TRENDS IN INTERNATIONAL ENVIRONMENTAL LAW

*Ved P. Nanda**

INTRODUCTION

It is easy to predict that in the 1990s the international environment will be a priority issue on the global agenda.[1] There is a growing awareness that the biosphere is a fragile ecosystem, and that the world community must address challenges which are beyond the capacity of any single state to face effectively. Examples abound: population growth; degradation of natural resources; marine pollution; hazardous waste; acid rain; nuclear hazards; ozone depletion; and global warming.[2]

Recent developments in international environmental law show a promising trend in embodying perceived common interests on a bilateral, regional or global scale in appropriate institutions, norms and procedures. This essay illustrates this trend, in a historical setting, by studying two issues which relate to atmospheric problems: stratospheric ozone depletion and global warming. Both are unprecedented in their potential impact on humanity and consequently command special attention.

I. INTERNATIONAL ENVIRONMENTAL LAW IN HISTORICAL CONTEXT

Although serious efforts toward the management of the global environment are of recent origin, human concern for the environment is not new.[3] Early attempts at management, however, were

---

* Thompson G. Marsh Professor of Law and Director, International Legal Studies Program, University of Denver College of Law.

1. In December 1988, the United Nations General Assembly resolved that a U.N. Conference on Environment and Development be convened in 1992. *See* G.A. Res. 196, 43 U.N. GAOR, U.N. Doc. A/43/915/Add. 7 (1988) (adopted on Dec. 20, 1988); G.A.Res 53, 43 U.N. GAOR, U.N. Doc. A/43/905 (1988). On March 22, 1989, 34 out of 116 participating countries signed an international convention in Basel, Switzerland, to control the transport and disposal of hazardous wastes. *See* INT'L ENV. REP. [BNA], CURR. REP. 159 (April 12, 1989). *See also* Kieborn, *Environment is Becoming Priority Issue*, N.Y. Times, May 15, 1989, at C5, col.4.

2. *See generally* Conable, *Third World Must Overcome 1980s*, 46 BULL. ATOMIC SCIENTISTS, Jan./Feb. 1990, at 11, 12.

3. *See, e.g.*, UNEP, *Environmental Law: An In-Depth Review* 5 (UNEP Rep. No. 2, 1981) (noting that England enacted in 1273 a statute against air pollution, which was fol-

sporadic and ineffectual.[4] Thus, until the 1950s, the only evidence of the fruition of such attempts was to be found either in a number of weak international treaties on certain conservation issues such as the protection of whales or migratory birds, or in a few diplomatic and arbitral cases, with uncertain precedential value.[5]

A partially successful treaty was the 1909 Boundary Water Treaty between the United States and Canada.[6] Subsequently, a 1938 arbitral decision between these two countries, the *Trail Smelter Arbitration,*[7] explicitly recognized the principle of state responsibility for transboundary environmental damage.

> [U]nder the principles of international law, as well as of the law of the United States, no State has the right to use or permit the use of its territory in such a manner as to cause injury by fumes in or to the territory of another or the properties or persons therein, when the case is of serious consequence and the injury is established by clear and convincing evidence.[8]

By the early 1970s, however, scientific and legal literature reflected an enhanced global awareness of transnational environmental problems.[9] A large number of bilateral, regional and multilateral conventions were in place covering international waterways, oil

---

lowed in 1307 by a Royal Proclamation banning the use of coal in village furnaces). [hereinafter UNEP Rep. No. 2] *See generally* Utton, *International Environmental Law and Consultation Methods*, 12 COLUM. J. TRANSNAT'L L. 56, 57-59 (1973).

4. *See* UNEP Rep. No. 2, *supra* note 3, at 5-6.

5. *See id.* at 5. *See generally* Nanda & Moore, *Global Management of the Environment: Regional and Multilateral Initiatives*, in WORLD CLIMATE CHANGE 93, 93-95 (V. Nanda ed. 1983) [hereinafter Nanda & Moore].

6. Treaty with Great Britain relating to Boundary Waters between the United States and Canada, Jan. 11, 1909, 36 Stat. 2448.

7. Trail Smelter Arbitration (U.S. v. Canada), 3 R. INT'L ARB. AWARDS 1911 (1938); 3 R. INT'L ARB. AWARDS 1938, (1941).

8. 3 R. INT'L ARB. AWARDS 1938, 1965 (1941).

9. *See, e.g.*, DAVID DAVIES MEMORIAL INSTITUTE OF INT'L STUDIES, WATER POLLUTION AS A WORLD PROBLEM (1971); R. FALK, THIS ENDANGERED PLANET (1971); GLOBAL EFFECTS OF ENVIRONMENTAL POLLUTION (S. Singer ed. 1970); E. GOLDSMITH, R. ALLEN, M. ALLABY, J. DAVOLL & S. LAWRENCE, A BLUEPRINT FOR SURVIVAL (1972); INSTITUTE OF ECOLOGY, MAN IN THE LIVING ENVIRONMENT (1972); LAW, INSTITUTION & THE GLOBAL ENVIRONMENT (J. Hargrove ed. 1972); and MAN'S IMPACT ON THE GLOBAL ENVIRONMENT (1970) (reporting findings, conclusions, and recommendations of the Massachusetts Institute of Technology sponsored Study of Critical Environmental Problems). Symposia on international environmental issues were published in a number of law journals. *See* 13 NAT. RES. J. 177 (1973); 12 *Id.* 131 (1972); 11 *Id.* 221 (1971); 7 TEX. INT'L L.J. 1 (1971); 6 U.B.C.L. REV. 111 (1971); 2 U. TORONTO L.J. 173 (1971). Legal periodicals on exclusively environmental issues, such as ECOLOGY LAW QUARTERLY, ENVIRONMENTAL AFFAIRS, ENVIRONMENTAL LAW, and THE ENVIRONMENTAL LAW REVIEW started publication. For a more complete listing of the relevant literature, see Henning, *A Selected Bibliography on Public Environmental Policy and Administration*, 11 NAT. RES. J. 205 (1972); U.N. Doc. A/Conf. 48/13/ Rev.1 (1972) (bibliography of documents collected for use by the participants at the 1972 Stockholm Conference on the Human Environment).

pollution on the high seas, and such diverse issues as nuclear transportation and waste disposal, acid rain, protection of endangered species, weather modification, and transboundary air pollution.[10] During the 1960s and early 1970s significant national legislation was enacted in the United States, creating a comprehensive domestic system of environmental law. In the 1970s several other countries followed the U.S. example. However, these advances were inadequate to meet the global environmental challenge.

