biological resources: genetic resources, organisms or parts thereof, populations, or any other biotic component of ecosystems with actual or potential use or value for humanity.

biotechnology: any technological application that uses biological systems, living organisms, or derivatives thereof, to make or modify products or processes for specific uses.²⁵

New elements of international environmental law reflect the current discourse over the meaning and worth of biodiversity, both in theory and in practice. International cooperation, access to information, notification and consultation, and legal doctrines such as the precautionary principle²⁶ and Principle 21 of the Stockholm Declaration²⁷ are all relevant to biodiversity conservation and sustainable use. These principles are based on a non-hierarchical approach to policy-making and respect for a variety of views.

The procedural rights reflect a new respect for participation by local communities and non-governmental organizations,²⁸ input which can no longer be excluded by closed doors and files or deliberations limited to one interest group or body of knowledge. Both the precautionary principle and Principle 21 of the Stockholm Declaration (copied verbatim in Article 3 of the Convention on Biological Diversity) embody the concept of responsibility and the need to consider sustainability over time and space in decision-making. Without participation from diverse groups or consideration of the needs of various life forms and different generations, it is difficult to imagine any hegemon in the old Westphalian nation-state system making adequate choices to fulfill this sense of global responsibility. The shift towards prevention and responsibility, and away from the notion of liability and compensation for those who get caught after harm occurs, is a crucial aspect of acceptance of the fundamental concept of biological diversity in our international politico-legal system. Furthermore, dispute resolution by conciliation and arbitration is the

25. Biodiversity Treaty, *supra* note 2, Art.2.

26. The goal of this principle is the prevention of harm. For a good discussion of the development of the principle, see DANIEL BODANSKY, *New Developments in International and Environmental Law*, in AMERICAN SOCIETY OF INTERNATIONAL LAW PROCEEDINGS, 413 (1991).

27. "States have, in accordance with the Charter of the United Nations and the principles of international law, the sovereign right to exploit their own resources pursuant to their own environmental policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other states or of areas beyond the limits of national jurisdiction." Biodiversity Treaty, *supra* note 2, Art. 3.

28. See RICHARD FALK, *EXPLORATIONS AT THE EDGE OF TIME* (1992).

technique of choice in the new United Nations Convention on Biological Diversity. It is particularly well suited to disputes based on conflicting social and economic values, in contrast to adjudication of violations of a legal standard which is more a matter of proof of causation and damages.

The treaty also codifies new duties and obligations under international law in terms of sharing the benefits of biodiversity. It is a first step towards an acknowledgement of the need for global resource management to prevent the extinction of biological diversity and assure universal access to genetic resources, regardless of their physical location within territorial boundaries of nation-states. In this sense, the benefit-sharing provisions begin to break down sovereignty as well as seeking a measure of equity in the distribution of the resources or their products, whether life-saving medications or nutritionally-superior foods. The interdependence of the globe is understood to require this sharing if any life forms are to survive. Once the basic premises of responsibility and sharing are accepted, then it is only a matter of finding the means to achieve these ends, such as by transfer of environmentally-sound technology, access to genetic resources, and distribution of some of the royalties from successful products to the local communities or countries of origin of the genetic resources. Greater international cooperation will benefit those who participate; those who choose not to share need not, but will be denied access to the resources the others have.

A. *History*

Important scientific and policy recommendations were first made by groups such as the IUCN,²⁹ which prepared a draft convention on biological diversity that included a provision whereby the private sector would cede its intellectual property rights to an independent body, presumably for compensation; the technology could then be freely shared as in the public domain or licensed to applicants. Although this mechanism was dropped from subsequent drafts, it has merit in light of the current debates, especially in the United States and Switzerland, over the effect of the Convention on patent holders and the resistance by the biotechnology industry to compulsory licensing.

Government representatives began meeting in the late 1980s to discuss threats to dwindling stores of biodiversity worldwide. Solutions to this new threat to the planet's survival were sought to protect as-yet uncounted numbers of life forms, plants and animals, and the habitats necessary to sustain them. By the time the General Assembly of the United Nations authorized the convening of the United Nations Conference on Environment and Development

29. The IUCN is a unique non-governmental organization ("NGO") which includes governments, individuals, and NGOs among its membership. Headquartered in Switzerland, the IUCN has an Environmental Law Centre in Bonn, Germany, which conducts research and prepares recommendations and draft conventions to further the development of international environmental law.

(UNCED),³⁰ the agenda for the conference included the topics of biodiversity and biotechnology as separate chapters in Agenda 21, the final document of UNCED's action plan.

