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Forest Fires as a Common International Concern: Precedents for the Progressive Development of International Environmental Law

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Forest Fires as a Common International Concern: Precedents for the Progressive Development of International Environmental Law

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I. Introduction

Transnational air pollution from forest fires, for the first time, became a tragic reality on a worldwide basis during 1997 and 1998. Occasioning loss of human life and property, these same fires also caused enormous loss of biodiversity since they raged in the rich tropical forests around the equator and in rich Siberian boreal forests on three different continents. The acute air pollution in Southeast Asia alone impaired the health and property of millions of people. In addition to the immediate damage caused by forest fires, the releases of carbon dioxide, which has warming effects as a green house gas, and of aerosols, which reflect sunlight and thus have a cooling effect, have a complicated effect on Earth's climate.¹ Many of these fires started as the result of human activities, and most burned without the benefit of any fire control measures.

The scope of these fires was unprecedented. In May of 1998, state environmental protection officials in Texas declared the air unfit to breathe from the coast of the Gulf of Mexico for over 100 miles inland, and the entire state went on an air pollution alert.² Hazy skies were reported as far north as Colorado and South Dakota.³ The smoke caused health problems and cut visibility. The fires were burning in Mexico, which was experiencing its worst drought in seventy years. The number of forest fires reached 11,000 from an average of 7,000. Over 1,500 square miles burned.⁴

Meanwhile, during the same year, forest fires in Central America consumed 2,150 square miles of forests, primarily in Guatemala, Honduras and Nicaragua.⁵ The Mexican fires affected this region also. Smoke from the fires caused dense haze

1. See *Forest Fires in Russia Will Add to Global Warming*, AGENCE FRANCE-PRESSE, Oct. 21, 1998, available at <http://www.reliefweb.int/w/rwb.nsf/s/FA3119BF54376B64C12566A5002FD96E>. The Deputy Chief of Goskomecologia, the State Committee for Environmental Protection (Russia's environmental ministry at the time) and Dr. Amirkhan Amirkhanov, reported that the fires in 1998 on the Island of Sakhalin (where two-thirds of the island were subject to fires) and the fires in the Khabarovsk and Primorye provinces resulted in the emission of tens of millions of tons of carbon dioxide. See generally *id.*

2. See John H. Cushman, Jr., *Texans Coping With Smoke Cloud From Fires in Mexico*, N.Y. TIMES, May 18, 1998, at A10.

3. See *Americans Ready to Battle Fires, Warn That Relief is Weeks Away*, CHI. TRIB., May 24, 1998 at 1.

4. See Eugene Linden, *Smoke Signals Vast Forest Fires Have Scarred the Globe, But the Worst May be Yet to Come*, TIME, June 22, 1998, at 1.

5. See *id.*

across the region, closing all four international airports in Honduras.⁶

During the same period, forest fires in Africa burned around Mt. Kilimanjaro in Tanzania, as well as in Kenya, Rwanda, Congo and Senegal, all exacerbated by the drought accompanying El Niño weather patterns in Africa.⁷ In South America, fires in Brazil consumed some 20,000 square miles, or an area half the size of New York State. The journal, *Nature*, called the Brazilian patterns of unmanaged logging that led to new surface fires and a cycle of forest impoverishment that contributed to further fires, a kind of "cryptic deforestation."⁸ In Siberia, 15,000 forest fires in 1997 and over 19,000 in 1999 burned with little effective means of extinguishing them.⁹ Some fire fighting forces and equipment reached the peat forest fires in Belarus and European Russia,¹⁰ but substantial burning was not controlled.¹¹

Perhaps the most extensive and acute forest fire phenomena were found in South East Asia. The fires of 1997 in Kalimantan and Sumatra, Indonesia, and in parts of Malaysia and Papua New Guinea, produced plumes of smoke that blanketed Singapore and Malaysia and reached the Philippines and Thailand. To imagine the breadth of the disaster, it is as if forest fire smoke covered an area as extensive as the United States, or both East and West Europe. Singapore, which has strong domestic air pollution control systems and clear air, was enveloped with air unfit to breathe.

6. See *Forest Fires' Smoke Closes 4 Airports*, CHI. TRIB., May 14, 1998, at 1. See also *Mexico Will Use U.S. Help to Fight Forest, Bush Fires*, CHI. TRIB., May 16, 1998 (stating that the "air quality is . . . equivalent to smoking four packs of cigarettes per day").

7. See Linden, *supra* note 4, at 1.

8. Daniel C. Nepstad et al., *Large-Scale Impoverishment of Amazonian Forests by Logging and Fire*, 398 NATURE 505 (1999).

9. The sheer scope of the fires overwhelmed the Russian Federation Ministry for Civil Defense, Emergencies and Elimination of Consequences of Natural Disasters (EMERCOM), the Ministry of the Interior and Forest Ministry. Ilyshin-76 water bombing airplanes were used, but there was insufficient aerial surveillance and communications and adequate capacity to fight fires on the ground were ground. See U.N. OFFICE FOR THE COORDINATION OF HUMANITARIAN AFFAIRS, RUSSIAN FEDERATION FOREST FIRES - OCHA SITUATION REPORT No. 1 (July 28, 1999), available at <http://www.reliefweb.int/w/rwb.nsf/S/70231B411857B9F9C12567BC0056B955>.

10. See Marina Koreneva, *Russia's Taiga Burns as Heatwave Keeps Up*, AGENCE FRANCE-PRESSE, July 16, 1999, available at <http://www.reliefweb.int/w/rwb.nsf/s/62508C91D334616FC12567C400661B20>.

11. See Eric S. Kasische et al., *Satellite Imagery Gives Clear Picture of Russia's Boreal Forests*, 80 EOS TRANSACTIONS, AM. GEOPHYSICAL UNION 141 (1999); see also DAVID HERRING, NASA EARTH OBSERVATORY, EOS STUDY: EVOLVING IN THE PRESENCE OF FIRE (1999), available at <http://earthobservatory.nasa.gov/Study/BOREASFire>.

The transnational air pollution caused health problems and measurably damaged the economy in Singapore, in Brunei and in Malaysia.¹²

The occurrence of these forest fires in the same temporal span has been attributed to the climate phenomenon of the El Niño/Southern Oscillation, which brings drought conditions to the areas where these fires took place. The dry weather also heightens the likelihood of fires, and the lack of rain exacerbates the dispersion of the air pollution from the fires. El Niño is a shift in Pacific Ocean temperatures and atmospheric conditions that alter wind patterns. This phenomenon was first identified nearly a century ago by Peruvian fishermen, who gave it the name of the Christ child since the peak of the phenomenon appears around the December celebration of Christ's birth.¹³ It is now thought that these events appear cyclically, and have been going on for a much longer period of time. Contemporary advances in scientific detection, monitoring and modeling have made it possible to study the El Niño/Southern Oscillation effects.¹⁴ After the drought and El Niño, the wind patterns shift and the La Niña phenomenon brings excessive rainfall, often to the same regions that endured the drought. If forest fires have denuded the hills, this deluge of rain can cause severe erosion and flooding since tree cover no longer exists to soak up the rain and the roots no longer hold the soil against the water run-off.

While the dry conditions of El Niño may have prepared the dry and hot conditions that fanned the flames, the weather was not the cause of the forest fires. The fires ignited and grew out of control because of a variety of causes, which were overwhelmingly induced by human behavior. In each region, however, some variables remained the same. Lightning caused some fires, but many were set to clear tropical forest cover for agricultural purposes. Except in Russia, the human populations are increasing in the regions where the fires take place. Many people live in and near the forests, as population growth has brought human habitats closer to forestlands. In every case, there was no long-standing system

12. See Michael Brauer & Jamal Hisham-Hashim, *Fires in Indonesia: Crisis and Reaction*, 32 ENVTL. SCIENCE & TECH. 404A, 405A-406A (1998).

13. See U.S. Nat'l Atmosphere & Oceanic Admin. (NOAA), *Frequently Asked Question about El Niño & La Niña*, available at <http://www.pmel.noaa.gov/toga-toa/el-nino/faq.html> (last modified Jan. 25, 2001).

14. See J. Madeleine Nash, *Fire and Rain: El Niño's Fury can Still be Seen in Drought and Raging Blazes of Borneo; Now Asia Must Prepare for a Possible Deluge from La Niña*, TIME INT'L, April 20, 1998, at 1.

of local fire prevention, no training to curb fires, and virtually no organized fire fighting capacity. In each case, the fires were not fully extinguished by man but by the rains of nature. In most places there was no alternative but to get out of the way of the fire and wait for the rains, which were slow to come because of the dry weather conditions. Finally, all of these fires took place in some of the most biologically diverse and rich areas of the Earth; the loss of forest habitat adversely affects endemic and migratory species.

Traditionally, the law and governmental policy have regarded forest fires, like fires in cities, quintessentially as local matters to be addressed by domestic policy and municipal legal frameworks.¹⁵ For decades, if a nation chose to allow its forest fires to burn until rainfall extinguished them, as was largely the case in the Soviet Union, such a governmental response was not considered an appropriate question for international law. Even at the United Nations Conference on the Human Environment (UNCED), the 1992 "Earth Summit," there was an assumed consensus among the sovereign states that a nation's forests were its own business.¹⁶ UNCED declined to advance proposals for a treaty on forests and their management, and adopted "non-binding forest principles" as a modest foundation for future discussions.¹⁷ These Forest Principles recognized the responsibility of States to ensure that activities within their jurisdictions do not damage the environment of other states or areas beyond the limits of national jurisdiction,¹⁸ but at the same time considered that each State has a "sovereign right to utilize, manage and develop their forests,"¹⁹ and that this should be done in an ecologically sustainable way.²⁰ Never do the Principles address the phenomena of forest fires, although they extol the many and varied values of the forest for human society. Since fires ravish these values, the failure to reference forest fires is remarkable; so intent were the delegates in preserving their national rights to control their forests that they

15. See, e.g., Norman J. Weiner, *Uncle Sam and Forest Fires: His Rights and Responsibilities*, 15 ENVTL. L. 623 (1985).

16. See generally *Non-Legally Binding Forest Principles*, U.N. Conference on Env't and Dev., Agenda Item 9, U.N. Doc. A/CONF.151/6/Rev.1 (1992), reprinted in 31 I.L.M. 881 (1992) [hereinafter *Non-Legally Binding Forest Principles*].

17. *Id.*

18. See *id.* princ. 1.

19. See *id.* princ. 2(a).

20. See *id.* princ. 2(b).

neglected the potential roles for international cooperation in preventing and containing forest fires.²¹

The failure to reference forest fires at UNCED also is found in principal outcome of the Earth Summit, its action plan, Agenda 21.²² The Agenda 21 chapter on "Combating Deforestation," pays scant attention to forest fires by merely including references to the "lack of adequate forest-fire control" and the anti-poaching of timber in a long list of threats to forests world wide.²³ There is no mention of international or regional cooperation to address the need to build capacity to combat forest fires. In the chapters of Agenda 21 on combating desertification,²⁴ managing mountain regions,²⁵ or on conserving biological diversity,²⁶ there is no mention of how forest fires leave the land denuded and subject to erosion, thereby inducing desertification, eroding mountains and causing flooding, and destroying biologically diverse habitats. It is as if the nations at the Earth Summit chose to assume that each nation could look after its own forest fires and that the issue should not be inscribed on the priority list for the world.

The forest fire events of 1997-98 have changed this situation; even if Earth's nations remain slow to acknowledge the fact. What was once deemed exclusively to be a problem of domestic, municipal law, is now squarely a common concern of nations and a proper focus for international public law. This is so because of the transboundary pollution caused by the smoke of fires,²⁷ and the destruction of habitat for migratory species,²⁸ but is also so because of the destruction of biodiversity in contravention of under-

21. See generally *Non-Legally Binding Forest Principles*, *supra* note 16. Article 5 of the U.N. Convention on Biological Diversity notes, for instance, that "Each Contracting Party shall, as far as possible and as appropriate, cooperate with other Contracting Parties . . . on matters of mutual interest, for the conservation and sustainable use of biological diversity." U.N. Convention on Biological Diversity, *opened for signature* June 5, 1992, S. TREATY DOC. NO. 103-20 (1993), *reprinted in* 31 I.L.M. 818 (1992) [hereinafter *Convention on Biological Diversity*].