In 1972 the convening of the U.N. Conference on the Human Environment in Stockholm[11] was a timely response to the perceived need for coordination and management. The Conference succeeded in adopting a Declaration on the Human Environment[12] and an Action Plan containing recommendations for environmental management,[13] and in establishing the framework for the creation of the United Nations Environmental Program,[14] an organization which continues to coordinate the goals of global environmental assessment and management.

The negotiations on the principles to be included in the final declaration of the Conference highlighted the differing perceptions and fears of the developed and developing countries on environmental issues. While some developing nations viewed environmental protection as a concern primarily of the developed countries, most developing nations were sensitive to issues of sovereignty, especially related to the methods they could choose to pursue in exploiting their natural resources. Despite the disagreements, compromises were reached, resulting in Principle 21, which recognized both sovereignty and a responsibility on the part of states to ensure that activities within their jurisdiction or control did not harm other states.[15]

While the recognition of such a duty represents a landmark in international environmental law, implementation was difficult, particularly since the Declaration represented a compromise rather than a consensus.[16] Much of the progress made through the 1970s and early 1980s was the result of either regional or unilateral mea-

10. *See* Nanda & Moore, *supra* note 5, at 95 for authorities.

11. *See generally* Report of the United Nations conference on the Human Environment, U.N. Doc. A/Conf. 48/14/Rev. 1 (1972) [hereinafter Stockholm Report].

12. *See generally id.* at 3-5.

13. *See id.* at 6-28.

14. *See* G.A. Res. 2997, 27 U.N. GAOR Supp. (No. 30) at 43, U.N. Doc. A/8730 (1972).

15. *See* Stockholm Declaration on the Human Environment, in Stockholm Report, *supra* note 11, at 5.

16. *See* A. SPRINGER, THE INTERNATIONAL LAW OF POLLUTION 21 (1983).

sures, since universal agreement between developing and developed countries was difficult to achieve in most areas.[17]

Significant change began to develop in the 1980s as attention was turned to such issues as nuclear hazards, export of hazardous waste and hazardous technology,[18] ozone depletion,[19] and global warming.[20] These phenomena began to be viewed as truly global problems that required concerted international action. Such action was considered imperative if the severe consequences of ozone depletion and global warming were to be avoided.

The conclusion of this essay will illustrate the current trends in international atmospheric law, and assess the probable future developments of this body of law. The implications for international environmental law in general will also be noted.

II. INTERNATIONAL ATMOSPHERIC LAW

A. General

During 1989, ozone depletion and global warming attracted considerable attention in conferences and studies, with active participation of states and international organizations.[21] Efforts underway

---

17. *See generally* Nanda & Moore, *supra* note 5, at 96-116.

18. *See generally* Nanda & Bailey, *Export of Hazardous Waste and Hazardous Technology: Challenge for International Environmental Law*, 17 DEN. J. INT'L L. & POL'Y 155 (1988).

19. *See generally* Nanda, *Stratospheric Ozone Depletion: A Challenge for International Environmental Law and Policy*, 10 MICH. J. INT'L L. 482 (1989).

20. *See generally* Nanda, *Global Warming and International Environmental Law: A Preliminary Inquiry*, 30 HARV. J. INT'L L. 375 (1989).

21. These included, in February: a meeting of legal and policy experts in Ottawa, Canada, concerning protection of the atmosphere, which was hosted by the Government of Canada, (*see* 12 INT'L ENV. REP. [BNA], CURR. REP. 108 (Mar. 8, 1989)), and an international conference on "Global Warming and Climate Change" in New Delhi (*see id.* at 110); in March: a conference in London attended by 124 nations which was cosponsored by the British government and the United Nations Environment Program (UNEP) on "Saving the Ozone Layer" (*see id.* at 106), and a summit conference attended by 24 nations at The Hague which was convened by the Prime Ministers of France, Norway and the Netherlands (*see id.* at 106); in May: a UNEP conference in Helsinki consisting of the contracting parties to the Montreal Protocol (*see, e.g.*, Whitney, *Industrial Countries to Aid Poorer Nations on Ozone*, N.Y. Times, May 6, 1989, at 5, col. 1; Hunt, *Ozone Layer Measures Debated*, Financial Times (London), May 5, 1989, at 2, col. 1), an international meeting in Geneva to discuss the greenhouse effect (*see, e.g., The White House and the Green House*, N.Y. Times, May 7, 1989, at A22, col. 1), and a conference of the UNEP Governing Council in Nairobi (*see, e.g.*, Ozanne, *Ecological Commitment to be Tested*, Financial Times (London), May 15, 1989, at 3, col. 5); in June: a meeting of the Intergovernmental Panel on Climate Change (IPCC) in Nairobi (*see* 12 INT'L ENV. REP. [BNA], CURR. REP. 335 (July 1989)), an Asia-Pacific meeting attended by representatives of 12 nations on ozone protection (*id*, at 286 (June 14, 1989)), and the executive council meeting of the World Meteorological Organization (WMO) which discussed global climate change as a priority item on its agenda (*id.* at 305); in July: U.N. University launched the Human Dimensions of Global Change Program

are designed to formulate and implement timely and rational responses to address the legal, political, economic and social issues presented by these environmental challenges. This section discusses primarily the legal issues arising from stratospheric ozone depletion and global warming. It opens with a brief description of the nature and scope of the challenge each presents and the pertinent policy implications. Next, the applicable principles of international environmental law are discussed. This is followed by current responses of states and international organizations, and recommendations for further action.