The two topics had become joined two years earlier in the draft treaty birthed by The United Nations Environment Programme (UNEP) pursuant to Decisions 14/26 and 15/34 of the Governing Council.³¹ The Convention was to be negotiated separately from UNCED, although on the same timetable. The Convention's goal was ambitious: to produce a completed convention to be opened for signature at the Rio conference in June, 1992, along with a second convention on climate change, negotiated under the auspices of the General Assembly. Few believed a treaty could be concluded so rapidly on biodiversity, a topic which lacked both consensus and certainty. The negotiators worked without the benefit of the type of scientific report produced by the Intergovernmental Panel on Climate Change (IPCC), which provided a consensus view of scientific agreement used as a basis for the Climate Change Convention.

The initial sessions where government representatives discussed the nascent topic were referred to as meetings of the "Ad Hoc Working Group of Experts on Biological Diversity."³² By the summer of 1990, sufficient progress had been made, including the completion of studies on various aspects of the issues, so that a new Sub-Working Group on Biotechnology was established to prepare terms of reference on biotechnology transfer.³³

The Governing Council of UNEP then created an Ad Hoc Working Group of Legal and Technical Experts³⁴ to prepare a new international legal

30. G.A. Res. 44/228, U.N. GAOR, 44th Sess., Agenda Item 82, U.N. Doc. A/RES/44/228, (1990).

31. The Reports of the INC Negotiating Sessions are contained in documents UNEP/Bio.Div/INC.3/11, UNEP/Bio.Div/N4-INC.2/5, UNEP/Bio.Div/N5-INC.3/5, UNEP/Bio.Div/N6-INC.4/4, UNEP/Bio.Div/N7-INC.5/L1.

32. The first meeting was held from 16-18 November 1988, the second meeting from 19-23 February 1990, and a third meeting from 9-13 July 1990, all in Geneva.

33. The Group first met from 14-17 November 1990.

34. "The first two sessions were held under the name 'Ad Hoc Working Group of Legal and Technical Experts on Biological Diversity.' The documents of these sessions may be found under the series UNEP/Bio.Div./WG.1 and UNEP/Bio.Div./wg.2. In making its decision on the change of name at its 16th session, the Governing Council affirmed that the change of name did not mean a new negotiating body nor affected the continuity of the process of elaborating the Convention. It further affirmed that participation in meetings of the Intergovernmental Negotiating Committee should be in accordance with the rules of procedure adopted at the second session." *Report of the Intergovernmental Negotiating Committee for a*

instrument for the conservation and sustainable use of biological diversity, "taking particular account of the need to share costs and benefits between developed and developing countries and ways and means to support innovation by local people."³⁵ They considered reports from the earlier Ad Hoc Working Group of Experts on Biological Diversity and prepared draft elements which could become articles of a convention.³⁶ With the assistance of legal experts representing all geographical regions, the Executive Director of UNEP prepared the first formal draft convention at the request of the working group.³⁷ By the third session of the Ad Hoc Working Group,³⁸ the meetings had taken on the additional nomenclature of an Intergovernmental Negotiating Committee (INC) by virtue of UNEP Governing Council Decision 16/42 of 31 May 1991. Each subsequent meeting, including the final session, was designated both as a numbered negotiating session and a differently numbered session of the INC, i.e., "Sixth negotiating session/Fourth session of the INC."³⁹

B. *Substantive Provisions of the Convention*

1. *Sovereign Rights and Responsibilities (Article 3)*

The legal duties created by the treaty overall may be weaker than many had hoped when the drafting began, and it is unclear in what chronological order, if any, states must provide access to biological resources in developing countries and share the benefits of technology from developed countries. Nevertheless, the treaty is a milestone in International Environmental Law as the first conservation treaty to include Principle 21 of the Stockholm Declaration in the body of the treaty itself. The debate up to the last day of the session was shaky, with some states insisting Principle 21 should only be part of the preamble, others preferring only the "sovereign rights" half of the equation without the "responsibility" half of Principle 21, and some arguing for

Convention on Biological Diversity on the Work of Its Third Session, at 1, U.N. Doc. UNEP/Bio.Div./INC.3/11,4 (1991).

35. UNEP Governing Council Decision GCSS II/5, August 1990, *cited in Note by the Executive Director*, Ad Hoc Working Group of Legal and Technical Experts on Biological Diversity, 1st Sess., at 5, U.N. Doc. UNEP/Bio.Div./WG.2/1/2 (1990).

36. The "Ad Hoc Working Group of Legal and Technical Experts" first met in Nairobi from 19 to 23 November 1990.

37. This draft was considered at the second session of the Ad Hoc Working Group of Legal and Technical Experts from 25 February to 6 March, 1991, in Nairobi.