22. See AGENDA 21: EARTH'S ACTION PLAN 161-63 (Nicholas A. Robinson ed., 1993).

23. See *id.* at 166.

24. See generally *id.* ch. 12.

25. See generally *id.* ch. 13.

26. See generally *id.* ch. 15.

27. The transboundary impacts contravene Principle 21 of the U.N. Stockholm Conference on the Human Environment (repeated as Principle 2 of the Rio Declaration on Environment and Development), as general principle of law binding on all nations, and also Article 3 of the U.N. Convention on Biological Diversity. See generally *Convention on Biological Diversity*, *supra* note 21, art. 3.

28. The loss of habitat contravenes the duty to conserve *in situ* biodiversity under the U.N. Convention on Biological Diversity, *supra* note 21, and also the Bonn Treaty

takings in the Convention on Biological Diversity to integrate the conservation and sustainable use of biodiversity into each nation's plans, programs and policies.²⁹ Insofar as the burning of Earth's forests contributes to climate change, a "common concern" of humankind, the fires do not protect the climate system "for the benefit of present or future generations of humankind."³⁰ The devastating effects of forest fires in 1997-98 are likely to be revised during the next El Niño phenomena, and before that eventuality is the time for the international community to take action.

This article will examine (a) how traditional principles of state responsibility under international public law address the issue of transboundary pollution from forest fires, (b) what the application of basic rules of international cooperation under the United Nations Charter meant for the fires of Mexico and Indonesia, and (c) since both the rules of state responsibility and of the obligation to cooperate are woefully short of producing sustainable human systems to prevent and cope with forest fires, how the principles of environmental law should be marshaled to guide governmental systems to manage forest fires consistently at the local, national or international levels. Unless the governmental and non-governmental interests that care about the health and biodiversity of the world's forests give forest fire protection a much higher priority than they do at present, their efforts to pass on the forest resources of Earth to the next generations will fall woefully short.

Forest fires today have become more than an act of God or a dramatic and tragic event. Such fires now endanger the public health and safety across national borders. In addition, forest fires impoverish the world's scarce gene bank, diminishing a global resource that is of common concern to mankind. Since humans began to use wood for their needs, some eighty percent of the forests that originally covered the various continents have been cleared and converted to fragmented, degraded or non-forest uses.³¹ The remaining forestlands with biological value are found in the Amazon Basin, Central Africa, South East Asia, as well as the boreal forests of Canada, Russia and the United States. Of these regions,

on Migratory Species. See Convention on the Conservation of Migratory Species of Wild Animals, June 23, 1979, 19 I.L.M. 11 (1980).

29. See Convention on Biological Diversity, *supra* note 21, art. 6, 31 I.L.M. at 825.

30. U.N. Conference on Env't & Dev.: Framework Convention on Climate Change, art. 3(1), 31 I.L.M. 849, 854.

31. See The Global Forest Watch Database, available at <http://www.globalforestwatch.org> (last visited Apr. 25, 2001).

only Canada and the United States have the capacity to use fires in forests as a management technique and to detect and control forest fires. Even in these states, however, the task is not easy. Vast fires in the Florida Everglades required evacuations in 1998,³² and horrific fires in New Mexico in 1996 burned vast areas of parks and national forests, as well as human settlements.³³

Without a better global effort to prevent and cope with forest fires, the remaining wild forests' resources of the world are at risk. Quite apart from the present loss of commercial timber and species habitat, and the present problems of flooding and erosion in the aftermath of fires, the loss of these wooded lands will reduce the capacity of regions to absorb carbon dioxide through photosynthesis, thereby making the challenge of managing emissions of green house gases all the more problematic. Forests sequester carbon in their woody tissue as a result of photosynthesis, and are often termed the "lungs" of the Earth.³⁴ The recurring forest fire events put much more at stake than just the apparently transient and dramatic event of the fire itself. How does, or should, the law attend to this situation?

II. Traditional International Law & State Responsibility

Under the United Nations Charter and principles of international law, states have 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."³⁵ This settled principle of international law, Principle 21, makes it clear that if a state allows air pollution from its forest fires to damage another state, then it is responsible for compensating the other state for that damage. This Principle has been cited in the case of treaties dealing with abatement of industrial acid rain³⁶ and indeed was codified from the early air pollution arbitral decision in *The Trail Smelter Arbitration* (United

32. See Sarah Lundy & Larry Barszewski, *Brush Fires Keep Water Battlers Busy - 30 MPH Winds Fan Blazes Near Lion Country Safari Reserve*, SUN-SENTINEL FT. LAUDERDALE, Apr. 10, 1998, at 1B.

33. See *1,000 Flee From Fire in New Mexico*, WASH. POST, May 7, 1996.

34. See, e.g., AL GORE, *EARTH IN THE BALANCE* 121-22 (1992).

35. See Declaration of the U.N. Conference on the Human Environment, June 16, 1972, princ. 21, U.N. Doc. A/CONF.48/14/Rev.1 (1973), reprinted in 11 I.L.M. 1416 (1972).

36. See U.N. ECE, Convention on Long Range Transboundary Air Pollution, Nov. 13, 1979, T.I.A.S. No. 10541, pmbl., reprinted in 18 I.L.M. 1442 (1979).

States and Canada).³⁷ The Principle was reiterated in the Declaration of Rio de Janeiro on Environment and Development adopted at the U.N. Earth Summit in 1992.³⁸

Whether one considers the air pollution from the fires to have damaged a nation's people and resources under the *Corfu Channel* case,³⁹ or considers the damage to have harmed a common and shared resources in the "air shed" under the *Lake Lanoux Arbitration*,⁴⁰ it is evident that the state which is the source of the pollution would be liable for the damage caused.

Yet, would claims of injury and demands for compensation, arbitration or litigation before the International Court of Justice have any beneficial effect in such a circumstance? Forest fires erupt rapidly and are unplanned events. When there is a fire, there is precious little time for prior notice and consultation with states located down-wind about an impending transboundary impact. After the event, the quantification of the widespread damage often is difficult at best; a state will ask whether it is worth the effort of calculating the quantification and managing the demand. How will the damaged state, in turn, compensate its own nationals? Finally, would a damage award achieve deterrence or encourage better care to prevent the forest fires? After the fires, there is vast damage to repair and scarce resources to prevent future fires. Moreover, even if one were to view the statistical likelihood that there will be more forest fires, and thus further damage in the future, is this not a risk that the state enduring the fires is taking, and a risk, that the state suffering the air pollution, is aware of and accepting by its inaction? It is hard to see how the concepts of liability in international responsibility may be a useful concept to either deter future forests or insist on measures to prevent the fires. It is evident that traditional international public law has little to offer to solve the problems of transnational forest fire air pollution.

One analogous situation is the air pollution caused by Iraq's burning of the oil wells and reserves in Kuwait during the Persian Gulf War. Iraq deliberately bombed the largest Kuwaiti oil field, two refineries, an offshore loading terminal, tanks, and tankers,

37. See 3 U.N. Rep. Int'l Arbitration Awards 1911, 1938 (1941); reprinted in 35 AM J. INTL. L. 684 (1941).

38. See *Non-Legally Binding Forest Principles*, supra note 16, princ. 2, at 874.

39. See *Corfu Channel* (U.K. v. Albania), 1949 I.C.J. 4 (Apr. 9).

40. See *Affaire du Lac Lanoux* [Lake Lanoux Arbitration] (Fr. v. Spain), 12 R.I.A.A., 24 I.L.R. 101 (1957).

as it withdrew from Kuwait.⁴¹ Although the armed conflict ceased on March 1, 1991, the fires continued to burn for weeks, emitting a plume twenty-two thousand feet into the atmosphere and causing blackened snow in the Himalayan Mountains of Pakistan and Nepal.⁴² The health impacts on people and the continuing damage to ecosystems has been assessed as part of the post-war claims settlements.⁴³ Once the claims are determined, the methodology and quantification of air pollution damage claims may provide a precedent that could be used for acute injury from forest fire incidents.

There have been no effective claims or remedies from the transboundary radioactive pollution that resulted from the fires at the Chernobyl nuclear power reactor in the USSR on April 26, 1986. People continue to suffer a slow death in Belarus from this incident in the Ukraine.⁴⁴ Given the failure of international public law to address the aftermath of Chernobyl itself,⁴⁵ it is hard to envision states organizing to address the equally troublesome aftermath of the forest fires. The Foreign Affairs Ministries of states would rather not raise troublesome claims with their neighboring states, and the public is either denied legal recourse or is passive to demand action from their foreign affairs ministries. Unlike the air pollution from Kuwaiti fires resulting from armed conflict, the civilian forest fires or the civilian nuclear reactor fires have not produced concerted state recourse to the traditional rules of international law.

III. The International Law Obligation of Cooperation

The Charter of the United Nations is premised on the principle of cooperation. Through the Charter, states founded the United Nations "to achieve international co-operation in solving

41. See Jennifer Parmalee, *Kuwaiti Emir Snuffs Out Last Iraqi-Lit Oil Fire*, WASH. POST, Nov. 7, 1991, at A1 cited in Jessica E. Seacor, *Environmental Terrorism: Lessons From the Oil Fires of Kuwait*, 10 AM. U. J. INT'L L. & POL'Y, 481, 482 n.4 (1994).

42. See generally Seacor, *supra* note 41.

43. See generally Tiffani Y. Lee, Note, *Environmental Liability Provisions Under the U.N. Compensation Commission: Remarkable Achievements With Room for Improved Voluntary Deterrence*, 11 GEO. INT'L ENVTL. L. REV. 209 (1998).

44. See, e.g., Alice Lagnado, *The Nuclear Family: Chernobyl*, SCOTLAND ON SUNDAY, Feb. 11, 2001.

45. There were, of course, new treaties negotiated after Chernobyl to cope with the eventuality of another such incident, but not much done with issues of State responsibility for the incident itself. See International Atomic Energy Agency: *Conventions on Nuclear Accidents*, Sept. 26, 1986, 25 I.L.M. 1369, 1377 (1986).

international problems of an economic, social, cultural or humanitarian character. . . ."⁴⁶ As Professor Wolfgang Friedmann explains, international law is strengthened by "the gradual emergence of an international law of cooperation, implemented by an increasing number of international organizations, pursuing the common interests of mankind in the fields of economic and social development, health, communications, and other matters of human welfare."⁴⁷

Given the interdependence of the natural systems of the biosphere, it is normal that states seek to cooperate on common matters of environmental protection. The Rio Declaration on Environment and Development of 1992 expressly provides that "States shall cooperate in a spirit of global partnership to conserve, protect, and restore the health and integrity of the Earth's ecosystem. In view of the differentiated contributions to global environmental degradation, States have common but differentiated responsibilities."⁴⁸ Cooperation on matters of environmental protection is widely accepted as a basic obligation of international law.

The question that should be asked, however, is whether a minimum level of cooperation, or merely not frustrating cooperation "by sitting on the sidelines," is sufficient for a state to meet its duty to cooperate. It is evident that whether a state has satisfied its duty to cooperate should depend on a good faith effort to act effectively, given the common, but differentiated, responsibilities various states may have depending on their circumstances.

The test to determine whether this obligation to cooperate in international law has been satisfied should be whether the response was proportional to the demand, in light of the resources of

46. U.N. CHARTER art. 2, para. 3.

47. Wolfgang Friedmann, *The Role of International Law in the Conduct of International Affairs*, 20 INT'L J. 158, 159 (1965).

48. U.N. ENV'T PROGRAMME, RIO DECLARATION ON ENV'T & DEV., U.N. Doc. A/CONF.151/26, Annex I, U.N. Sales No. E.73.II.A.14 (1972), available at <http://www.un.org/documents/ga/conf151/aconf15126-1annex1.htm>.

Principle 7. States shall cooperate in a spirit of global partnership to conserve, protect, and restore the health and integrity of the Earth's ecosystem. In my view of the different contributions to global environmental degradations, states have common but differentiated responsibilities. The developed countries acknowledge the responsibility that they bear in international pursuit to sustainable development in view of the pressures their societies place on the global environment and on of the technologies and financial resources they command.