B. Stratospheric Ozone Depletion[22]

World awareness of ozone layer depletion has sharpened since the discovery in the fall of 1987 that the loss of ozone in the Antarctic had climbed to fifty percent during the austral spring,[23] and the finding that chlorine monoxide levels at certain altitudes had reached 500 times normal concentrations.[24] The next year, scientists reported that a global loss of ozone had occurred during the past seventeen years,[25] and also reported the first finding of

---

at a press briefing (*see id.* at 401 (Aug. 9, 1989)), the international economic summit in Paris which endorsed action to protect earth's "Ecological Balance" (*see id.* at 382; *see also id.* at 404 for a report released by Global Climate Coalition); in August: Japan presented a position paper to IPCC, advocating development of technologies to fight greenhouse effect (*see id.* at 434 (Sept. 13, 1989)); in September: the Council of Europe called upon its 23 member states to create a World Climate Fund to help the Third World (*see id.* at 487 (Oct. 11, 1989)), a representative of the European Community recommended the creation of an environmental fund at the 44th General Assembly of the International Monetary Fund and the World Bank (*see id.* at 488), and the President of the International Union for the Conservation of Nature and Natural Resources (IUCN) called for the establishment of a gene bank to adapt food resources to climate changes (*see* 1 World Climate Change Rep., No. 2 [BNA Int'l] 4 (Oct. 1989) [hereinafter World Climate Change Report]); in October: Canada's Environment Minister said that Canada planned to impose "radical" measures to slow the onset of global warming (*see* 12 INT'L ENV. REP. [BNA], CURR. REP. 539 (Nov. 8, 1989)); In November: environmental ministers from all over the world met in the Netherlands in a conference on Atmospheric Pollution and Climate Change under the joint auspices of the Netherlands government, UNEP and WMO (*see* 13 *id.* at 527); and in December: the World Conference on Preparing for Climate Change was held in Cairo, which adopted the Cairo Compact (*see* 13 *id.* at 6-7, 33 (Jan. 10, 1990)).

22. In this section I have borrowed extensively from my earlier work cited at note 19.

23. *See* R.W. Watson *et al., Present State of Knowledge of the Upper Atmosphere 1988: An Assessment Report* 18 NASA Pub. 1208 (Aug. 1988) [hereinafter *Ozone Trends Panel Report*]. *See also* Shabecoff, *Antarctic Ozone Loss is Worsening*, N.Y. Times, Oct. 1, 1987, at 16, col. 4; Kerr, *Ozone Hole Bodes Ill for the Globe*, 241 SCIENCE 786 (Aug. 12, 1988).

24. *See* Shell, *Solo Flights into the Ozone Hole Reveal its Causes*, SMITHSONIAN, Feb. 1988, at 142, 154 (reported by James Anderson, Philip S. Weld Professor in Atmospheric Chemistry at Harvard University).

25. In the fall of 1986 NASA decided to coordinate and sponsor with the Federal Aviation Administration (FAA), the National Oceanic Atmospheric Administration

ozone destruction in the Arctic.[26] In the fall of 1989, scientists again found in the Antarctic "one of the deepest holes ever."[27] Evidence thus far indicates that human-induced chemical change in the atmosphere is the major cause for the rapid depletion of stratospheric ozone.[28]

The challenge is to prevent further increase of the number of gases which deplete atmospheric ozone.[29] Appropriate preventative and remedial steps taken thus far include the 1985 Vienna Convention for the Protection of the Ozone Layer,[30] the 1987 Montreal Protocol on Substances that Deplete the Ozone Layer,[31] and the recent efforts to find substitutes for chlorofluorocarbons (CFCs).[32] Long-term consequences of atmospheric ozone loss have presented decision makers with a new set of challenges. Since depletion in the total column of stratospheric ozone (the amount of ozone found throughout the world) would allow harmful solar ultraviolet radiation to penetrate to the surface of the earth,[33] and a change in vertical distribution of atmospheric ozone could be a contributing fac-

---

(NOAA), the World Meteorological Organization (WMO) and the United Nations Environment Program (UNEP), a review of all ground-based and satellite-based data. It selected the Ozone Trends Panel, composed of eminent scientists from federal agencies, research institutions, private industry, and universities. *See Ozone Trends Panel Report, supra* note 23, at 2, 4.

26. *See* Kerr, *Evidence of Arctic Ozone Destruction*, 240 SCIENCE 1144 (May 27, 1988). *See also Scientist Fears Hole in Ozone is Developing Over the Arctic*, N.Y. Times, May 18, 1988, at 10, col. 5; Browne, *New Ozone Threat: Scientists Fear Layer is Eroding at North Pole*, N.Y. Times, Oct. 11, 1988, at B7, col. 1; Hoffman, et. al., *Stratospheric Clouds and Ozone Depletion in the Arctic during January 1989*, 340 NATURE July 13, 1989, at 117.

27. Kerr, *Ozone Hits Bottom Again*, 246 SCIENCE 324 (Oct. 20, 1989).

28. *See Ozone Trends Panel Report, supra* note 23, at 3.

29. *See generally* U.S. ENVIRONMENTAL PROTECTION AGENCY, 1-8 ASSESSING THE RISKS OF TRACE GASSES THAT CAN MODIFY THE STRATOSPHERE (Office of Air and Radiation, Dec., 1987) [hereinafter ASSESSING THE RISKS OF TRACE GASSES]; R.T. WATSON, M.A. GELLER, R.S. STOLARSKI & R.F. HAMPSON, PRESENT STATE OF KNOWLEDGE OF THE UPPER ATMOSPHERE; AN ASSESSMENT REPORT 6-8 (NASA Ref. Pub. 1162, May 1986) [hereinafter 1986 ASSESSMENT REPORT]; Strodal & Isakson, *Ozone Perturbations Due to Increases in N_2O, CH_4 and Chlorocarbons: Two-Dimensional Time Dependent Calculations*, in 1 EFFECTS OF CHANGES IN STRATOSPHERIC OZONE AND GLOBAL CLIMATE 83, 84 (J. Titus ed. 1986) (an EPA and UNEP study) [hereinafter 1986 OZONE AND CLIMATE STUDY]; Kerr, *supra* note 23, at 785, 786.

30. Vienna Convention for the Protection of the Ozone Layer, March 22, 1985, *reprinted in* 26 I.L.M. 1516 (1987) [hereinafter Vienna Convention].

31. Montreal Protocol on Substances that Deplete the Ozone Layer, Sept. 16, 1987, *reprinted in* 52 FED. REG. 47515 (Dec. 14, 1987), and in 26 I.L.M. 1541 (1987) [hereinafter Montreal Protocol].

32. It is, however, worth noting that eventually CFCs might also have to be banned. *See* 12 INT'L ENV. REP. [BNA], CURR. REP. 534 (Nov. 8, 1989) (statement of a senior NASA scientist who said that without such a ban the hole in the ozone layer over the Antarctic will recur annually).

33. *See* Frederick, *The Ultraviolet Radiation in the Biosphere*, in 1986 OZONE & CLIMATE STUDY, *supra* note 29, at 121.

tor in bringing about regional and perhaps global climate changes,[34] it is imperative that a proper balance of stratospheric ozone be maintained. Stratospheric ozone depletion, resulting in ultraviolet radiation exposure at the earth's surface, is likely to cause adverse effects on human and animal health,[35] and harmful effects on plants[36] and aquatic systems.[37] Thus, policy makers are left with no choice but to regulate the manufacture and use of ozone-depleting chemicals.