38. 24 June to 3 July 1991 in Madrid.

39. U.N. Doc. UNEP/Bio.Div./N.6-INC.4/3 (1992).

deletion of the whole thing. The U.S. supported a compromise, which was to include the text of Principle 21 verbatim with a "chapeau" which would have limited the force of the obligation by merely stating: "The Contracting Parties shall be *guided by* the following principle in their actions under the Convention." (emphasis added) The "chapeau" was ultimately dropped, although both the U.K. and France repeated the language in declarations upon signing the Convention. Article 3 now reads:

States have, in accordance with the Charter of the United Nations and the principles of international law, the sovereign right to exploit their own resources pursuant to their own environmental policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other states or of areas beyond the limits of national jurisdiction.⁴⁰

The new Biodiversity Convention converts Principle 21, which had already achieved the status of customary law in the eyes of many legal commentators and policy analysts, into a binding treaty obligation. Certain regional seas conventions and specific oil pollution treaties have already incorporated Principle 21 into their texts, but no species or habitat conservation treaty has done so outside of preambulatory language. The problem remains to define what duties are actually created thereby, particularly with the inherent tension between the two phrases which comprise the "carefully crafted balance" in this article. What is clear, however, is that the Biodiversity Convention places genetic resources under the sovereign control of nations, reversing the "common heritage" concept of ownership of natural resources. The language of Articles 3 and 15 thus confirms the sovereign right of states to determine the use of natural resources found within their territorial boundaries.

2. *Conservation and Sustainable Use of Biological Diversity (Articles 6 and 8-10)*

The Convention creates a duty for each Contracting Party "in accordance with its particular conditions and capabilities" to conserve biodiversity and to sustainably use its components. The treaty defines "sustainable use" as "the use of components of biological diversity in a way and at a rate that does not lead to the long-term decline of biological diversity, thereby maintaining its potential to meet the needs and aspirations of present and future generations."⁴¹ The concept of conservation was not specifically defined as a term because its meaning was elaborated in two articles dealing with *in situ* and *ex situ* conservation, the first referring to ecosystems, habitats, and species in their natural surroundings and the second referring to zoos and botanical gardens.

40. Biodiversity Treaty, *supra* note 2, Art. 3.

41. *Id.* at Art. 2.

Article 8(c) of the treaty establishes the duty to "regulate and manage biological resources important for the conservation and sustainable use of biological diversity whether within or outside protected areas."⁴² In order to achieve this key mandate of regulating or managing biological resources, the Contracting parties shall rehabilitate and restore degraded ecosystems; prevent the introduction of or eradicate alien species threatening biodiversity; and establish geographically-defined protected areas, at least "as far as possible" and "as appropriate," through legislation and regulation on a national level. The problems of local communities living around the perimeter of protected areas and the complex interactions of surrounding ecosystems are insufficiently understood by scientists and ecologists. Nor is it known what size of protected area is adequate. The Convention's commitment to research and training, public awareness and education, and sharing of benefits with local communities may lead to solutions of these questions not yet available to policy-makers. Effective environmental management, especially on a global level, requires more information about ecosystems, habitats, and species and their interaction. The counting of components of biological diversity required by the Convention will create a database which can suggest what additional steps must be taken.

To complement *in situ* measures, Contracting Parties shall conserve components of biological diversity in *ex situ* facilities, preferably within the country of origin of the resources. Any collection of resources from natural habitats for this purpose shall be regulated and managed "so as not to threaten ecosystems and *in situ* populations of species." Measures shall also be adopted for the recovery and rehabilitation of threatened species and for their reintroduction into their natural habitats. Many such projects are carried on in zoos and gene banks, especially in the U.K. and the U.S.

Cooperation between governments and the private sector is acknowledged to be necessary to develop additional methods for conservation and sustainable use of biological resources. Fair pricing of natural resources or their products, such as tropical timber, should reflect the cost to the resource base in loss of biodiversity; national accounts should show this loss as a debit rather than as a credit for a sale or export. While the treaty does not go this far, it does address capacity-building within the country of origin of the genetic resources as important to the effort to stop the loss of biodiversity where it is still found.