Id.

the states involved.⁴⁹ If states effectively cooperated to abate the problem, then the level of such action may be deemed adequate to satisfy the duty to cooperate under international law. If the problem continued or worsened, despite the cooperation, then patently, the duty to cooperate was not satisfied. This proportionality test, put in context by the "common but differentiated responsibilities" measurement, provides a measuring system by which to test the performance of states as to their duty to cooperate. In this setting, it permits the analysis of state conduct, with respect to the obligation to cooperate, in the same way that state responsibility does with respect to the obligations of Principle 21 discussed above.

In the context of the forest fires, as soon as the transnational threat became apparent, the states inaugurated substantial efforts at cooperation. As will be seen, these presently fall short of being an effective step to ensure that future fires will be averted or contained. While sincere and well-intended measures were taken to cooperate in the abatement of the fires, the proportionality test posited above was not satisfied. Nonetheless, the rules of cooperation were taken seriously, thereby motivating humanitarian actions, which, in turn, had a greater effect than did the consideration of the traditional rules of state responsibility discussed above. This can be seen in the disposition of largely bilateral assistance for the fires in Mexico and in the context of the largely multilateral assistance for the fires in Indonesia.

A. The Mexican Forest Fire Catastrophe

Once the magnitude of the Mexican fires became apparent, the United States undertook to offer assistance. Brian Atwood, head of the United States Agency for International Development, made clear that the United States' interest in the problem extended nationally, and not just as a regional United Nations interest to protect the affected regions of Texas.

This disaster in Mexico has to be the most serious of its kind we have seen anywhere in the world, including the fires in Indonesia. American people wonder why we should care about the fires in Mexico. It is not just the smoke and haze that is affecting the

49. See Jessica Myers, *Henderson Discusses Smallpox Eradication*, THE JOHNS HOPKINS NEWSLETTER, Mar. 8, 2001, available at <http://www.jhu.edu/~newslett/03-8-01/News/4.html>.

United States as far north as Wisconsin and as far east as Georgia, but it is the potential loss of biodiversity.⁵⁰

The fires in the Chimalapas Biological Reserve, for instance, endangered fifteen hundred of the world's most endangered species of plants and ninety percent of the migratory birds that fly between the United States, Canada, and South America and use the Reserve.

The fires in Mexico roared through eleven of the thirty-one Mexican states and caused extensive damage to a quarter of the forest in the Desierto de Los Leones National Park at the edge of Mexico City, cloaking the capital in soot for over a week.⁵¹ The Mexican Secretariat of the Environment (SEMARNAP) reported that eighty percent of the fires were burning in areas inhabited by people, with grave risk to life and health. In Chiapas, the smoke and fog were so thick that headlights were needed at midday.⁵² In response, Mexico mobilized resources to fight the fires and to avert their recurrence. Thirty thousand military personnel and 6,000 civilians were reportedly deployed to fight the fires. The volunteers had little training, or for that matter, time for it.⁵³ It was reported, as of April 1998, that six helicopters and two light aircraft were tracking the fires, but only one Canadian aircraft equipped to water bomb the fires was in use.⁵⁴ The fire patterns could not be tracked because the smoke's thickness prevented the planes from flying at an adequate range. Only in May 1998 did the United States government provide a King Air plane equipped

50. See *Species Could be Lost in Mexico Forest Fires*, CHI. TRIB., June 6, 1998, at 1.

51. See Molly Moore, *Fires Devastate Mexico; Blazes Destroy Nearly 300,000 Acres in 112 States*, WASH. POST, April 12, 1998, at A1.

52. See *id.* at A21.

53. See Molly Moore, *Mexico's Unquenchable Fires: Ecological Disaster Unfolds as Ancient Forest Burns On*, WASH. POST, May 31, 1998, at A1 [hereinafter Moore, *Mexico's Unquenchable Fires*].

Antonio Juarez is a foot soldier on the front lines of firefighter hell. His weapons against southern Mexico's worst fires in a century are a machete and five gallons of water in a rubber backpack. The peasant farmer, 51, charges into burning rubble clad in sandals, a straw cowboy hat and a tattered bandanna. His future mission: to help hold back the raging wildfires that are gobbling Mexico's last remaining virgin cloud forest, torching the trees that are home to nesting toucans and quetzals, charring tens of thousands of acres of hunting territory of endangered jaguars and pumas, and creeping beneath the thick blankets of lichen and mosses on the forest floor to consume the roots of rare flora.

Id.

54. See U.S. DEP'T OF AGRIC., *MEXICO HAS FOREST FIRES, TOO* (1998), available at 1998 WL 9038073.

with infrared sensors to find fires beneath the cloud forest canopy of the tropical forest.⁵⁵ The United States sent forty-five fire-fighting experts to assist from May 16 to July 6, 1998.⁵⁶ Some \$8 million was allocated to assist Mexico.⁵⁷ Over fifty fire fighters and members of special brigades died in Mexico fighting the fires.⁵⁸ In the central state of Michoacán, 100 villagers tried to save part of the forest areas used as the wintering habitat for the migratory Monarch Butterfly, by bringing buckets of water two hours from their village.⁵⁹ Given the lack of resources to fight such widespread fires and the magnitude of the fires, these response efforts were simply insufficient to bring the crisis under control. Despite these efforts, many fires burned until extinguished by the rains in late June, while others kept burning into July.⁶⁰

The causes of the Mexican fires were varied, yet ninety percent were attributed to human negligence and only ten percent to natural causes.⁶¹ These causes include actions by farmers to clear land for expanded agricultural uses and others by narcotic traders to raise poppies or marijuana. Many fires were started by the careless disposal of cigarettes by drivers of cars and trucks, others by recreationalists or vacationers. A small percentage was created by natural causes.⁶² In response, Mexico is reported to have proposed an educational program to persuade farmers not to use fire to burn off trees in preparation for planting or grazing. Proposals have been made that the setting of intentional fires should be classified as an environmental crime. However, as of mid May, only 109 investigations of the some 10,000 fires had been undertaken.⁶³ Even if the leads for investigations are promising, the

55. See Moore, *Mexico's Unquenchable Fires*, *supra* note 53.

56. See *Smoky Skies From Mexican Fires Clear As Texas Heats Up*, FLORIDA TODAY, Aug. 8, 1998, at A9.

57. See Carlos Freymann, *Mexico's Blazes Should Spark Fire Prevention Programs*, SAN ANTONIO BUS. J., July 3, 1998, at 29.

58. See Molly Moore, *Wildfires in Mexico, Central America Burn Unabated; Smoke extends as Far North as Wisconsin*, WASH. POST, May 19, 1998, at A15 [hereinafter Moore, *Wildfires in Mexico*]. See also Diego Cevallos, *Environment-Mexico: Fires Cause Worst Tragedy in 50 Years*, Inter-Press Service, Apr. 2, 1998, available at http://www.oneworld.org/ips2/apr98/16_06_072.html. Diego Cevallos estimated the numbers at twenty in his report. See *id.*

59. See Moore, *Wildfires in Mexico*, *supra* note 58.

60. See *id.*

61. See *Fires Devouring Forests*, MEX. BUS. MONTHLY, May 1, 1998.

62. See *id.*

63. See Molly Moore, *Wildfires in Mexico*, *supra* note 58.

fires destroy all evidence of negligent or criminal activity; arson is nearly impossible to establish absent eyewitnesses.

It is interesting to note that the North American Commission on Environmental Cooperation (CEC),⁶⁴ organized under the Environment Side Agreement⁶⁵ for the North American Free Trade Agreement (NAFTA),⁶⁶ would have the legal authority to fashion a cooperation between Canada, the United States and Mexico to address forest fire management. Unlike the Association of South East Asian Nations (ASEAN), which at once began consultation regarding how to cooperate to prevent and cope with fires in Asia, the CEC has yet to respond seriously to this tragic economic and ecological and human disaster in its territory. While some might argue that the CEC is, perhaps, too new an institution to take on such a task, there are already very effective compacts and treaties for the deployment of fire fighters from various states and provinces in the United States and Canada;⁶⁷ the model already exists among two of the three partner nations. The CEC would do well to facilitate the operational cooperation with Mexico to replicate such systems between that nation and the other two. This potential for cooperation remains to be realized.

These accounts of the responses to the Mexican and Central American forest fires indicate that there was an immediate humanitarian response to cooperate with Mexico on the part of the United States. However, the rapid expansion of the fires, exacerbated by the very dry El Niño weather patterns, rendered the national and international responses inadequate to the problem. Clearly, whether the rules of international cooperation are being effectively embraced must be measured by whether the response is proportional to the need. In the case of Mexico, the national

64. See North American Commission on Environmental Cooperation, *available at* <http://www.cec.org>. (last visited May 21, 2001). The seat of the CEC is in Montreal.

65. See North American Agreement on Environmental Cooperation (NAAEC), Nov. 1993, 32 I.L.M. 1480 (1993) (also known as the Environmental Side Agreement).

66. See North American Free Trade Agreement (NAFTA), 19 U.S.C. § 3301 (1998).

67. See, e.g., Northeastern Interstate Forest Fire Protection Compact (which covers the northeast United States and adjacent areas of Canada), 1949, continued in 1963, reprinted in N.Y. ENVTL. CONSERV. LAW § 9-1123 (McKinney 1991). Had there been fire-fighting agreements between Texas and Mexican States, fire-fighting help could have been provided. As governor of Texas, George W. Bush was reported to have offered to send State forest teams and helicopters to Mexico to join in fighting the fires if the State could be reimbursed for the cost, as is usual under such forest fighting compacts. See William Branigin, *Smoke From Mexico Fires Prompts Health Alert in Texas*, WASH. POST, May 16, 1998, at A11.

response was not adequate and the international response on the part of the United States, as a neighboring state, was also clearly inadequate.

B. The Indonesian and South East Asia Forest Conflagration

The case of Mexico can be contrasted with that of Indonesia and the South East Asian international response. In Asia, a much more deliberative pattern emerged, launching a more pervasive form of cooperation, but did not have much more of an effect than ultimately was seen in the North American context. Like the bilateral help to Mexico, this system of cooperation provided too little, too late, to be effective in helping to cope with the fires, and was not proportional to the task.

Indonesia confronted the worst drought in fifty years, extending over more than one year. For the first eighty-nine days of 1998, not a drop of rain fell in East Kalimantan.⁶⁸ In June the fires began, and efforts to protect the people and to save the remaining 20,000 orangutans proved difficult. Wildlife conservation teams rescued some 200 orangutans, many of which were badly burned.⁶⁹ Villages had captured many abandoned baby orangutans, hoping to sell them to get cash to live on. As Willie Smits of the Warariset Forestry Station described it, "In East Kalimantan, the situation is desperate – for both people and orangutans. There is no a conflict for survival."⁷⁰ This vignette captures the crisis. People have died because of the lack of food and protection and biodiversity has been lost in Indonesia. Ill-equipped citizens rose to fight the fires and protect the rare habitats around them, such as the Kota Kinabatangan forests.⁷¹ Indonesia is estimated to have lost \$4.5 billion in fire related damage, including loss of timber, agriculture, biodiversity, health impacts, loss of tourism, loss

68. See *Indonesia: Orangutan Population in Kalimantan Projected to Drop by 30%*, ANTARA-THE INDON. NAT'L NEWS AGENCY, Feb. 4, 2000.

69. See *id.*

70. J. Medeleine Nash, *Floods and Fires? They're Just the Beginning of El Niño's Impact*, TIME, June 1, 1998, at 26.

71. See, e.g., *The Burning Issue*, SING. ENVTL. COUNCIL, vol. 5, no. 2 (1998): Last month office workers in Sabah put down their briefcases and rolled up their trouser legs to join rangers from the Kota Kinabatangan forestry department. Together they tackled the fires which were raging in the region- one of the country's most important conservation areas and a major breeding ground for some of Asia's rarest animals, including proboscis monkeys, orangutan and elephants. These Sabah firefighters were just some of a largely unsung army of "conservation heroes."