In responding to this task, it is noteworthy that the 1985 Vienna Convention[38] and the 1987 Montreal Protocol[39] affirm the role of formal, multilateral treaties to achieve the objective of emission reduction. The use of less formal methods, such as information exchanges and technical aid, would not have sufficed to meet the seriousness of the challenge.

Within the international community, ensuring treaty implementation is always a significant and uncertain concern. Achieving wide ratification of the instrument is, of course, essential for practical reasons as well as to instill a sense of commitment among the participants. In addition, a solid institutional structure must be established to oversee and monitor the implementation, to apply the standardized norms, and to agree upon and provide for remedies. This includes establishing appropriate procedures to assure reasonable access to the decision-making process for those seeking redress under the agreement. Finally, an effective incentive and coercive system must be combined with a compulsory dispute settlement mechanism to encourage observance and to ensure a reasonable degree of reliance.

While the Montreal Protocol meets several of these requirements, others remain unsettled. For one, parties must establish institutional mechanisms and procedures for determining noncompliance.[40] And while the Protocol does provide for trade restrictions to

---

34. *See* Hansenm, et al., *The Greenhouse Effect: Projections of Global Climate Change*, in *id.* at 199.

35. *See, e.g.*, U.S. Environmental Protection Agency, *Ultraviolet Radiation and Melanoma* (Office of Air and Radiation, December 1987); *see* Frederick, *supra* note 33, at 121; Emmett, *Health Effects of Ultraviolet Radiation*, in *id.* at 129; Waxler, *Ozone Depletion and Ocular Rocks form Ultraviolet Radiation*, in *id.* at 147.

36. *See* Teramura, *Overview of Our Current State of Knowledge of UV Effects on Plants*, in *id.* at 165.

37. *See* Worrest, *The Effect of Solar UV-B Radiation on Aquatic Systems*, in *id.* at 175.

38. *See* Vienna Convention, *supra* note 30.

39. *See* Montreal Protocol, *supra* note 31.

40. *See id.* art. 8.

enforce compliance,[41] the current thrust is on voluntary compliance. Also, the parties must address numerous loopholes in the control measure when they convene. An equally important question concerns whether the adopted policy will provide sufficient incentives to facilitate developing and deploying safe alternatives to the present CFCs and halons.

In part, the Protocol focuses specifically on the needs of developing nations. The parties must attempt to make available to less-developed countries advanced technology, alternative substances, and subsidy aid aimed at reducing production of harmful chemicals.[42] It is true that developing countries produce and consume fewer of these substances, but to permit them an exception now would contribute significantly to future increases in production as well as the associated consequences. It would also tend to decrease the parties' commitment to cooperative effort. Indeed, it is important that a maximum number of less-developed countries participate in this control effort now. Unfortunately, India chose not to participate in the Conference at all,[43] and although the People's Republic of China did participate, it refused to sign the Protocol.[44] These two highly populous, industrializing nations must be strongly encouraged to formally recognize their international obligation to reduce ozone depletion by becoming parties to the Montreal Protocol.[45] For this to happen, however, it is essential that the more developed countries accept their stated responsibility to share appropriate technologies with the developing states at a reasonable cost.

The Montreal Protocol is a crucial step forward in the ongoing development of international environmental law. The world community demonstrated a rare consensus by accepting strict controls imposed on states for activities thought harmful but not yet definitely proven so. As Mostafa Tolba, director of UNEP, said after the adoption of the Protocol: "[n]ever before in the history of science and law has the international community agreed to take such radical steps to avert a problem they anticipate, before that prob-

41. *See id.* art. 4.

42. *Id.* art. 5(2)(3).

43. *See* Weisskopt, *Nations Sign Agreement to Guard Ozone Layer*, Wash. Post, Sept. 17, 1987, at A2, cols 4, 6.

44. *See id.*

45. In early March 1989, over 120 countries met in a three-day conference on the protection of the ozone layer convened by the British government in London from March 5-7. The purpose was to persuade non-parties to become parties to the Protocol. *See* Financial Times (London), March 4, 1989, at 5; Whitney, *London Talks Hear Call for '97 Ban on Anti-Ozone Chemical*, N.Y. Times, Mar. 6, 1989, at B10, col. 1.

lem has begun to take its toll."[46]

The Montreal Protocol entered into force on January 1, 1989, following the necessary number of ratifications.[47] As if in testimony to both the enormity and severity of the problem and the increasing commitment to combat it, the Protocol's substantive limitations are already apparent. In the United States, the Environmental Protection Agency[48] and the U.S. Congress[49] have actively called for further strengthening of its provisions. Others seeking the same outcome include Canada,[50] Japan,[51] the European states,[52] international organizations such as UNEP[53] and WMO (The World Meteorological Organization),[54] as well as industry[55] and consumer groups.[56] The need is urgent for extensive and intensified research toward finding suitable substitutes for CFCs and halons, toward effective and cost-effective recycling processes, and toward reducing their emissions as coolants, solvents, and in the production of foam.[57]

C. The Problem of Global Warming[58]

Evidence of global warming came to widespread public attention in 1988, when drought in the United States served to heighten public interest in the scientific findings that were documenting a trend toward global warming. An increase in world average temperature

---

46. Cited in 10 INT'L ENV. REP. [BNA], CURR. REP. 531, (Oct. 14, 1987).

47. *See* 12 INT'L ENV. REP. [BNA], CURR. REP. 3 (Jan. 11, 1989).

48. *See* 52 FED. REG. 47498 (1987); 53 *id.* 18800 (1988).

49. *See, e.g.*, Senate Bill 324, cosponsored by 30 Senators, 135 CONG. REC. S1036 (daily ed. Feb. 2, 1989) (sponsored by over 30 Congresspersons to amend Clean Air Act to reduce ozone depletion); S491, 101st Cong., 1st Sess., 135 CONG. REC. S4541 (1989).

50. *See e.g.*, 11 INT'L ENV. REP. [BNA], CURR. REP. 110 (Feb. 10, 1988); *id.* at 310 (July 13, 1988).

51. *See, e.g.*, 10 *id.* at 582 (Nov. 11, 1987); 11 *id.* at 157-58 (Mar. 9, 1988); *id.* at 212 (April 13, 1988).