3. *Identification and Monitoring (Article 7)*

A great physical exploration of nature is called for in mapping components of biodiversity, much of which is concentrated in "hot spots" principally located in developing countries. In such areas rich in biological diversity, a minute fraction of the species have been counted or even identified. Contracting Parties are now obligated to collect, maintain and organize data identifying and

42. *Id.* at Art. 8(d).

monitoring the condition of components of biodiversity in the following categories:

1. Ecosystems and habitats: containing high diversity, large numbers of endemic or threatened species, or wilderness; required by migratory species; of social, economic, cultural or scientific importance; or, which are representative, unique or associated with key evolutionary or other biological processes;
2. Species and communities which are: threatened; wild relatives of domesticated or cultivated species; of medicinal, agricultural or other economic value; or social, scientific or cultural importance; or importance for research into the conservation and sustainable use of biological diversity, such as indicator species; and
3. Described genomes and genes of social, scientific or economic importance.⁴³

In addition, processes and categories of activities likely to have "significant adverse impacts on the conservation and sustainable use of biological diversity" are to be identified, and their effects monitored "through sampling and other techniques." Here the private sector, universities and scientific associations, and non-governmental organizations can make a contribution to the Linnean project. "In fact, regional networks of NGO's are forming to exchange information, empower one another and themselves, and provide monitoring and implementation strategies."⁴⁴

4. *Duty to Notify and Consult; Impact Assessment (Article 14)*

National strategies, plans or programmes are to be developed by Contracting Parties to reflect the measures and goals of the Convention. Specifically, Article 14 (d), entitled "Impact Assessment and Minimizing Adverse Impacts," creates a duty to notify other states "in the case of imminent or grave danger or damage *originating under its jurisdiction* to biological diversity *within the area under jurisdiction of other States or in areas beyond the limits of national jurisdiction*," as well as "to initiate action to prevent or minimize such danger or damage."⁴⁵ Article 14(e) calls for national plans for emergency responses to

43. *Id.* at Annex I.

44. *E.g.*, the Brazilian Biodiversity Information Network, Australian Biodiversity Coalition, North American Biodiversity Alliance, the South/North Environmental Campaigns Coalition (SECC), the US-Indonesia Conservation Network, and the Island Resources Foundation.

45. Biodiversity Treaty, *supra* note 2, Art. 14(d) (emphasis added).

danger to biological diversity and for the establishment of procedures to control or mitigate damage or restore biological diversity.

Environmental assessments are a particularly useful tool for information-gathering and presentation of facts to decision-makers faced with conflicting values and choices involving economic growth on one hand and conservation of resources on the other. EIA's have long been used in the U.S. and are growing in popularity in the European Community.⁴⁶ The Convention calls for their use by Contracting Parties on "proposed projects that are likely to have significant adverse effects on biological diversity with a view to avoiding or minimizing such effects." The Convention also urges public participation in these procedures, an important element of the process in the U.S. experience which is being adopted generally in international environmental law and policy-making.⁴⁷ These duties of notification and emergency response parallel developments in other areas of international environmental law.⁴⁸ Interestingly, these provisions usually apply to ultrahazardous activities⁴⁹ but here apply to activities or events which threaten biological diversity.

5. *Access to Genetic Resources (Article 15)*

Article 15 must be read together with Article 16, representing together the fundamental trade-off of the entire Convention and illustrating the political and economic strengths of both the biodiversity-rich developing nations and the technology-based developed nations. Each has something the other needs and wants. In Article 15, each Contracting Party "shall endeavor to create conditions to facilitate access to genetic resources for environmentally sound uses by other Contracting Parties." This provision permits "biodiversity prospecting," for example, as representatives of pharmaceutical companies seek plant specimens in rain forests which can be tested in laboratories for genetic material which may lead to the manufacture of a new drug. In this case, the sovereign rights of the nation where the plant is located are reaffirmed and access may be denied to nations or private companies from nations which are

46. Nicholas A. Robinson, *International Trends in Environmental Impact Assessment*, 19 B.C. ENVTL AFF. L. REV. 591 (1992).

47. The UNCED preparatory meetings demonstrated the effectiveness of a broad range of non-governmental organizations in addressing delegations of member nations, circulating documents, and commenting on draft language for the Rio Declaration on Environment & Development and Agenda 21.

48. For example, following the Chernobyl accident in 1986, two conventions were adopted on notification of other states and emergency response to situations posing imminent danger in case of nuclear accidents.