Id.

of industrial output, and other related losses. This sum is more than double all the foreign assistance received by Indonesia annually the year before, and is about 2.5% of Indonesia's Gross National Product. Had a foreigner caused the damage, the claim in this amount would be more than the combined legal liabilities assessed by the Exxon Valdez and Bhopal tragedies.⁷²

In light of the losses in Indonesia (estimated at 4.5 million hectares in 1997 alone), and that many more millions of people were injured throughout southeast Asia than had been injured in Mexico, it is evident that the head of the United States Agency for International Development was speaking out of ignorance when he classified the losses in Mexico as worse than those in Indonesia. As the Assistant Executive Director of the United Nations Environment Programme stated, "the forest fires of Indonesia have been categorized as an environmental emergency of exceptional proportions."⁷³ UNEP endorses that conclusion, aware as it is of the status of Indonesia as one of the twelve "mega-biodiversity" countries of the world, rich in species, many unique to that nation and deserving of international protection. Indonesia possesses eleven percent of the world's known flowering plants, twelve percent of the world's mammals, fifteen percent of all amphibians and reptiles, and some thirty-seven of the world's fish.⁷⁴

Indeed, the United States National Atmospheric and Oceanic Administration (NOAA) monitored the Indonesia crisis by satellite because the area where fires were widespread was too vast for monitoring by airplane and the satellite systems were in place to monitor the fires.⁷⁵ The United States and the Asian Development Bank allocated \$6 million to assist Indonesia and neighboring states to cope with the environmental disasters of the fires. Other nations also made similarly modest bilateral grants of humanitarian assistance.

72. See WORLD WILDLIFE FUND FOR NATURE & ECON. AND ENV'T PROGRAM FOR SOUTHEAST ASIA, *THE INDONESIAN FIRES AND HAZE OF 1997: THE ECONOMIC TOLL*, available at <http://www.eepsea.org/publications/research1/ACF62.html> (last modified June 23, 2000).

73. *Id.*

74. See Jorge Illueca, Address to the Singapore Environment Council Policy Dialogue on Southeast Asian Forest Fires (June 4-5, 1998) (on file with author) [hereinafter Illueca].

75. See, e.g., G. Gutman et al., *Using NOAA/AVHRR Products to Monitor El Niño Impacts: Focus on Indonesia in 1997-98*, BULL. OF THE AM. METEOROLOGICAL Soc'y, June 1, 2000.

Both the forest fires in Mexico and in Indonesia were unprecedented and enormous, but if one measures the environmental and economic impact that Indonesia had on its neighbors, it is evident that the Indonesian crisis eclipses the great loss in Mexico. Singapore and Malaysia each provided air pollution alert information on the Internet, so that individuals could take action to protect their health by assessing the pollution index directly.⁷⁶ The "haze" damage to Singapore has been estimated at \$74.1 million and Malaysia's losses at \$310 million.⁷⁷ The lost tourism income from the air pollution is readily quantified. In addition, the impacts of the Indonesian fires that were located on the island of Borneo, on the adjacent nation of Brunei Darussalam, and on the adjacent Malaysian states of Sabah and Sarawak, were acute in health impacts and lost of natural resources.⁷⁸

Brunei Darussalam does not have the problem with palm oil or timber plantations that Indonesia or parts of Malaysia experience. Fires spread into Brunei from over the Indonesian and Malaysian border. This disrupted life in Brunei substantially. The experience of the Shell Oil refinery in Brunei illustrates this. The Brunei Shell Petroleum Company is responsible for some 4,000 persons, including dependents. The air pollution was so acute in Brunei during the period of the fires that it exceeded maximum health limits (100 PSI) repeatedly; indoor air was often measured at 200 PSI. Workers regularly had to volunteer to fight fires in order to prevent their spread. Shell had to invest \$3 million just in disbursements to fight fires, secure the health of its workers, and keep its refinery open in conditions of near zero visibility; this figure does not include the lost revenues when production was shut down.⁷⁹

The causes of the fires in Indonesia were partially natural but mostly human. One of the major causes was the burning of land to plant new, lucrative palm oil plantations. Although the use of

76. See [Singapore] Ministry of the Env't, *PSI Reading*, <http://www.env.gov.sg/psi/index.html> (updated daily); Malaysia Dep't of Env't, *Continuous Air Quality Monitoring Stations in Peninsular Malaysia*. . [and] *Sabah & Sarawak* (1999), http://www.jas.sains.my/doe/udara2/udara2_frames.html.

77. See *id.*

78. See Michael Brauer & Jamal Hisham-Hashim, *Fires in Indonesia: Crisis and Reaction*, 32 ENVTL. SCI. & TECH., 404A (1998).

79. See Johan W.H. Kwant, Lecture at the Singapore Environment Council Policy Dialogue on the Southeast Asian Fires (June 4-5, 1998) (on file with author).

fire to clear land had been made illegal in 1993 in Indonesia,⁸⁰ the government undertook no enforcement of this law, and indeed, with corruption, the practice continued unabated. Professor and Ambassador Tommy Koh of Singapore has advocated that it is time to name the corrupt companies and individuals who cause these problems.⁸¹ "It's not El Nino [sic] that set the fires. A United Nations report said that 80 per cent of the fires were set by logging companies and palm oil plantations. If we want to prevent a recurrence of the haze, the only thing to do is to stop these bad guys."⁸² A German forest expert, Ludwig Schindler, noted that most of the fires began on commercial plantations and on concession lands; he urged that the companies should be obliged to put fire fighting teams and equipment in place on their concession lands.⁸³ In addition, large paper and pulp mills in Indonesia, just west of Singapore and Malaysia, induce behavior that allows forest fires to develop, since they demand salvage timber and are supplied by new incursions into forestlands. Fires have also spread along degraded lands. Unlike Mexico, the use of "slash and burn" agricultural clearing by small farmers was not the major cause of the fires in Indonesia.

The pattern of international cooperation to control forest fires in Indonesia and the other areas of Southeast Asia has been developing for some years. Because of past cooperation, a system had developed to cooperate to track the fires in Indonesia. However, the magnitude of the 1997 and 1998 fires were greater than expected and the system of cooperation to supply assistance to fight the fires was not up to the magnitude of the task. Fire and air pollution smoke incidents had taken place in Indonesia before the

80. See Simon S.C. Tay, *South East Asian Forest Fires: Haze Over ASEAN and Int'l Envtl. Law*, 7 RECIEL 198, 199 (1998).

81. See Leong Chan Teik, *Land Clearing by Fire: 'Name the Bad Guys'*, STRAITS TIMES, June 5, 1998, at 53.

82. *Id.* Professor Tommy Koh has said that the "only thing to do to prevent the haze from recurring" is to "[s]top the 'bad guys' who clear land by setting fires by publicising [sic] their names and mobilising [sic] public opinion against them." *Id.*

83. See Dominic Nathan, *Repeat of Fires a 'Death Penalty'; The Kalimantan Fires Which May Flare Up During the July Dry Season Will Be 10 Times More Devastating than the 1982-83 Episode, Says Fire Expert*, STRAITS TIMES, May 28, 1998.

Plantation forests are "an invitation to fire," he said, because they dry out very quickly and humidity levels are much lower than in natural forests. The undergrowth is a good fuel source to spread the fires as well, he added. "A second fire will sweep through these areas faster and the dead trees will be excellent fuel. Fires will be much hotter and the flames higher."

Id. (referring to words spoken by Mr. Ludwig Schindler, a German forest fire expert).

1997-98 crisis in 1982-83, 1987, 1991, and 1994.⁸⁴ As a result, a conference was called by Indonesia in Bandung in 1992, following the 1991 fires.⁸⁵ The 1982-83 fires had caused some \$8-9 billion worth of damage, and those a decade later were more severe.⁸⁶

The Bandung Conference recommended a number of measures of international cooperation to prepare Indonesia and other states to be able to cope with the forest fire problem. The purpose was the development of an international program to initiate a "Long-Term, Integrated Forest Fire Management Programme" for Indonesia.⁸⁷ The Programme was to involve national agencies involved in forest fire control, and international experts and donors. Beginning in 1995, Indonesia's Environmental Impact Management Agency (BAPEDAL) established a "National Coordination Team on Land and Forest Fire Management."⁸⁸ Projects were launched by the Canadian, German, Japanese, and United States bilateral aid agencies, and by the European Union and the U.N. Food and Agricultural Organization.⁸⁹ A workshop in 1997 developed "National Guidelines on the Protection of Forests Against Fires," and in 1998 the Bogor Agricultural University established the Research Center for Forest Fire and Land Studies.⁹⁰

The Bandung strategy did engage the system of international cooperation. It stimulated the development of a forest fire management program in the Association of South East Asian Nations (ASEAN). The ASEAN member states conducted workshops and meetings between 1992 and 1996 on "Transboundary Haze Pollution."⁹¹ This led to one bilateral agreement, and on December 12, 1997, Malaysia and Indonesia entered into a Bilateral Memorandum of Understanding to jointly tackle the "haze problem" (meaning the transboundary air pollution) and to manage any other disasters.⁹² It also led to multilateral undertakings. For instance, in 1998, based on the 1997 ASEAN Regional Haze Action Plan described below, the Asian Development Bank provided financial support through a Regional Economic Technical Assistance

84. See JOHANN G. GOLDAMMER, SING. ENVTL. COUNCIL, SCIENTIFIC AND TECHNICAL COOPERATION IN SE ASIA: INT'L CONTRIBUTIONS (1998).

85. *See id.*

86. *See id.* at 2.

87. *Id.* at 4

88. *Id.* at 5.

89. *See* GOLDAMMER, *supra* note 84, at 5.

90. *See id.*

91. *Id.* at 8.

92. *See id.*

(RETA) to assist ASEAN to strengthen cooperation among the ASEAN states affected by the fires and the air pollution from the smoke.⁹³

At a meeting in June of 1995, the ASEAN Environment Ministers agreed on the ASEAN Cooperation Plan on Transboundary Pollution,⁹⁴ which forms the basis for the ASEAN Regional Haze Action Plan. Parenthetically, it can be noted that the gentleness of phrase by which the transboundary air pollution is referred to as "haze," describing its national manifestation in the polluted states, is a diplomatic way to avoid having to confront the states that cause the problem with the issues of state responsibility that are evident here. Cooperation is encouraged if the issues of liability are set aside. As Professor Simon S.C. Tay has observed, ASEAN policy and practice build consensus and cooperation by recognizing "the norm of non-interference in another state's affairs," by adopting "non-binding plans, instead of treaties and legalistic rules," and by relying "on national institutions and actions, rather than a stronger central bureaucracy."⁹⁵

The Secretary General of ASEAN, Dato' Ajit Singh, has described the ASEAN Cooperation Plan on Transboundary Pollution as consisting of three program areas: Transboundary Atmospheric Pollution, Transboundary Ship-borne Pollution and Transboundary Movement of Hazardous Wastes. In each programme area, the objectives, strategies, activities and institutional arrangements are further elaborated. The Plan of Cooperation also contains a section on resources and extra regional support which describes the various sources of technical expertise and financial assistance that are available or can be mobilised to support ASEAN's efforts in implementing the Plan. The Plan further includes a section on implementation and evaluation which outlines the steps required to implement the Plan and evaluate the progress made.⁹⁶

The Plan provides for a short-term strategy to "prevent anthropogenically induced forest fires, especially in land clearing activities in timber and agricultural estates and transmigration projects," by prohibiting the "burning of biomass generated largely by development projects during dry periods," and by early detec-

93. See *id.*

94. *Forward to ASEAN SECRETARIAT, ASEAN COOPERATION PLAN ON TRANSBOUNDARY POLLUTION (1997) [hereinafter ASEAN PLAN].*

95. See Tay, *supra* note 80, at 200.

96. See ASEAN PLAN, *supra* note 94, at 2.

tion of fires and enhancing communications to share information and deploy relevant activities.⁹⁷ Long-term goals include finding alternative uses of biomass and employing zero burning practices.