52. *See, e.g.*, by U.K., *id.* at 156, 158 (Mar. 9, 1988); 440 (Aug. 10, 1988); by West Germany, *id.* at 157 (Mar. 9, 1988); by Netherlands and Sweden, *id.* at 211 (April 13, 1988). The European Economic Community has proposed a ban on CFCs by 1988. *See* 13 *id.* at 41 (Feb. 14, 1990).

53. *See, e.g.*, 11 *id.* at 225 (April 13, 1988); *id.* at 581-84 (Nov. 9, 1988); *id.* at 644-45 (Dec. 14, 1988).

54. *See, e.g, id.* at 581 (Nov. 9, 1988); *id.* at 644, 644-45 (Dec. 14, 1988).

55. *See, e.g., id.* at 110, 112-13 (Feb. 10, 1988); *id.* at 158 (Mar. 9, 1988); *id.* at 227-28 (April 13, 1988); *id.* at 324 (June 8, 1988); *id.* at 520, 520-21 (Oct. 1988); *id.* at 650 (Dec. 14, 1988).

56. *See, e.g.*, 10 *id.* at 492 (Oct. 14, 1987) (Swiss consumers federation seeking boycott of aerosols containing CFCs).

57. *See generally* 53 FED. REG. 47509-47511 (1987).

58. In this section I have relied extensively on my earlier work cited at note 20.

of 0.4° C. over the last thirty years was recorded.[59] The six warmest years of the last century were all in the 1980s.[60] Finally, 1988 was declared to be the warmest year on record.[61]

As frightening as the documentation of global warming over the last 100 years may have been, the projections for the next hundred years are even more bleak. A rise in average global temperature of between 3 and 9° F. has been predicted by the middle of the next century.[62] As a consequence, a rise in sea levels can be expected[63] (accompanied by massive flooding of low-lying coastal areas) as well as changes in precipitation patterns, growing seasons, and availability of fresh water.[64] Such sudden changes are likely to have serious implications for patterns of human habitation, food availability and transportation as well as for natural ecosystems.[65]

Some of the uncertainty in identifying long-term effects of global warming pertains to the time frame within which environmental change is likely to occur. Other uncertainty arises from the projection of current technological, economic, and demographic trends into the future. However, the probability that global warming will affect the future way of life of the human species cannot be ignored. This has led to the discussion of various strategies for confronting this challenge.

One type of strategy is adaptive. Such an approach seeks to ad-

---

59. *See* Hansen, *The Greenhouse Effect: Impacts on Current Global Temperature and Regional Heat Waves* 2 (statement presented at the Hearing before the U.S. Senate Committee on Energy and Natural Resources, June 23, 1988). *See also* Jones, Wigles & Wright, *Global Temperature Variation Between 1986 and 1984*, 322 NATURE 430 (1986); Kerr, *Is the Greenhouse Here?* 239 SCIENCE 559 (Feb. 5, 1988) Kerr, *The Global Warming is Real*, 243 SCIENCE 603 (Feb. 1989).

60. 12 INT'L ENV. REP. (BNA), CURR. REP. 110 (1989); Hansen, *supra* note 59 (noting that the four hottest years have been in the last decade).

61. *See* Shabecoff, *Global Warmth in '88 Is Bound to Set a Record*, N.Y. Times, Feb. 2, 1989, at 1, col. 1.

62. Johnsten, *What Will a Warmer Climate Do?*, Christ. Sci. Monitor, Oct 24, 1988, at 6, col. 3 (citing an Oct. 1988 report by the American Association for the Advancement of Science); U.S. Environmental Protection Agency, 1-2 *The Potential Effects of Global Climate Change on the United States—Draft Report to Congress* (Oct. 1988). Both reports assume no major reduction in the burning of fossil fuels.

63. For a recent report of the workshop on sea level rise to be brought about by the greenhouse effect, *see* World Climate Change Rep., *supra* note 21, at 11-12.

64. EPA, *Can We Delay a Greenhouse Warming?: The Effectiveness and Feasibility of Options to Slow a Build-up of Carbon Dioxide in the Atmosphere* 1-5 (Sept. 1983). *See also The Greenhouse Effect: Scientific Basis and Policy Implications* (testimony of Stephen Schneider, National Center for Atmospheric Research before Subcomm. on Water and Power Resources of the House Comm. on Interior and Insular Affairs, Sept. 27, 1988); EPA, *Greenhouse Effect, Sea Level Rise, and Salinity in the Delaware Estuary*, (Delaware River Basin Commission, May 1986); 15 EPA J., No.1, at 9-27 (Jan./Feb. 1989).

65. *See supra* note 64; *see also* Schabecoff, *Draft Report on Global Warming Foreseeing Environmental Havoc in U.S.*, N.Y. Times, Oct. 20, 1988, at A14, col. 1.

just societal patterns to cope with the effects of climatic change,[66] and could, in many cases, be implemented unilaterally. Examples of such strategy would include the planting of alternative crops, relocation of populations away from coastal areas, and securing alternative supplies.[67]

Additional problems arise in convincing civilian populations of the need to alter existing societal patterns when climatic changes are expected to occur gradually over time. They are likely to be unpersuaded until some disaster occurs (thus defeating the very purpose of an adaptive strategy), especially when one notes that adaptive strategies are likely to incur larger expenses.

A second type of strategy is preventative. Preventative strategies seek to prevent global warming from occurring rather than merely adjusting to its effects. Examples of preventative strategies would include energy conservation,[68] the development of alternative fuels,[69] a tax on fossil fuels,[70] an international emissions trading program,[71] and possibly research into ways of neutralizing the greenhouse gases already in the atmosphere. Some of these strategies can be implemented unilaterally, but to have the desired outcome—a lessening of global warming—they would have to be pursued by a large number of states.

Problems also exist with the implementation of these strategies. They are likely to be expensive. Further, their implementation is likely to have no apparent effect on global warming, since they are really designed to avert future disaster. In fact, in the short term, the global warming trend is likely to worsen due to the effects of the greenhouse gases released before any preventative measures are implemented. The expense and apparent lack of immediate effect of these strategies is likely to spur increased public resistance toward preventative strategies unless a substantial and effective program of public education is also implemented.

Additionally, any effective preventative measures require interna-

66. *See Greenhouse Effect: Scientific Basis and Policy Implications, supra* note 64, at 20-21.

67. *See id.*

68. *See Greenhouse Effect and Global Climate Change* (Hearings before the Senate Comm. on Energy and Natural Resources, 100th Cong., 1st Sess, Nov. 9-10, 1987) 214, 222 (statement of James Gustave Speth, World Resources Institute).