49. I.e., nuclear accidents or outer space activities. Biotechnology may be considered as ultrahazardous activity.

not party to the Convention.⁵⁰ Access to genetic resources is subject to national legislation, although private companies are free to enter into contracts with governmental entities to assure access in developing countries to genetic resources.⁵¹

6. *Transfer of Technology and Intellectual Property Rights (Article 16)*

The new biodiversity treaty explicitly reaffirms the importance of intellectual property rights, despite fears of compulsory licensing to meet the objectives of the treaty. Transfer of technology from developed to developing countries is contemplated in return for access to genetic and biological resources located within the territory of developing countries. The treaty specifically defines technology as including biotechnology, and throughout the text refers to sharing of the benefits derived from the use of genetic resources, defined as "genetic material of actual or potential value;" genetic material is defined as "any material of plant, animal, microbial or other origin containing functional units of heredity."⁵²

More analysis is needed of what "sharing of benefits" means and what action, if any, governments must take in relation to their private sectors. It is unclear from the text exactly what obligations a government must meet under this article, due in part to the confusion over subparagraphs (2) and (5) of Article 16.

Contracting Parties "undertake to provide and/or facilitate" access to and transfer of technologies which are "relevant to the conservation and sustainable use of biological diversity or make use of genetic resources and do not cause significant damage to the environment."⁵³ First, much technology which fits this definition is in the public domain already or is low tech or "appropriate," and does not even raise the issue of intellectual property rights when discussing its transfer. Second, the treaty clearly states that any transfer shall be "on

50. Venezuela refused continued access to several American drug companies exploring genetic resources there following the U.S. government's refusal to sign the Biodiversity Convention in Rio in June, 1992.

51. Merck, a major U.S. pharmaceutical company, entered into such a contract with INBIO, a Costa Rican research institute, in 1991. In return for an initial cash payment and a percentage of royalties on any successful drug, Merck can search for and remove any plants from a specific area in Costa Rica, the home of one of the world's richest stores of biological diversity. For a detailed account of this agreement and other ventures, see BIODIVERSITY PROSPECTING: GUIDELINES FOR USING GENETIC AND BIOCHEMICAL RESOURCES SUSTAINABLY AND EQUITABLY (1993).

52. Biodiversity Treaty, *supra* note 2, Art. 2.

53. *Id.* at Art. 16.

mutually agreed terms" and on a "fair and equitable basis."⁵⁴ Article 16 is not clear whether and to what extent developed states' governments may be obligated to direct their private sector to transfer technology to the developing world. In Article 16(4) the obligation to transfer technology is weakened by the use of phrases like "as appropriate" and "facilitates" instead of a stronger verb like "compels." In Article 16(5), "recognizing that patents and other intellectual property rights may have an influence on the implementation of this Convention," the Contracting Parties are exhorted to cooperate "subject to national legislation and international law in order to ensure that such rights [patents and other intellectual property rights] are supportive of and do not run counter to its [the Convention's] objectives."⁵⁵

We are thus thrown back upon the language of the "Objectives," Article 1. An early draft of Article 1 which was later substantially rewritten stated that the objective of the Convention was "to conserve the maximum possible biological diversity for the benefit of present and future generations and for its intrinsic value."⁵⁶ Several means of achieving this goal and the added task of providing for "the fair and equitable sharing of the benefits of research in biotechnology arising out of conservation of the biological diversity" included in later drafts the sustainable use of biological resources; "by providing adequate, new and additional funding to the developing countries;" "by taking account of the need to share costs and benefits between developed and developing countries;" and by "securing/providing" economic and legal conditions favorable for the transfer of technology "to them on preferential and non-commercial terms."⁵⁷ The final text changed the objectives to three: the conservation of biological diversity, the sustainable use of its components, and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources, including by appropriate access to genetic resources and by appropriate transfer of relevant technologies, taking into account all rights over

54. *Id.*

55. *Id.*

56. *Revised Draft Convention on Biological Diversity*, U.N. Doc. UNEP/Bio.Div./WG.2/3/3 (1991). Page 6 contains alternative language for the Convention's objectives. This language was subsequently moved to the preamble, where it can be found in the final adopted text of the Convention in two phrases: "Conscious of the intrinsic value of biological diversity..." and "Determined to conserve and sustainably use biological diversity for the benefit of present and future generations."

57. *Fifth Revised Draft Convention on Biodiversity*, Article 1 at 4, U.N. Doc. UNEP/Bio. Div./N7-INC.5/2 (1992). The quoted language is bracketed text to be negotiated by the parties.

those resources and to technologies, and by appropriate funding.⁵⁸ The unsettled question at the center of the difficulty in interpreting Articles 15 and 16 is whether strong intellectual property laws are actually favorable for the transfer of technology or not. There is significant political disagreement over this underlying premise; the lack of consensus explains some of the ambiguities or apparently contradictory paragraphs in Article 16.