The air pollution of 1997 stimulated implementation of the 1995 Cooperation Plan through the actions set forth in The Regional Haze Action Plan. The 1997 fires produced very acute regional air pollution from July to October of 1997 in Brunei, Indonesia, Malaysia and Singapore and to a lesser extent in the Philippines and Thailand. The public was demanding action because of the unprecedented health problems affecting, literally, millions of people in these states. The Regional Haze Action Plan has three primary objectives: "(a) to prevent land and forest fires through better management policies and enforcement; (b) to establish operational mechanisms to monitor land and forest fires; and (c) to strengthen regional land and forest fighting capability and other mitigation measures."⁹⁸ The activities identified as priorities to attain these ends are all technical, e.g., preparing inventories, enhancing remote sensing of fire phenomena, developing a common air quality index, better communications and cooperation. The institutional arrangements involve greater roles for the ASEAN Specialized Meteorological Center (ASMC) and the ASEAN Institute of Forest Management (AIMF). ASEAN "should explore ways to work closely" with the following list of bodies in order "to enhance cooperation to combat forest fire": the ASEAN Working Group on Forestry; ASEAN-EC Joint Consultative Committee (JCC) Sub-Committee on Forest; Brunei-Indonesia-Malaysia-Philippines (BIMP), and the East ASEAN Growth Areas (EAGA) Sub-Committee on Forest.⁹⁹

It is evident from the details of the Plan that it is a rudimentary set of recommendations, rather far removed from actually building the capacity in any single nation to more effectively combat the forest fires. This may be partially ascribed in inexperience, especially with fires on such a vast scale. However, it is also the result of the weakness of the ASEAN Environment Ministries, vis à vis the economic development ministries, and the fact that many of the fires are associated with powerful plantation and timber developers who either do not wish to have government scrutinize their activities or have corruptly prevented government from enforcing the applicable laws supervising their endeavors. None-

97. *Id.* at 3.

98. *See* Tay, *supra* note 80, at 241, 260.

99. *See* ASEAN PLAN, *supra* note 94, at 3-5.

theless, the full agreement on the strategies established a firm foundation on which to build more substantive work, which may promise more immediate benefit for fire fighting and prevention.

The Regional Haze Action Plan, underwritten by the Asian Development Bank's RETA, takes the Co-operation Plan to a stronger level of endeavor. This Action Plan expressly calls for: (a) an adoption of legislation to ban open burning; (b) strict enforcement of laws; (c) more effective systems of air quality monitoring of all sources of air pollution; (d) guidelines to discourage activities which can lead to land and forest fires; and (e) operating procedures for the early mobilization of resources to prevent the spread of fires.¹⁰⁰ It spells out the roles for regional monitoring through ASMC. It includes a detailed plan for strengthening national and regional fire fighting capability; inventories of existing capacity; compiling lists of needed equipment; acquisition of such equipment; establishing operating procedures to deploy fire-fighting resources in each country; regional fire-fighting operations; and for establishing a mechanism to update the Regional Haze planning. A Regional Haze Task Force is to meet monthly to review the progress on implementing the Plan.¹⁰¹ In May of 1998, ASEAN convened an inception workshop on strengthening ASEAN capacity to mitigate transboundary haze, and the cooperation continues at a technical level to advance aspects of the Action Plan.

One striking aspect of the ASEAN Action Plan is that it is essentially a call for consistent and parallel measures at the national level. Only the ASMC role in providing regional services that none of the states can secure on their own, is truly operational, and it only detects the problem and its scope. In the area of fire prevention and response, virtually nothing is outlined for international cooperation. The Action Plan does provide that national fire fighting measures will be strengthened by establishing "an operating procedure to activate the deployment of the fire-fighting resources in each country for regional fire-fighting operations."¹⁰² However, the financial crisis in the region and the political and socio-economic transformations in Indonesia have meant that there has been neither the rapid development of national forest fighting teams, or a management system for the regional de-

100. See ASS'N OF SOUTHEASTERN ASIAN NATIONS, REGIONAL HAZE ACTION PLAN (1997), available at http://www.asean.or.id/function/pa_haze.htm.

101. See *id.*

102. *Id.* para. 11(d).

ployment of forest fighting resources. All the Asian Development Bank funds are for studies and analysis, and do not supply the needed cooperative action itself.

While the ASEAN Action Plan is sound, it is evident that the magnitude of the forest fire problem is far greater than the current levels devoted to implementing the Plan. This is a dimension of cooperation that needs to be realized in the future. Perhaps, in response to the Asian Development bank studies, the further support will be forthcoming, but, in terms of producing a sound forest fire prevention and fighting capacity, the duty to cooperate remains to be fulfilled. While these efforts at regional cooperation proceeded, the fires burned. Despite the scramble to cope with the fires and the mounting damage, it took the return of the monsoon season rain to extinguish the widespread fires.¹⁰³ In terms of the 1997-98 fires, the allocation of material, technical assistance, and finance from the international community was wholly inadequate to combat the raging fires. In light of the proportionality test, the states cooperating together failed to marshal the activity to satisfy their duty to cooperate. In undertaking these altogether too weak measures, one is reminded of the maxim that "good intentions pave the way to Hell." The fires were a Hell for anyone who confronted them, and the International Law obligation to cooperate was ineffective in producing action proportionate to the need. It is likely that the phenomenon of transboundary air pollution will be repeated, with the attendant loss of life, biodiversity, and natural resources.

C. The United Nations' Tentative Considerations of Forest Fires

If the regional and bilateral efforts at cooperation in the cases of Mexico and Indonesia were inadequate to the challenge, is there a role for the international community represented in the United Nations? The U.N. Food and Agricultural Organization (FAO) had long worked on fires as a matter of technical assistance in forest management. The U.N. Division of Humanitarian Affairs in New York in the past has assisted in organizing relief for states engulfed in vast forest fires, along with other "natural" disasters. But the 1997-98 worldwide fire phenomenon in raised the legiti-

103. See *Southeast Asia's Haze Clears as Monsoon Rains Begin*, (Austl. Broad. Corp., Nov. 19, 1997).

mate question of whether the United Nations should facilitate wider international cooperation to cope with fires.

In order to build consensus that international cooperative measures were needed, the U.N. system has convened numerous meetings and consultations of experts. These meetings, in and of themselves, do not produce immediate action. It can take some years before the political consensus emerges to support a new U.N. cooperative venture and for the financial support to be donated by states to allow the cooperation to advance. In the interim, of course, the problem of the forest fires continues to get worse and little is done to actually work on resolving the problem. At best, the meetings build toward the day action will be agreed upon; at worst, the meetings educate a range of officials and give the appearance of activity which is too often disconnected to remedial measures.

The acute publicity given to the fires in 1997 and 1998 prompted the United Nations Environment Programme (UNEP) to convene a meeting of experts on "Coordination of U.N. Response to Indonesian Fires" on April 20-21, 1998, in Geneva, Switzerland.¹⁰⁴ That meeting was followed by a World Meteorological Organization Workshop (WMO) on "Regional Transboundary Smoke and Haze in South-East Asia" in Singapore on June 2-5, 1998¹⁰⁵ and the WMO approved a "Programme To Address ASEAN Regional Transboundary Smoke (PARTS)."¹⁰⁶ The World Health Organization (WHO) convened a workshop in Lima, Peru, on August 3-7, 1998 on "Guidelines for Forest Fire Emergencies."¹⁰⁷ In late 1998, the WMO and the U.N. International Decade for Natural Disaster Relief convened an inter-agency review and Retrospective of the 1997-98 El Niño events.

UNEP's Executive Director, Dr. Klaus Topfer, announced that UNEP would take on a central coordinating role for building capacity to cope with forest fires.¹⁰⁸ UNEP, for instance, is under-

104. See Kang Siew Li, Malaysia, *EU to Help Train Indonesia's Fire Fighter*, BUSINESS TIMES, Apr. 30, 1998, at 2.

105. See *Not Bad This Year?*, STRAITS TIMES, June 3, 1998, at 2.

106. See WMO WORKSHOP ON REGIONAL TRANSBOUNDARY SMOKE AND HAZE IN SOUTHEAST ASIA (Sept. 1998), available at http://www.uni-freiberg.de/fireglobe/iffn/country/un/un_1.htm.

107. See U.N. FAO/ECE/ILO Team of Specialists on Forest Fire - *Minutes of Meeting* (May 1998), available at http://www.uni-freiburg.de/fireglobe/iffn/org/ecefao/ece_1.htm.

108. UNEP Executive Director Welcomes Indonesian Rains but Stresses UN Forest Fighting Efforts Must Continue (Apr. 28, 1998), available at <http://www.grida.no/infl/news/news98/news28.htm>.

taking to assist "the development and improvement of the fire early warning component of the action plan within the UNEP/GEF project on Emergency Response to Combat Forest Fires in South-East Asia."¹⁰⁹ The Global Environmental Faculty (GEF) allocated to UNEP a grant of \$850,000 for work in Indonesia, Malaysia, Singapore, Thailand and the Philippines in order to set up the basic consultation procedures for the deployment of emergency fire fighting help as between the governments, the international agencies, and non-governmental organizations. The product will be public education about fire prevention and ultimately "a strategy to combat the fires, and make recommendations to donors."¹¹⁰ The UNEP efforts are intended to complement the WMO/NOAA Programme To Address ASEAN Regional Transboundary Smoke (PARTS), which will result in an aerial fire surveillance regime for Sumatra under a Sub-Regional Fire Fighting Arrangement. UNEP has indicated that it is ready also to work with the U.N. Development Programme on regional protocols and agreements in Asia, although no negotiations for such have been indicated.¹¹¹

The commendable willingness of UNEP's Executive Director to serve a coordinating role in coping with forest fires is subject to the willingness of the nations to support that role. There is rarely coordination among the national positions among the different international organs. A nation can take a leadership role in one arena through certain agencies, such as NOAA's contribution of remote sensing and monitoring help in South East Asia, and take a small role through another agency, such as the United States Agency for International Development's weak presence in the Asian forest fire area, and higher public profile but similarly weak involvement in the assistance to Mexico. Similarly, whether or not to support a UNEP coordination role will be initially decided by the United States State Department delegation to the UNEP Governing Council meetings in Nairobi. Other nations have a similarly segmented decision-making process.

Even among international agencies it is not clear that other segments would be responsive to UNEP leadership. Others have proposed a different model of cooperation. For instance, a U.N. FAO and U.N. Economic Commission for Europe Team of Specialists on Forest Fires prepared a multi-agency program proposal to

109. See Illueca, *supra* note 74.

110. *Id.*

111. See *id.*

link UNEP, FAO, UNESCO, WMO, the International Tropical Timber Organizations (ITTO), and the IDNDR in a coordinate effort at cooperation. The initiative was endorsed by a U.N. FAO/ECE/ILO Conference on "Forest, Fire and Global Change," held at Shushenskoe in the Russian Federation in 1996.¹¹² The FAO and U.N. ECE Team of Specialist on Forest Fires had earlier submitted the proposal as "A Possible Role of the U.N. System in Fire Research and Wildfire Disaster Management" as an Annex of the Yokohama Strategy for a Safer World, at the World Conference on Natural Disaster Reduction (Yokohama, May 1994),¹¹³ and it was considered at the International Conference on "Wildland Fire '97" in Vancouver, British Columbia, Canada.¹¹⁴

Thus, in the aftermath of the 1997-98 forest fire catastrophes around the world, it is evident that many international inter-governmental organizations have *begun* to address the problem of how to cooperate to prevent or cope with the fires. At the same time, the present international cooperation is fragmented among many agencies, and has such a low level of financial support that it cannot be expected to make a significant contribution to solving the forest fire problem. Moreover, the international assistance seems focused primarily on the problem of southeast Asia, while the need is for a response to build capacity in every region since the forest fire phenomena are global and since effective capacity to prevent and fight forest fires exists only in western Europe, Canada, the United States, and a few selected other states.

It is, therefore, fair to assess that the response of states through their United Nations multilateral system to the duty to cooperate is no more effective today with respect to forest fires and transboundary air pollution than is the response at the bilateral or regional levels. It may be that the world community must await an even greater loss of human life and biodiversity in the next wave of forest fires, which can take place during the next El Niño/Southern Oscillation period, before it will find the political conviction to act with effectiveness that is proportionate to the challenge.