69. *See id.* at 223.

70. Recently an official of the Institute for European Environmental Policy has favored such a tax to encourage development of more environmentally benign technologies. *See* World Climate Change Rep., *supra* note 21, at 23-24.

71. The U.K. Secretary of Energy has suggested such a program. *See id.* at 17.

tional cooperation.[72] While the industrialized countries produce the majority of the greenhouse gases, such as carbon dioxide (CO_2), the developing world's contribution is growing at a rapid rate as these nations implement strategies for industrialization.[73] Therefore, questions of burden-sharing and likely subsidization of third world efforts must also be resolved.

Despite these difficulties, it is essential that preventative strategies be implemented immediately because of the lag time between diminution of greenhouse gas emission and likely reduction of the effects of global warming. Also, the time needed to forge international consensus on appropriate strategies to address global warming and its societal implications must be considered.[74]

It is difficult to determine precisely what particular strategy should be pursued. Further, while the models may predict certain climatic change on a global scale, such changes will not be felt uniformly in all areas. Indeed, some nations may even experience locally beneficial climate changes.[75] It is equally important to note that the types of policies which must be implemented are likely to require lengthy periods of time. One suggestion points to "a fifty percent reduction in the global consumption of fossil fuels, a halting of deforestation [and] a massive program of reforestation."[76] That is why the challenge is especially formidable.

III. INTERNATIONAL ENVIRONMENTAL LAW

International environmental law obligates states to regulate activities within their jurisdiction so that these activities do not cause harm to the environment in areas beyond their jurisdiction.[77] This

---

72. *See* Nanda, *supra* note 20; Alm, *Global Warming: Is an International Consensus Possible?*, 23 ENVIRON. SCI. TECHNOL. 151 (Nov. 2, 1989).

73. Global CO_2 emissions were distributed as follows in 1984: North America - 25%, Western Europe - 15%, Eastern Europe - 25%, and developing nations - 15%. The figure for developing nations compares to a figure of less than 6% in 1950. *See Greenhouse Effect and Global Climate Change, supra* note 68, at 138, 143 (statement of James F. Decker, Acting Director of the Office of Energy Research, U.S. Department of Energy).

74. There is little doubt that such strategies need to be integrated into wider environmental, economic, and political strategies as suggested by Norwegian Prime Minister Gro Brundtland. *See* 12 INT'L ENV. REP. [BNA], CURR. REP. 227, 229 (1989).

75. *See, e.g. Global Warming—The White House Effect*, THE ECONOMIST, Feb. 3, 1990, at 28, col. 3.

76. Houghten & Woodwell, *Global Climatic Change* 260 SCIENTIFIC AMERICAN 36 (April 1989).

77. *See* Principle 21 of the Stockholm Declaration on the Human Environment, in Report of the U.N. Conference on the Human Environment, U.N. Doc. A/Conf. 48/14/Rev. 1, at 3, 5 (1973). *See also* RESTATEMENT (THIRD) OF THE FOREIGN RELATIONS LAW OF THE UNITED STATES § 601, Reporters' Note (1987) [hereinafter RESTATEMENT]; State-

norm, broadly stated in Principle 21 of the Stockholm Declaration on the Human Environment,[78] would apply to transfrontier air pollution[79] as well as pollution of water courses.[80] Failure to observe this principle would subject the violating state to liability for damages caused, usually to a neighboring state.

The issue of liability highlights both the complexity of the problem and the inadequacy of the principles of existing international environmental law in addressing global warming and stratospheric ozone depletion. In these cases, the problems are global in nature and not bilateral. The "polluters" in the case of global warming, for example, are all the nations of the earth. Further, it would be impossible to trace precisely the harm caused or the targets or victims of the harm by the emissions of any single state. While this may suggest some theory of proportional liability, no precedent exists for such a proposition,[81] and there are enormous practical difficulties in attempting to collect awards from more than one hundred and fifty nations. From this brief discussion one must conclude that exclusive reliance upon principles of liability for damages in the areas of global warming and stratospheric ozone depletion is likely to be unsatisfactory.

The challenge becomes even more daunting because the potential damage, particularly in the case of global warming, is also likely to be irreversible. Therefore, monetary compensation, even if available, is likely to be inadequate. Loss of valuable farmland, of coastal cities and ports, changes of weather patterns, particularly if irreversible, are difficult to quantify.[82] But assuming that some figures could be reached, how would such a sum be distributed to not only

---

ment of the Meeting of Legal and Policy Experts on Protection of the Atmosphere (Feb. 22, 1989, Ottawa, Canada), at 3 (citing Stockholm Declaration). *See generally* Nanda, *The Establishment of International Standards for Transnational Environmental Injury*, 60 IOWA L. REV. 1089, 1095-1100 (1975).

78. *See* Stockholm Declaration, *supra* note 77.

79. *See* U.N. Convention on Long-range Transboundary Air Pollution (Nov. 13, 1979), T.I.A.S. No. 10541.

80. *See* proposed Article 8 of the Law of the Non-Navigational Uses of International Watercourses, in *Report of the International Law Commission on the Work of Its Fortieth Session* [hereinafter I.L.C. Report], 43 U.N. G.A.O.R. Supp. (No. 10) 83 U.N. Doc. A/43/10 (1988)

81. *But see* Stockholm Declaration, Principle 22, *supra* note 77, which provides: "States shall cooperate to develop further the international law regarding liability and compensation for the victims of pollution and other environmental damage caused by activities within the jurisdiction or control of such States to area beyond their jurisdiction."

82. Some studies suggest, for example, that large areas of Florida will be flooded, including almost all areas south of Fort Myers. *See* Houghten & Woodwell, *supra* note 76, at 42.

the thousands or millions of affected people living within a given nation, but to their descendants who will also suffer the continuing consequences of phenomena like global warming?[83]

The answer, of course, is that such harm must be prevented through international cooperation. Recent work by the International Law Commission,[84] while not dealing specifically with the problem under study here,[85] has indicated the need to link rules of reparation and prevention. Such an approach is necessitated by the problems of ozone depletion and global warming.

One suggestion is that any proposed convention would need to include provisions establishing an institutional structure which could facilitate cooperative actions and prevent harm through monitoring compliance with the substantive provisions of the convention.[86] It should also provide facilities for consultation.