Some developing nations argue that the absence of intellectual property rights is most favorable for the transfer of technology, as techniques and processes can simply be copied without paying any royalties and knowledge is freely shared. Others such as the U.S. insist that a strong system of intellectual property laws actually encourages invention and investment in environmentally-sound technology, thus furthering the goal of transfer of technology. In practice, the absence of industrial property protection may result in multinational corporations which own patented processes or equipment *avoiding* investments or activities in countries which do not have adequate intellectual property laws. Similarly, national businesses and inventors may seek to protect their creations by registering patents or copyrights abroad rather than developing their ideas at home. The question of how to create conditions "favorable to the transfer of technologies" is being explored by an expert panel convened by UNEP and the interim secretariat for the Convention on Biological Diversity, which met in the inter-sessional period prior to the first ICCBD in October, 1993.

The U.S. argued in Nairobi that governments would be agreeing under the Biodiversity Treaty to change their national laws in ways that might result in a government compelling private industry to give away all their intellectual property rights. This simply will not happen unless companies are compensated for such a taking, either by their government or by payments from a global fund. In a time of world-wide recession, no government can afford to hamper its private businesses by ordering them to give away their technology and know-how for free to either governmental institutions or the private sector of developing countries. The U.S. has argued that the objective of the transfer of technology to the developing countries requires just such action on the part of governments of developed countries, and fears legislation in certain developing countries might be enacted to force such compulsory licensing. The Convention is not clear on this point however, even if Contracting Parties were required to compel licensing of technology, the patent-holders merely would lose windfall profits from a monopoly on technology relevant to the conservation and sustainable use of biodiversity, consistent with a global sharing of benefits. Nevertheless, the Convention does not require such an event or suggest that the patent-holders should not be compensated for their intellectual property even if there is a change over to a different system of ownership of such rights.

58. The language of the objectives was not changed during the last two negotiating sessions from the text as it stood in December 1991.

However, the final text of the biodiversity treaty does not call for the abandonment of intellectual property laws at all. Rather, it reaffirms their existence and recognizes their claims. Article 16(2) states that, "In the case of technology subject to patents and other intellectual property rights, such access and transfer shall be provided on terms which recognize and are consistent with the adequate and effective protection of intellectual property rights."⁵⁹

Intellectual property rights may be "favorable" to the transfer of technology by encouraging investment in joint ventures or research and development of better, more environmentally-sound technologies for the conservation and sustainable use of biodiversity. Investments of financial resources and transfer of technologies to conserve biological diversity are also expected to produce a wide range of environmental, economic and social benefits within developing countries and create market opportunities for developed countries.

Citizens of developed countries presently possess most of the world's patents and copyrights. We cannot assume that the same geographical distribution will continue once legal protection for businesses and inventors is established in developing countries. For example, Malaysia has copyright and patent laws and its economy is flourishing. This benefits both multinational corporations which do not fear copying of industrial factories and processes if they establish factories in the nation, and local businesses and industries which register their own inventions under the intellectual property laws. India, which has limited intellectual property laws of its own, is the home of a burgeoning native biotechnology industry. Taiwan, long known for its refusal to participate in international copyright conventions, is now considering adoption of intellectual property laws to encourage a domestic biotechnology industry. Brazil is also considering adoption of an industrial property act, not coincidentally, at the same time as a domestic biotechnology and pharmaceutical industry is stirring. These developments illustrate the different rates of industrialization in the developing world, since only newly-industrialized nations are able to support fledgling biotechnology industries. The Convention fails to address this gap between nations in the developing world or to differentiate the needs or obligations of developing nations as vastly different as Taiwan and Somalia, for example.

Ultimately, any technology or genetic experimentation which results in a life-saving drug or an improved source of food, a pollution-control or a bioremediation process should be readily available to save the planet and its people, not be held hostage to private profits. The benefits from these inventions under the Convention are to be shared with the country of origin of the genetic resources from which the inventions were derived – and indeed with all people on the basis of equity and fairness. Perhaps we are focusing on the

59. Biodiversity Treaty, *supra* note 2, Art. 16(2).

wrong end of the microscope in examining genetic resources - missing their beneficial application to living beings and natural resources and seeing only dollar signs.

In the treaty negotiations some argued that since natural products cannot be patented, profits from patent protection should be denied altogether to those who alter nature by laboratory procedures or new combinations of genetic material. The compromise appears to permit private ownership of patent rights and the profits resulting therefrom as long as the benefits of the new inventions are shared. Those who preserved the sources of the original genetic material, especially women, indigenous or local communities, by traditional practices in harmony with nature, are to be rewarded, through a share of the royalties from successful products or by other means. The shared benefits approach seems most consistent with the overall structure of the Biodiversity Convention, which establishes a balance or trade-off between access to biological or genetic resources (Article 15) and transfer of technology (Article 16). It is a treaty which gives both developed and developing states something they need.