112. See GOLDAMMER, *supra* note 84, at 13.

113. See *id.*

114. See *id.* (Dr. Goldammer is a participant in the U.N. FAO/ECE/ILO Team of Specialists on Forest Fire, and is based at the Fire Ecology and Biomass Burning Research Group, Max Planck Institute for Chemistry, c/o Freiburg University, in Freiburg, Germany).

IV. The Roles for Environmental Law in Preventing Fires

If neither the public international law principles of state responsibility nor those provided by the obligation of cooperation can provide an effective working legal framework for states to rely upon in responding to the world-wide forest fire crisis that accompanies El Niño, then what role can law serve? The still emerging field of environmental law provides an answer. Because forest fires are intimately a part of land stewardship, it is appropriate to examine the contributions of environmental law as the field of law whose doctrine and process most closely address all aspects of the forest fire phenomena.

Environmental law is a system that works across political borders, whether within a nation or transnational. It is a set of rules and principles designed to bring human conduct into accord with the scientifically understood operations of Earth's natural systems. To be sure, it can be (and too often still is) evaluated solely in traditional legal terms, as either municipal law or international law, but upon a deeper reflection, it is apparent that environmental law integrates both the domestic and the regional or global levels.¹¹⁵ It is this integrative role of environmental law that makes it a most useful system for the challenge of preventing forest fires. Environmental law builds systems and relationships across the sectors of government agencies and the territories of different jurisdictions, and the levels of authority from the local government to the United Nations.

Environmental law in Indonesia or Mexico or any other state is not an isolated sector of municipal law. It is a network of related legal regimes serving a common worldwide public policy objective. This is evident since the world's conservation of biological diversity is a matter of common concern globally, the stabilization of Earth's climate under the United Nations Framework Convention on Climate Change¹¹⁶ depends upon containing vast releases of carbon dioxide (whether from forest fires or other sources) into the atmosphere as well as maintaining forests as sinks which sequester carbon dioxide through photosynthesis, and the sharing of data obtained from the development of scientific studies of El Niño/Southern Oscillation phenomena, including the use of remote sensing satellite technology from orbital space, is necessarily

115. See Nicholas A. Robinson, *Comparative Environmental Law Perspectives on Legal Regimes for Sustainable Development*, 111 WIDENER L. SYMP. J. 247 (1998).

116. See *Non-Legally Binding Forest Principles*, *supra* note 16, at 849.

an effort engaging the scientists of all nations. At the regional scale, preventing or containing forest fires is essential to safeguarding public health across national borders from air pollution. These shared and common global purposes are advanced by each nation's forest fire management systems (or the lack of them). The methods and systems of environmental law, adapted to the conditions and cultures of the states that embrace them, are the relevant legal framework for forest fire prevention.

Forest fires will not be prevented unless sustainable land use systems are established in each nation. These regimes cannot be imposed by a treaty system, but rather must be built from the cultures and environments of each nation or area. In the parlance of "common but differentiated responsibilities," each geographic region with forest habitat has the common responsibility to prevent forest fires, and each can and must implement this responsibility in different ways, according to the differentiated conditions prevailing in their area.

A. Forest Fires and Environmental Law In New York: An Illustration

The role environmental law can play amidst the socio-economic development of a state can be illustrated by the way forest fire prevention and control functions in a state such as New York. In the late 1800s, New York State endured devastating fires similar to those of Mexico and Indonesia.¹¹⁷ New York was expanding its economy and population rapidly, exploiting natural resources, and building new industries based on those resources. Government was relatively weak, and there were no programs of federal financial or technical aid (much less international or foreign aid). New York had no system for forest fire prevention or management, and only some of New York's rural communities had volunteer fire brigades. By the late 1800's, New York was exploiting timber resources in its Adirondack Mountains at a rapid pace.¹¹⁸ This was a period of rapid expansion and development of natural resources, not unlike the conditions in Indonesia or Malaysia today. New York then was a leading source of lumber; in 1850 1.6 billion board feet, or twenty percent of all lumber from any source

117. See *The Insider's Guide to the Adirondacks, Chapter Highlights*, available at <http://www.insiders.com/adirondacks/main-history.htm#4> (last visited May 21, 2001).

118. See *id.*

in the United States came from New York.¹¹⁹ By 1866, pulp mills were established on the upper Hudson River, and by 1890 New York was the leading source of pulp, with seventy-five mills, or a third of all such mills in the United States. New railroad lines cut through the Adirondack Mountains to help bring out the wood. The branches and discarded parts of the timber littered the clear-cut mountainsides. Sparks from the railroad engines, or from careless logging operations, started vast forest fires, which could not be extinguished except by rains. In the late 1880s and early 1890s, it is estimated that forest fires destroyed some 16,000 acres across the Adirondacks. In the year after the fires, as the snow melted, the water would wash away the topsoil and denude the hillsides. Floodwaters would accumulate in the Hudson River and regularly flood the capital city of Albany each spring.¹²⁰

This state of affairs was insufferable and unsustainable. It enriched some individuals and commercial enterprises, but at the cost of the safety and property of the citizens of Albany and other Hudson River valley communities. The legislature, in 1885, decided to create a State Forest Preserve Commission to regulate the timber practices and establish more sustainable management practices. Unfortunately, the Commission proved rather ineffective, in part because economic vested interests were able to influence and bribe the Commission to make few changes. In 1892, in an attempt to protect fish and game habitat, the legislature designated large areas of the Adirondack Mountains as the Adirondack Park, but the Commission called for lumbering on Park lands. It became clear that a park merely created by statute would fall victim to vested economic interests. Indeed, in 1893, the then State Governor proposed a bill, which the legislature adopted, allowing wood to be sold from anywhere in the Adirondack Forest Preserve.¹²¹

This rejection of the efforts to safeguard the mountain forests outraged the state's citizens in New York City, who looked for stronger protection for the Adirondacks. Under the State Constitution, periodically the citizens of New York gather in a convention to rewrite the state's fundamental law. By coincidence, a Constitutional Convention was sitting during this period. Con-

119. See *Lumber*, COMPTON'S ENCYCLOPEDIA, available at http://www.comptons.com/encyclopedia/ARTICLES/0100/01115136_A.html.

120. See ELEANOR BROWN, *THE FOREST PRESERVE OF THE STATE OF NEW YORK* (1985).

121. See *id.*

cerned citizens enlisted leading attorneys of the New York Bar, David McClure, Louis Marshall and others, who were delegates to the Convention, to add a constitutional provision for the Forest Preserve. In November of 1894, the citizens voted to adopt the new Constitution with a provision stating:

The lands of the state, now owned or hereafter acquired, constituting the forest preserve as now fixed by law, shall be kept as wild forest lands. They shall not be leased, sold or exchanged, or taken by any corporation, public or private, nor shall the timber thereon be sold, removed or destroyed. . .¹²²

New York went beyond setting aside the world's first legislated "wilderness" area of forest and mountain habitat, thereby protecting the watershed of the headwaters for the Hudson River, its beauty, and biological diversity. These measures protected a vast region from the abuses that fed the forest fire phenomena. New York also established a system to organize the public to extinguish forest fires before small fires could become vast conflagrations. The bill that created the first Forest Commission in 1885 also established a system of local fire wardens (including authority for emergency impressment of any adult individual into the battle to combat fires, and to pay them for this service). Management of this system involved establishing forest districts and recruiting individuals for the warden roles. After adopting the constitutional amendment, the legislature merged the fire prevention system of the former Forest Commission with the Fish and Game Commission, which became the Forest, Fish and Game Commission in 1897, and, in 1911, the Conservation Commission. A cadre of state forest rangers were deployed to help recruit and train the volunteers, and enforce laws and regulations against negligent forestry practices.¹²³ The state established a nursery to raise seedlings and restore the damaged forest areas.¹²⁴

The new system was put to the test. In 1903 it did not rain for seventy-two days. Human and natural causes ignited 500 fires, burning 460,000 acres. Major dry seasons recurred with resultant fires in every decade. In 1931 New York purchased its first airplane for use in detecting fires. The state continues to employ a team of Forest Rangers, as well as the system of volunteer

122. N. Y. CONST. art. XIV.

123. See N.Y. ENVTL. CONSERV. LAW art. 9 (McKinney 1999).

124. See *id.* § 9-0105.

firefighters. With the restoration of the forest habitat, the Adirondack Mountains retain moisture, and the number of acres burned is much reduced; for instance, in 1980, of 772 forest fires fought in the Adirondacks, only some 5,400 acres were burned.¹²⁵

Since no one area can have enough forest fire fighting brigades for the potentially truly massive forest fire, New York has entered into a number of mutual aid agreements with other states and with nearby provinces in Canada. These agreements, termed "Compacts," are essentially treaties within the federal system of the United States.¹²⁶ Under these agreements, New York will send teams of trained fire fighters to other states in an emergency, and other states will send their teams to New York. The receiving state agrees to reimburse the sending state for the entire expenses of sending their team. Such mutual aid agreements allow a state to quickly assemble and deploy a sufficient cadre of trained fight fighters and equipment to fight a significant fire raging beyond their normal fire fighting capacity.

It is instructive to note that the state of New York established this system with five essential elements: (1) the strongest possible (constitutional) mandate for preservation of forest habitat as watershed and habitat; (2) the regulation of lumbering and related commercial activity in and near forests, with a team of forest rangers to oversee and enforce those regulations, and equipping the rangers with modern fire detection and fighting equipment; (3) the recruitment of citizen volunteers to assist in detection and rapid extinguishing of fires; (4) the participation of an alert citizenry, organized into non-governmental organizations, to help protect the forests and advocate for improvements in their management; and (5) mutual aid agreements with other states in the United States and provinces in Canada.

Since 1972, this system of forest protection and management, including its strong fire-fighting element, has been incorporated into the fabric of contemporary environmental law. New York State now tests the quality of all streams and lakes, classifies these surface waters, and strictly controls all discharges of pollutants into them.¹²⁷ The state adopted the first Acid Deposition

125. See BROWN, *supra* note 120, at 140.

126. See The Northeastern Interstate Forest Fire Protection Compact, 1949, continued in 1963, *reprinted in* N.Y. CONSERV. LAW § 9-1123.

127. See N.Y. ENVTL. CONSERV. LAW §§ 17-0101 to -1017; *see also* Clean Water Act §§ 101-618, 33 U.S.C. §§ 1251-1387 (1994).

law in the United States,¹²⁸ designed to curb the air borne pollutants in "acid rain," and has strong state air pollution laws.¹²⁹ New York has effective endangered species legislation, as well as strong wildlife laws.¹³⁰ The state also adopted the Adirondack Park Agency Act in 1971, to establish a master plan and facilitate the adoption of land use and zoning laws for all the privately owned lands in the area of the Park and adjacent to the "forever wild" Forest Preserve.¹³¹

Most comprehensive, and perhaps most important of the contemporary environmental laws, however, is the New York State Environmental Quality Review Act (SEQRA).¹³² Adopted in 1976, this is New York's environmental impact assessment (EIA) law. It is important because it governs any governmental act – including permitting private persons to act – affecting the forests or any other environmental resource. SEQRA requires local authorities and state agencies alike systematically to evaluate the environmental impacts of their actions and "to the maximum extent practicable, minimize or avoid adverse environmental effects."¹³³ In forestlands, this analysis includes the protection of watershed, habitat and prevention of forest fires. The EIA system cuts across all sectors, resulting in such activities as silviculture or road building, recreation and tourism activity completing much the same environmental analysis. SEQRA builds in precaution and seeks to ensure the active consideration of the needs of future generations in governmental decision-making.¹³⁴ Most importantly, the SEQRA process requires the identification of alternatives to the proposed action.¹³⁵

Finally, New York law authorizes and encourages citizens as individuals and as members of non-governmental organizations (NGOs) to participate in the establishment of all the rules and regulations established to protect the environment.¹³⁶ Proposed new rules and agency SEQRA reviews are published in an Environmental Notice Bulletin, available to the public, by the New

128. See N.Y. ENVTL. CONSERV. LAW § 19-0901.

129. See *id.* § 19-0101; see also Clean Air Act §§ 401-416, 42 U.S.C. §§ 7651-7651o (1994).

130. See N.Y. ENVTL. CONSERV. LAW § 11-0539.

131. See N.Y. EXEC. LAW §§ 800-820.

132. See N.Y. ENVTL. CONSERV. LAW art. 8.

133. *Id.* § 8-0109(1).