While this discussion suggests a departure from the traditional, near-exclusive reliance upon liability to enforce international environmental law, it must be recognized that liability remains a valid remedy. Thus, a proposed convention may impose liability, or even penalties, on states that do not observe convention limits on emissions. In this case, the "damage" that would require compensation would not be the physical harm likely to be caused at some distant (or not so distant) time in the future, but immediate burdening of the atmosphere with greenhouse gases.

Another alternative would consider liability appropriate for the mere failure to abide by agreed-upon limits on the theory that such conduct constitutes a breach of a contract between sovereigns. Breach of such a contract could trigger the application of the liquidated damages clause in the convention. The justification of such damages could be based upon the increased costs of the other state parties to further reduce their individual emissions to reach the ag-

---

83. On the issue of intergenerational liability, *see generally* RESPONSIBILITIES TO FUTURE GENERATIONS (E. Partridge ed. 1981); Gardner, *Discrimination Against Future Generations; The Possibility of Constitutional Limitations*, 9 ENV. L. 29 (1978); O'Toole & Walton, *Intergenerational Equity as it Relates to Conservation and Coal Extraction Standards*, 22 NAT. RES. J. 53 (1982); Weiss, *The Planetary Trust: Conservation and Intergenerational Equity* 11 ECOLOGY L.Q. 495 (1984); Comment, *Toward a Better Understanding of Intergenerational Justice*, 36 BUFFALO L. REV. 165 (1987).

84. *See* report on International Liability for Injurious Consequences Arising from Acts not Prohibited under International Law, in I.L.C. Report, *supra* note 80.

85. The Special Rapporteur noted that the framework "did not seem to be appropriate for dealing with harm to the human environment as a whole [because] there were many States of origin and virtually the whole community of mankind was affected." *Id.* at 24. However, some members of the Commission held the opposite view, *id.* at 23-24.

86. Such provisions can be found in the Economic Commission for Europe's Convention on Long-range Transboundary Air Pollution; *see supra* note 79.

gregate convention goal because of the conduct of the breaching party. While such compensation is likely to be inadequate to "make the damaged party whole," it may serve to deter the violator from disregarding the convention in the future. Of course, other, non-monetary sanctions may also be appropriate.

While this outline is necessarily vague, it does suggest that it is important to move in new directions and to synthesize various strands of international law in order to address global environmental problems. It also suggests that the proper forum for deliberating these controversial yet delicate issues is a global conference to consider a convention on global warming, a suggestion recently advanced by several nations.[87] An essential prerequisite, of course, is the completion of adequate preparatory work by experts prior to such a conference.[88] In one promising development, the groundwork for such a convention was prepared at the international meeting of legal and policy experts in Ottawa, Canada, in February 1989.[89] This framework recognizes the need for preventative and cooperative measures and envisions the establishment of new institutions such as a Secretariat. It also provides for referring disputes to institutions such as the International Court of Justice, while calling upon states to consider "coordination of [the] existing institutional arrangement." Depending upon how such a framework evolves in the future, it may offer promise for fashioning international environmental law appropriate to the challenge of global warming. As a result of these developments and the enhanced awareness of the need for prevention, a new trend has emerged. The trend is to influence the development of environmental law to anticipate and not just react to the environmental problems. There is a growing realization that certain kinds of environmental damage cannot be repaired, and that the international community must therefore prevent such damage from occurring. Already, the trend toward anticipation is evident in space law and the law of the sea. In both

87. *See* Shabecoff, *Global Warming: A Switch by Bush*, N.Y. Times, May 12, 1989, at A8, col. 6; *The White House and the Green House*, N.Y. Times, May 9, 1989, at A22, col. 1; 12 INT'L ENV. REP. [BNA], CURR. REP. 108, 109 (Mar. 8, 1989). *See generally* Ozanne, *Ecological Commitment to be Tested*, Financial Times, May 15, 1989, at 3, col. 5. Many nongovernmental organizations have also contributed to promoting scientific understanding which is a necessary prerequisite to any conference considering a convention. *See Change*, 17 AMBIO 410 (Nov. 6, 1988). *See also supra* note 1 (a U.N. Conference on Environment and Development scheduled for 1992); 13 INT'L ENV. REP. [BNA], CURR. REP. 41 (preparations for a climate change convention could begin as early as October 1990) [hereinafter IPCC Rep.].

88. For a report, see IPCC Rep., *supra* note 87.

89. *See* RESTATEMENT, *supra* note 77.

areas technological innovation was easily foreseeable that would make existing legal regimes (or lack thereof) unworkable.

A difference, however, between these areas and atmospheric law is the problem of consensus and control. Given the level of technology necessary to participate in the exploitation of space, the agreement of relatively few nations was needed. As for ocean law, customary law developed over a long period of time, and although a vast majority of the nations of the world agreed to sign the 1982 U.N. Convention on the Law of the Sea,[90] the opposition of a few nations, especially the United States, on the sea-bed provisions threatens the efficacy of the legal framework that has been established.

On the ozone issue, despite the fact that most of the production of the problematic substances can be traced to the more developed nations, consensus has been reached through consultation with the developing nations, some of which were just beginning to manufacture these substances. While consensus has not yet been achieved on global warming, there seems to be encouraging movement. At least all the nations of the world seem prepared to acknowledge the existence of the problem—even if there are differing views on the strategies to be employed in seeking solutions.

IV. Appraisal and Recommendations

It is clear that only concerted international action can meet these two critical challenges to the international environment facing the world community today. Positive action toward seeking prevention of stratospheric ozone depletion was possible[91] because most states which were primarily responsible for the production and use of CFCs and halons did identify a common interest in regulation of ozone-depleting chemicals. The Helsinki Declaration on the Protection of the Ozone Layer, signed by eighty nations on May 2, 1989,[92] attests to this common interest. It is important that these countries agreed "to facilitate the access of developing countries of relevant scientific information, research results and training and to seek to develop appropriate funding mechanisms to facilitate the transfer of technology and replacement of equipment at minimum

90. *See* United Nations, *The Law of the Sea: United Nations Convention on the Law of the Sea*, U.N. Pub. No. E.83.V.5 (1983).

91. *See* section II(B), *supra*.