7. Financing and Financial Mechanisms (Article 21)

The cost of preserving the world's biological diversity has been estimated by the World Resources Institute at \$17 billion/year for the next 10 - 20 years on a global basis. The cost estimate for implementation of the activities in the biodiversity chapter of Agenda 21 was \$3.5 billion annually (1993 - 2000).⁶⁰ The Convention on Biological Diversity envisions a system whereby donor nations would contribute voluntarily to the costs so that developing countries could meet their treaty obligations to conserve and sustainably use biological diversity. The financing scheme is premised on the fact that developing nations cannot pay for the measures required without compensation. There is also an element of historical justice to this plan, since the industrialization of the developed world and the high standard of living enjoyed by their citizens occurred as a result of the destruction of their biodiversity. If developing nations forego economic growth in order to conserve their rich biodiversity, then the rest of the world should pay for it. In return, Contracting Parties from the developed world will be given access to genetic resources under the terms of the treaty.

The controversy arises over Article 21(1), which developed nations fear will allow the Contracting Parties, dominated in numbers by developing countries, to set the level of contributions from donor nations. There is no provision in the Convention for majority vote; rather decisions are to be made by consensus. The language of that subparagraph simply says that the financial mechanism will

60. *Agenda 21*, U.N. Doc. A/Conf.151/L.3/Add.15, ¶15.8.

"function under the authority and guidance of . . . the conference of the parties"61 As four European nations declared at the time they signed the Convention in June, 1992, they understand this paragraph to refer only to the "amount of resources needed" and not to the size of contributions from any donor nation.

The developing nations have their fears about the financing arrangements too, since the compromise agreement named the Global Environment Facility (GEF), a programme of the World Bank, UNEP, and the United Nations Development Programme (UNDP), as the interim financial mechanism. Controlled tightly by the donor nations, GEF currently funds projects on biodiversity in the least developed countries as well as other projects. Developing nations, however, object to conditionality on assistance from a body which is not democratic or transparent (GEF uses weighted voting, for example). As a practical matter, however, it appeared that many developed nations would not agree to make any contributions unless they were through the GEF, at least until the treaty enters into force. When the Contracting Parties meet, alternatives can be considered at any time. Meanwhile, a review of GEF is underway.

III. CONCLUSION

One of the most interesting aspects of the Convention on Biological Diversity is the attempt to include references to relations between nations and the private sectors within them or within other nations.⁶² By expanding the nature of state responsibility, the treaty recognizes the broad public interest in the conservation and sustainable use of biological diversity and the ability of national governments to encourage their citizens, both individual and corporate, to achieve this goal. States are the authority granting patents and can regulate their terms and conditions. It remains to be seen through state practice or, conceivably, through subsequently-drafted protocols to the Convention, what action is specifically required of a national government in relation to the private sector within its boundaries. What if a corporation holding a patent to technology "relevant" to the goals of the treaty does not want to relocate its factory or research labs to a developing country which lacks infrastructure, or does not want to transfer technology to a nation which has little or no protection for intellectual property rights? One option is that the government of the nation in which the corporation has its place of business and is incorporated need do nothing, because there is no "mutual agreement";

61. Biodiversity Treaty, *supra* note 2, Art. 21(1).

62. *See Id.* at Art. 15.

therefore no transfer is required under the treaty.⁶³ Another option is to interpret the requirement that Contracting Parties "provide and/or facilitate"⁶⁴ the transfer of technology to mean that the government should encourage its private sector to comply through escalating measures, both positive (tax incentives) and negative (public or private exhortations, threat of sanction, denial of export licenses or government contracts). A final option would be compulsory licensing of the technology by a national government, presumably with reasonable compensation to the patent-holder, in order to turn it over to the public in a developing country from which access to genetic resources is sought. Requiring a private company to voluntarily comply with the technology transfer provisions of the treaty is unlikely to happen in any developing country and cannot be compelled under the biodiversity Convention.

Nothing in the treaty language explicitly requires Contracting Parties to absolutely guarantee the attainment of the objectives of the Convention. In actuality, many companies may wish to voluntarily transfer technology, responding to a business opportunity; others may find the "terms" of compensation adequate for their share in the technology, whether the payment comes from the national government or from a fund such as the financial mechanism established in the Convention for financing efforts by developing countries to comply with the treaty norms. Practice will no doubt calm many fears and others can be addressed by clarifications when the Contracting Parties meet. Now that the U.S. is a signatory, progress may be made in talks with all the major players from both the North and South present and negotiating. The planet's diversity of life depends upon the outcome.