134. See *id.* § 8-0103.

135. See *id.* § 8-0109(2)(d).

136. See N.Y. A.P.A. § 100.

York State Department of Environmental Conservation. The laws give citizens access to all government files relevant to the protection of the environment.¹³⁷ Judicial review is authorized for any action of any governmental body that disregards or misconstrues the applicable environmental laws.¹³⁸ Thus, a person concerned about the forests and the preparedness for forest fire prevention or fighting can discover the basic facts and participate in the government's forest fire programs. Indeed, the state laws mandate the government to consult with the public about the state's forest plans and programs.¹³⁹

From this description of New York State's legal regime for the stewardship of the forests of the state, the role of environmental law is evident. Fire fighting is not relegated to a special sector of government, and then starved for the funds and personnel to make it effective. Nor is fire fighting asked to compensate for the failures of land stewardship or negligent timbering. Rather, fire fighting is an essential part of a system of forest stewardship.

B. Mutual Aid Agreements – A Defining Threshold for Cooperation to Combat Forest Fires

New York State regularly deploys its forest rangers and forest fighting equipment to other States and Provinces with which it has negotiated mutual aid agreements. These are essentially like treaties,¹⁴⁰ since the States retain the sovereignty over their lands and forests, and have the right to enter into agreements with each other. In an interesting precedent, Canadian Provinces have also entered into these agreements. This formal process for preventing and cooperation for combating forest fires can provide a useful precedent for fashioning regional mutual aid pacts, as in the ASEAN region, or internationally through the United Nations Environment Programme.

137. See N.Y. PUB. OFF. LAW §§ 84-90.

138. See N.Y. C.P.L.R. art. 78.

139. See, e.g., N.Y. ENVTL. CONSERV. LAW § 9-0809.

To assure that all segments of the public have an opportunity to participate in the development of the plan, the planning program will be conducted with a structured program of public participation. The department shall establish procedures to keep the public informed about the planning process and to provide opportunities for the public to contribute to that process.

Id.

140. See U.S. CONST. art. 1, § 10, cl. 3.

Historical forest fire data for North America demonstrates that forest fires are a constant threat and real problem. In April of 1903, fires in New York's Adirondack Mountains burned 637,000 acres.¹⁴¹ In 2000, New York experienced 107 forest fires, which were controlled and burned only 425 acres. Forest Fires in the northeastern United States were in a similar scale, with 227 in Maine (286 acres), 248 in New Hampshire (160 acres), 28 in Vermont (67 acres), 1,854 in Massachusetts (2,735 acres), 55 in Connecticut (183 acres), and 82 in Rhode Island (76 acres). In contrast, in 1999, California experienced forest fires lasting from August through November, evacuating hundreds of people and burning over 220,000 acres; that year a fire in Nevada burned 288,220 acres.¹⁴² Forest fires in the western United States in 1997-98 were severe, and Congress held hearings in June of 1999 on the "Status of the Forest Service's Efforts to Reduce Catastrophic Wildfire Threats."¹⁴³

The northeast is more humid than the west, but it has extensive forest cover and the risk of fires could be great were it not for the Northeast Forest Fire Protection Commission. Following forest fires in Maine in 1947 that burned over 250,000 acres, the States decided to enter into an interstate Compact the same year to promote effective protection and control of forest fires in the northeastern states of the United States and adjacent portions of Canada.¹⁴⁴ New York State joined together with the States of Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont. Congress approved the Compact in 1949.¹⁴⁵ Quebec joined the Compact, and in 1970 New Brunswick did likewise; in 1997 Nova Scotia joined. Canadian Provincial participation in the Compact was approved by Congress in 1952.¹⁴⁶

141. See National Interagency Fire Center, *Historical Wildland Fire Statistics*, available at <http://www.nifc.gov/stats/historicalstats.html> (last modified Apr. 19, 2001).

142. *Id.*

143. See, e.g., *Status of Forest Service's Efforts to Reduce Catastrophic Wildfire Threats: Hearing Before the House Subcomm. on Forests & Forest Health of the Comm. on Res.*, 106th Congress (June 29, 1999) (statement of Barry T. Hill, Assoc. Dir., Energy, Resources, and Scientific Issues, Resources, Cmty., and Econ. Dev. Div.), available at <http://resourcescommittee.house.gov/106cong/forests/99jun29/hill.htm>.

144. See The Northeastern Forest Fire Protection Commission Website, available at <http://www.nffpc.com> (last modified May 10, 2001).

145. Northeastern Interstate Forest Fire Protection Compact, Public L. No. 81-129, 63 Stat. 271.

146. Canada forest fire Protection Compact, Public L. No. 82-340, 66 Stat. 71.

The Member States and Provinces of the Northeast Compact pay membership fees based on their share of the protected area of 66,047,101 acres of forest in the region. The Commission's mandate "is to provide the means for its member states and provinces to coped with fires that might be beyond the capabilities of a single member through information, technology and resource sharing (mutual aid) activities."¹⁴⁷ The Rules of the Commission provide that it is a "fact finding, coordinating and deliberative body with power to make recommendations to the member states."¹⁴⁸ Each Member State or Province can send three Commissioners, one from the fire fighting service, one from its Governor and one from its legislature. This ensures that the Commission's recommendations can be heard by each branch of government responsible for equipping and financing forest fire protection. Over the years a technical committee of State Foresters was set up to coordinate training, and formulate procedures for all technical issues of fire control. Under the over-all supervision of an Executive Committee, working teams have been set up for (a) training, (b) prevention, (c) equipment, (d) aviation, and (e) fire weather. An Executive Director manages the affairs of the Commission.

The Northeastern Compact functions well because each member state and province has established its own professional forest fighting agencies, with trained personnel and equipment. Each member can call on the others for mutual aid in case of a fire that its own team of fire fighters cannot contain. The Compact helps advise its members on what they need to do to maintain adequate forest fire fighting services. The Commission has a process for accreditation of member services and scheduling of periodic reviews of the services, for preparation of the findings of review teams, and the presentation of recommendations for program improvements to the full Commission.

When a state or province calls on the other Members of the Compact for mutual aid, the fire fighting teams or equipment requested are deployed. After the fire is contained, the Members requesting the aid pays the Member that contributed the assistance for the costs of the services. The Compact works well.

Similar arrangements exist among the federal agencies that manage the public lands of the United States, primarily in the

147. NORTHEAST FOREST FIRE PROTECTION COMMISSION (NFFPC), BRIEFING MANUAL 3 (2000) [hereinafter NFFPC].

148. Article I, Section 1, Rules and Regulations of the Northeastern Forest Fire Protection Commission (1994), *reprinted in* NFFPC, *supra* note 147, at 27.

west. The U.S. Department of the Interior and Department of Agriculture prepared an Action Plan for Federal Wildland Fire Management in 1996.¹⁴⁹ The Plan calls for establishing "Geographic Coordinating Groups" to work with all local and state and tribal partners in forest fire management. The Plan aims to develop interagency preparedness for wildfire management, including developing training tools and programs, common management procedures and objectives, implementation strategies, and fire prevention activities.

An Interagency Management Review Team is to establish fire management qualifications and qualification standards. In 1997, the U.S. Forest Service announced a goal of resolving the problems of the large, catastrophic forest fires on the 39 million acres of forest at high risk of fire by the year 2015. The plans call for employing programs to monitor forest health and developing a comprehensive strategy for reducing accumulated vegetation that fuels fires.¹⁵⁰

The examples of the Northeastern Compact, and the federal agency wildfires strategies, provide concrete examples of practical measures that States are taking to combat forest fires. The procedures, techniques, training, and financial systems have all been developed. While that would always need to be adapted to the different ecological, social and economic conditions of each nation, the broad outlines are evident. Fire fighting is an applied activity, not merely a planning process. The sooner teams of actual fire fighting services start to work together, with the full support of their governments, the sooner forest fires can be brought under control. International cooperation needs to begin from that premise. The successful models of inter-state cooperation exist. They should be adapted and emulated. If States wish to get results, they should insist that further international diplomatic deliberations over forest fires focus on putting in place the practical fire fighting service units, and bringing these services into cooperative alliances. This has worked over the years in New York and in the Northeast of North America.

149. See U.S. DEP'T OF INTERIOR & U.S. DEP'T OF AGRIC., FED. WILDLAND FIRE MGMT. POLICY & PROGRAM REVIEW - IMPLEMENTATION ACTION PLAN (1996), available at <http://www.fs.fed.us/land/wdiap.htm>.

150. See U.S. GEN. ACCOUNTING OFFICE, REPORT TO HOUSE SUBCOMM. ON FORESTS & FOREST HEALTH OF THE COMM. ON RES., *Western Nat'l Forests: A Cohesive Strategy is Needed to Address Catastrophic Wildfire Threats*, GAO/RCED-99-65, 106th Cong. (1999), available at <http://resourcescommittee.house.gov/106cong/forests/rc99065.pdf>.

C. Environmental Law Goals for Sustainable Development

The illustrative case of New York is useful in the context of states such as Indonesia and Mexico. While New York built its systems of law and forest management gradually, the pressures for development on natural resources in the developing nations, and in the economies in transition, require that these States move more rapidly to establish their environmental laws and forest fire protection systems.

Environmental law is clearly understood as a relevant body of law by each nation. Both Indonesia and Mexico have made the teaching of environmental law a requirement for their law degrees. Both supported *Agenda 21*, which in Chapter 8 calls for the strengthening of legal systems as essential for sustainable development.¹⁵¹ The public in both nations is increasingly frustrated with the poor administration of the basically sound environmental legislation, and there is growing impatience because of the evidence of corruption in the administration of the laws generally in both states. Both nations have reform oriented governments at present. The stewardship and remedial aspects that characterize the observance of environmental law in New York are not yet realized in these states. Nonetheless, the gradual strengthening of environmental law will bring the benefits of sustainable development.

It is important to note that New York developed its forest fighting and environmental law capabilities largely by itself, as a developing economy and society. There was no system of foreign aid, and the duty of cooperation in international law had not yet emerged. In this respect, the illustration of New York is also germane to the needs of developing states. As Ambassador and Law Professor Tommy Koh has observed, "Developing countries must avoid the mistake that co-operation at the international level can substitute for the needed sacrifices and hard work at the national level."¹⁵² When New York experienced its worst forest fires, the State was rich in natural resources but at the time was squandering its forest wealth, and no foreign aid came to help New York with its problems. There was no international cooperation at the

151. See *AGENDA 21*, *supra* note 22, paras. 8.13 to 8.26.

152. Tommy Koh, *The Quest for World Order; Perspectives of a Pragmatic Idealist*, INST. POL'Y STUD., at 63. Professor Koh elaborates this point as follows: "Our dream of a more prosperous and more equitable world can only be realized if all of us are prepared to work hard at home and to develop the habit of consultation and co-operation at the international level." *Id.*

time, and aid from the federal government would not come into existence until the institution of the Income Tax and the expansion of federal government roles during process of rebuilding the economy after the Great Depression in the 1930s.

Developing nations can take measures to control their forest fires in relatively short order. They can do so in cooperation with neighboring states. International organizations can provide the funds for the basic training and equipment needed to get forest fire services in place. But just as the fires destroy the resources base of each nation, it must essentially be the decision of each nation to invest its own financial and human resources in systems to combat fires. Since it takes a disciplined force to fight fires, and airplanes are needed, it would make sense for states initially to direct their armed forces to assume the responsibility for combating forest fires.

Indeed, in light of the markedly tepid response by the international community to the forest fire problems during 1997-98, it is safe to say that developing states and economies in transition can only rely upon themselves to establish the management systems that will prevent or control forest fires in the future. Current levels of bilateral and multilateral assistance are inadequate to carry the burden of subsidizing the capacity building for national or sub-national forest fighting. The Asian Development Bank RETA or the UNEP proposals for forest fire monitoring both pay scant attention to the reality that the forest fires must be prevented locally, and contained and extinguished locally. Neither makes strengthening environmental law a prerequisite to sustainable development of forest and other natural resources.