92. *See* 12 Int'l Env. Rep. [BNA], Curr. Rep. 225, 268 (May 10, 1989).

costs to developing countries."[93] Also, it is crucial that all chlorine compounds, such as carbon tetrachloride and methyl chloroform, be targeted along with CFCs and halons for elimination.[94]

However, concerning global warming, there are serious impediments to identifying such a common interest. This accounts for a lack of enthusiasm on the part of some states to move expeditiously for an international convention on the subject.[95]

The crisis character of the global warming situation has recently led to a discussion of the problem under the rubric of "ecological security."[96] Such analysis is encouraging in that it emphasizes a cooperative approach to the problem, while recognizing the importance of addressing the necessarily political aspects associated with it. Moreover, it acknowledges the inadequacies of existing international legal mechanisms, and invites nations to participate in the creation and adaptation of principles for a common aim: "to protect the human civilization from the threat of self-destruction [by] securing [the] conditions of its survival."[97]

This is not to say there is not room for unilateral, domestic procedures—adaptive, mitigative, or preventative strategy.[98] These are certainly necessary and must be explored.

Among pertinent U.S. Congressional actions, several bills were introduced in the Senate in 1988 and 1989.[99] Also, in 1987, Congress enacted the Global Climate Protection Act of 1987.[100] Under the Act, the President is responsible, through the Environmental Protection Agency, "for developing and proposing to Congress a coordinated national policy on global climate change."[101] The President is urged to accord the climate protection problems "a high

93. *Id.* at 268.

94. *See id.* at 226.

95. *See, e.g.*, 12 INT'L ENV. REP. [BNA], CURR. REP. 535 (Nov. 8, 1989) (statement of Mostafa K. Tolba, executive director of the United Nations Environment Program, reporting that "some countries do not share this sense of urgency.")

96. *See, e.g.*, Timoshenko, *Ecological Security: Global Change Paradigm* (paper delivered at the Boulder colloquium on "Global Changes and International Law" on February 1-2, 1989) (copy on file in the offices of the California Western International Law Journal).

97. *Id.* at 12-13.

98. For a recent discussion of these options, *see* Gleik, *Global Climate Change and International Politics* 18-19 (paper presented at the Boulder colloquium on "Global Change and International Law" on February 1-2, 1989) (copy on file in the offices of the California Western International Law Journal).

99. *See supra* note 49; 134 CONG. REC. S10112, 10282 (1988); 135 *id.* at S1036 (daily ed. Feb. 2, 1989).

100. *See* Pub. L. 100-24, Title XI (Dec. 22, 1987), 101 Stat. 1407, 15 U.S.C. § 2901 note.

101. 101 Stat. 1407, § 1103(b).

priority" on the agenda of U.S.-Soviet relations.[102] Additionally, the Secretary of State is to seek further international cooperation in limiting global climate change,[103] including the promotion of the early designation of an International Year of Global Climate Protection within the U.N. system.[104]

For international action to be effective, a convention based upon common global interest must be drafted in the near future. There are several prerequisites, however, for a common interest to emerge on the greenhouse issue. First, leading international agencies—UNEP and WMO—with active support of scientific research organizations, must intensify their efforts in conducting and coordinating atmospheric climate research.

Second, all segments of the world community, especially the developing countries, must be involved in the conducting of research as well as in the dissemination of research data. Every state must be persuaded that only concerted efforts can result in the reduction of CO_2 and CFC emissions.[105]

Third, all multilateral—international and regional—lending institutions, such as the International Bank for Reconstruction and Development and regional banks such as the Inter-American Development Bank, as well as lending institutions of developed countries,[106] must send a strong signal through their lending policies that environmental considerations in borrowing states are of utmost concern.

Fourth, any promotion of nuclear energy to address the worldwide greenhouse/ozone problem has to be coupled with international commitment and guarantees of nonproliferation. It is not suggested that the nuclear alternative be ignored, but rather that the focus remain on programs developing renewable sources of energy, conservation, and emission controls, and that effective international measures be undertaken to ensure that nuclear technology be used solely for peaceful purposes.

---

102. *Id.* at § 1106.

103. *See id.* §§ 1103(c), 1105.

104. *See id.* § 1105.

105. *See, e.g.*, Environment Canada, *The Changing Atmosphere--Implications for Global Security: Conference Statement* 5-12 (Toronto, Ontario, Canada, June 27-30, 1988). "Humanity is conducting an unintended, uncontrolled, globally pervasive experiment whose ultimate consequences could be second only to a global nuclear war." *Id.* at 1.

106. Some examples of bilateral efforts to help control environmental damage include the Netherlands-China agreement signed Sept. 24, 1988, *see* INT'L ENV. REP. [BNA], CURR. REP. 541 (Oct. 1988); the U.S. Treasury has recently set standards for preserving wetlands that will be implemented to evaluate funding requests in multilateral development banks, *see id.* at 540-41.

Finally, an international conference is the proper forum to discuss regulatory and control measures. Any agreement on limiting the use of fossil fuels would significantly alter lifestyles which are presently supported by abundant fossil fuel supplies. It is imperative that the proposed convention especially address the needs of developing countries.[107]

The change of lifestyle would be likely to have major impact on the developing world as well as the industrialized countries.[108] For example, the problem of deforestation is not limited to industrial production and needs; a startling seventy-five percent of the deforestation occurring is attributable to desperate rural poverty which forces people to destroy their environment to find subsistence of food and fuel.

The growing awareness of international environmental issues and recognition of a common interest in the world community to address these issues effectively have created a favorable climate for the expeditious development of international environmental law.[109] It is imperative that international lawyers and scholars work closely with their counterparts in the scientific community to provide decision makers with policy alternatives and, equally important, to fashion an appropriate international legal framework which is responsive to the critical needs of our time. Trends are challenging international environmental lawyers to anticipate and be creative.

---

107. *See, e.g.*, the text of a compact issued at the World Conference on Preparing for Climate Change in Cairo, Egypt, in December 1989, 13 INT'L ENV. REP. [BNA], CURR. REP. 33 (Jan. 10, 1990) (stating that affluent nations, "in recognition that climate change is a grave problem that humanity shares and has to solve in concert, need to make available to poorer nations significant additional financial and technological resources.") *See also* 12 *id.* at 487 (Oct. 11, 1989) (the Council of Europe calls upon its member states to establish a World Climate Fund to help Third World nations).

108. Revkin, *Endless Summer: Living with the Greenhouse Effect*, DISCOVER, Oct. 1988, at 50, 60.

109. *See, e.g.*, Experts Group on Environmental Law of the World Commission on Environment and Development, ENVIRONMENTAL PROTECTION AND SUSTAINABLE DEVELOPMENT: LEGAL PRINCIPLES AND RECOMMENDATIONS (A. Munro & J. Lammerze eds. 1987).