At the time of signing the final act in May, 1992, with the agreed text of the Convention, twelve declarations were filed to explain the position of various nations or to highlight remaining areas of contention. The U.S. declared its objections to the text, which is "seriously flawed," particularly in regard to intellectual property rights, finances (especially regarding the role of GEF), technology transfer and biotechnology. Nineteen developed states declared that Article 21(1) regarding the powers of the Conference of the Parties refers only to the "amount of resources needed" by the financial mechanism, not to the contributions by Contracting Parties. Columbia and Chile object to Article 22 on the relation of the Convention to other instruments of international law as unnecessary in light of the Vienna Convention on the Law of Treaties. The Nordic countries urge "a fair international burden sharing according to each country's means and needs." France refrained from initialling the final text because of the way it "undervalues the scientific approach" and because the French plan to include global lists was defeated. Algeria and Niger jointly called

63. *Id.*

64. *Id.*

for a seminar on the protection of Saharo-Sahelian fauna. Peru specified that equitable distribution of the benefits of traditional knowledge and practices of indigenous and local communities should be stipulated, not merely "encouraged" in Article 8(j); Colombia suggested a protocol on this point. India clarified its understanding of Articles 14(2) (objecting to the vague reference to liability and compensation for damage to biological diversity), 22(1) (limiting the range of other international legal instruments to be covered), and 39 (insisting on conditions of transparency, universality, and accountability of the Global Environment Facility if it is to function as the interim financing mechanism). Malaysia objected to Article 16(2) as failing to reflect its insistence that transfer of technology must be on concessional and preferential terms. Malawi stressed the importance of involving the public in protection of biological diversity, especially in communities near protected areas.

Another four declarations were filed upon signature of the Convention, although the Convention expressly prohibits ratification with reservations to the treaty. The U.K., France, Italy, and Switzerland repeated that Article 21(1) refers only to the "amount of resources needed" by the financial mechanism and not to contributions.

It remains to be seen whether the international community will take seriously the obligation to conserve and sustainably use biological diversity, and to share the benefits of biodiversity for the good of all species of both present and future generations. The Convention on Biological Diversity provides the basic structure for what must be done. The mutually beneficial trade-off of access to genetic resources in developing countries and transfer of environmentally sound and relevant technologies bodes well for eventual compliance with the treaty, once the details of the financial mechanisms and the chronology of activities are determined. Scientists, NGOs, and academics must remain committed to the implementation of provisions on monitoring, identification, and access to information. This participation will assist governments in complying with a treaty which looks to the 21st century.

Nature itself is not static. In response to human activity or left alone, natural systems are resilient. Biologists and others have given us the tools to recognize that much of this adaptability is due to the diversity of life itself. Nature selects the species possessing certain traits which allow survival under certain conditions. In another era, when drought or overpopulation or global warming alters the food supply or temperature again, animal and plant species must possess diversity to be able to adapt or else they will expire. Diversity is the best guarantee of future ability to adapt, unless the threat is too severe. A certain gene carrying the DNA code for one trait may be dominant, but recessive genes are needed for response to changing conditions. The danger in destroying biological diversity is that this pool or reserve of genes and species will be diminished to the point where nature cannot regenerate or respond to some future change in planetary conditions. Then some life forms will truly be extinct because monocultures cannot survive.

Biodiversity is only one feature of an entire collection of individual and quite different elements which are continuously evolving and adapting. Biodiversity itself cannot be preserved as a fixed property or entity. Ensuring the continuing productivity of the biosphere for current and future generations presents major problems. *It requires as a first step specifying the ways in which biodiversity is influenced by human activity, and the objectives for its use and conservation.*⁶⁵

Until individual human beings accept responsibility for their own patterns of consumption and production and insist on their governments doing the same, biodiversity will continue to be threatened. The next few years will be crucial in the development of a legal and institutional framework for achieving the goal of conservation and sustainable use of biological diversity through the U.N. Commission on Sustainable Development and especially through the new United Nations Convention on Biological Diversity. The best hope for the full diversity of life lies in the degree of seriousness with which the international community embraces the obligations contained in the Convention. The zeal of individuals, nongovernmental organizations, and key national governments in biodiversity-rich and technology-rich states is vital to the monitoring and implementing of the Convention.

65. *Supra* note 60; see also "Progress Report of the Secretary-General of the Conservation of Biological Diversity," *supra* note 1, at 2, (emphasis added).