The New York experience confirms that forest fire prevention succeeds when self-help is employed. If international assistance and cooperation are to advance the cause of sustainable development, then their objective must be to catalyze local measures for self-sufficiency, and then link these in effective mutual aid systems. When nations, like Indonesia and Mexico, already have made a commitment to such self-sufficiency by enacting stewardship norms through their national environmental laws, international development efforts would benefit from recognizing and strengthening those national efforts. This can be done on two fronts. The first is to strengthen the systems that characterize

environmental law in each nation,¹⁵³ and not to shy away from such a task simply because certain economic interests seek to continue their exploitation of natural resources. The second is to provide the basic training for community leaders to organize local fire protection programs.

Community organization to fight fires is the first step in self-sufficiency. Examples of organizing in this way can be found in developing nations. For instance, the first volunteer fire-fighting corps in Chile was organized in 1850 in Valparaiso. The model took hold there much as it did in New York State. There are now some 35,000 volunteers in 1,100 fire companies in Chile. Even in rural areas there are usually one or two volunteer fire companies. These are organized under 276 fire departments, or corps, and they raise funds locally for a barracks, a fire truck, communications equipment, and fire fighting tools. The corps are essentially private non-governmental corporations. In 1970, the Junta Nacional de Cuerpos de Bomberos de Chile was founded to provide national integration of the system. There is a National Fire Fighters Academy (Academia Nacional de Bomberos) which coordinates the training for all the volunteers, and the national budget allocates some \$11 million to the network.¹⁵⁴

Building this community volunteer network to fight fires is fundamental to successful forest fire management. It is used in other sectors, some also related to El Niño phenomena. For instance, in India, Dr. M.S. Swaminathan instituted an integrated monsoon management strategy to micromanage the planting of crops based on actual rainfall during the problematic El Niño period. As he describes it,

First, establish in every district a *Crop Weather Watch Group* consisting of climatologists, farm scientists, representatives of

153. It is remarkable that relatively little assistance goes toward implementing Chapter 8 of Agenda 21; international and bilateral aid agencies will give assistance for drafting legislation, but little to nothing for training personnel or assisting in the development of grass roots programs at implementation. An exception to this is the assistance that the Asian Development Bank gave to the International Union for the Conservation of Nature and Natural Resources (IUCN) to conduct a capacity-building course on teaching environmental law at University level for the professors of law from fifteen Asian and Pacific nations in 1997 and 1998, in cooperation with the Asia-Pacific Centre for Environmental Law at the National University of Singapore, and UNEP; see also Aarhus Economic Commission for Europe Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters, June 25, 1998, available at 1998 WL 750201.

154. See *Chile: Fire Prevention & Fire Fighting Equip. Market*, INDUS. SECTOR ANALYSIS, July 28, 1998.

farmers' and women's organizations, members of the mass media and officials of government and financial institutions. The tasks to be addressed by the group include monitoring monsoon progression, developing contingency plans and alternative cropping strategies to suit different weather probabilities, building seed reserves of alternative crops and intensifying efforts in the area of water harvesting and minor irrigation.¹⁵⁵

To extend this approach, he advocates training "in each village panchayat at least one male and one female member in the science and art of monsoon management."¹⁵⁶ The unpredictability of the effect of El Niño on the important monsoon rains for agriculture requires this community level involvement in cropping. The same approach can be seen in the initial organization of fire districts and towns in New York, or the volunteer fire corps in Chile.

What is missing from the reports of the follow-up to the Mexican forest fires, or the ASEAN Regional Haze Action Plan, and the Asian Development Banks RETA to assist after the Indonesian fires, is a commitment to assign high priority to this sort of community based organizing. There is also a lack of interest in creating economic instruments to generate the funds within each nation to secure the needed equipment and underwrite the on-going training. Beyond establishing user fees, especially for the larger scale commercial agriculture and silvaculture enterprises, to pay for building fire-fighting capacity, little to no attention has been paid to develop more sophisticated economic instruments such as a fire insurance system. Not only would insurance help compensate for unavoidable fire losses and prepare local communities to fight the next wave of fires, but by employing graduated levels of insurance premium fees, the system could reward those low risk insurers who employ strong fire prevention systems while assessing higher fees to high risk enterprises. This system would thereby provide economic incentives for sound fire prevention practices. The inattention to insurance in the aftermath of the 1997-98 fires is a mistake. It is more than a little ironic that the World Bank and others are examining new emission trading systems for emitting and sequestering carbon dioxide under prospective green house gas management schemes for the U.N. Framework Convention on Climate Change, and virtually no one

155. M.S. Swaminathan, *Pokhran, El Niño and the Monsoon*, THE HINDU, May 28, 1998, at 12 (emphasis in original).

156. *Id.*

is developing the needed fire insurance programs to help ensure that sustainable local economies will be there to manage and safeguard forests.

Similarly, there are proven forestry techniques to avert fires, and zero burn techniques for palm oil plantations and other agricultural activity. Environmental laws are needed to induce the use of sustainable agricultural practices. The Golden Hope Plantations Berhad in Malaysia was recognized by UNEP as its Global 500 Roll of Honor at the 1992 Rio de Janeiro Earth Summit for shredding old palm fronts and vegetation and replanting the new palms amidst the decomposing old, rather than burning the biomass.¹⁵⁷ This technique should be taught and mandated throughout Indonesia, Malaysia, and elsewhere as a sound and sustainable agricultural practice that obviates the need for burning and thus lowering incidents of forest fires.

New equipment, such as the Bombardier aerospace turboprop amphibian airplanes, which can load with surface water while in flight ("water scooping") and make repeated passes delivering water to remote fire areas, can be added to a nation's defense forces. There is no rational explanation for a nation having a large air force "to defend" against a theoretical foreign military force, and yet have no equipment to help fight off the common foe of fire. Spain, France, Greece, Italy, and Canada, along with heavily populated areas such as Los Angeles County in California, employ these planes effectively.¹⁵⁸ Thailand has acquired two such aircraft. Developing nations cannot afford to squander funds on military aircraft which may or may not ever be needed against "theoretically possible" enemies when their nations need these fire fighting aircraft to fight recurring and predictable fires. The shift in military budgets for this purpose is within the capacity of each developing nation to achieve. In Indonesia, most areas are within a short distance of water. In Mexico, while water may be more remote, the fires are often in places inaccessible to fire fighting equipment and fire suppression by aircraft may be essential.

Thoughtful analysis on the problem of transboundary air pollution from forest fires by Prof. Simon S.C. Tay notes that nations have not worked effectively at the regional or bilateral level to collaborate to end the fires, for instance, as in not creating a regional

157. GOLDEN HOPE PLANTATIONS BERHAD, *THE ZERO BURNING TECHNIQUE FOR OIL PALM CULTIVATION* (Kuala Lumpur, Malaysia 1997).

158. See Ed Smockum, *Dousing With Aircraft-Water Bomber Gives a Flying Start*, FIN. TIMES, Sept. 29, 1998, at 16.

fund to pay for measure to tackle the "haze" problem. If the North-east Compact can set up a common fund, so can other regions. At an Asia Pacific Regional Workshop on Transboundary Pollution in Singapore in May of 1998, Prof. Tay advocated six measures in the private sector that would induce more government action: (a) a full account of the costs and losses from the pollution would "be a basis for affected states to make the economic commitment to fund the necessary steps for the prevention and control of future fires"; (b) a regional treaty to set environmental limits and establish a basis for holding states responsible; (c) establishing access to the courts for private citizens to seek compensation for their losses; (d) having a more open and routine review of regional plans (such as in ASEAN), including a range of experts and NGOs; (e) conducting joint training of fire fighting units in the region, to build confidence in transboundary cooperation as well the enhanced skills in fire fighting; and (f) connecting regional economic incentives to better fire prevention, as in regional trade relations.¹⁵⁹

Professor Tay has effectively argued that inactivity in south-east Asia results from the perspective that governments, media, and the public take to the problem. If the air pollution is seen as merely haze, a local concern, as merely an unusual El Niño event, caused by many small fire incidents with no one at fault, and solvable just by organizing fire fighting, then there will be no effective response to the 1997-98 fires. If, on the other hand, fires are seen as recurring dangers, the air pollution as a threat to health, that fires can be prevented more effectively than fought, and that commercial enterprises can be held accountable for their behavior, then a government can be motivated to act.

Of course, inertia tends to move governments toward the first characterization. News about the fires in the media and regular reporting of the health impacts and costs of the transboundary air pollution, can build political pressure toward collaboration to develop more effective fire prevention and containment. The strategies recommended by Professor Tay depend on full and transparent sharing of knowledge about the fires and their causes, and this in turn on ensuring access to information, as well as public participation in decision-making, and ultimately access to justice. These principles lie at the heart of environmental law procedures, and have recently been reaffirmed in the United Na-

159. *Inertia Over Haze Problem – Need to Work Out Full Costs of Haze*, STRAITS TIMES, May 28, 1998, at 33.

tions Economic Commission for Europe's Convention on Freedom of Information, Public Participation and Access to Justice signed in Aarhus, Denmark, in June of 1998.¹⁶⁰ The pre-conditions in civil society, for Professor Tay's recommendations to take root, will depend on other regions, beyond Europe, developing similar agreements.

V. Conclusions

Much more is at stake in the response to the forest fires of 1997 and 1998 than the cause of fire fighting. The strengthening of civil society, to become responsible for the stewardship of fire and forests, is a fundamental premise for sustainable development. Careful use of natural resources will not advance amidst corruption and avoidance of environmental management systems. Nations with inefficient or corrupt governments will neglect good forest management and experience an escalation of forest fire damage and loss.

Yet it is not simply the developing states that must reorder their thinking if the forest fires are to be contained. There is a myopia in developed lands as well. Most environmental organizations devote substantial resources to establishing preserves to safeguard Earth's biodiversity, and yet spend virtually nothing on building the community level systems for forest conservation and forest fire prevention. The environmental advocates and actors need to add the challenge of forest fire prevention and management to their priorities. They need to help support the training of local forest rangers and facilitate the development volunteer fire prevention and fighting programs. Because the citizens and parliaments of developed states tend to assume that the fire phenomena is under control in their nations, they seem oblivious to the fact that it is out of control in most other regions.

The fires of 1997 and 1998 may have elevated forest fires onto the global agenda of concerns for journalists, but foreign ministries and national governments still appear not to have embraced that agenda. For many leaders in government and non-governmental sectors alike, the economic problems flowing from the economic depression in the markets of southeast Asia and the weak economy in Mexico, and the stressed economies of Brazil and the

160. See Aarhus Economic Commission for Europe Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters, June 25, 1998, *available at* 1998 WL 750201.

states in Africa, have eclipsed the worry about forest fires. The rains return and the urgency to prepare for the next wave of fires is clouded over.

Fire fighting in the biologically rich areas of the Earth requires an environmental priority at least as sustained and important as that served by the International Committee of the Red Cross and the Red Cross and Red Crescent Societies. Humanitarian concerns never leave the agenda, and the team of volunteers who mobilize in the wake of natural disaster or armed conflict are always in training and preparation. If the United Nations system is not prepared to mobilize the systems for the sustainable use and defense of forests, then organizations, such as the International Union for the Conservation of Nature and Natural Resources (IUCN), should be encouraged to add this work to their agenda and commit to it for the long-term.

The work of IUCN, through its World Commission on Protected Areas or its Species Survival Commission, will be gravely threatened by a repeat of the forest fires of 1997-98. For instance, in the Primorski Krai, a maritime region in the Far East of the Russian Federation, there were 120 large-scale forest fires out of 546 fires in 1998, which burned 43,820 hectares of forest-land. These were the worst forest fires in the region since 1921 and burned some 4,000-hectare in the Sikhote-Alinski and Lazovski Zapovedniki, which are the habitat for the endangered Siberian Tiger. Non-governmental organizations contributed a mere \$18,500 for fighting the fires, and rainfall in July 1998 finally extinguished the fires.¹⁶¹ Such set backs to biodiversity protection can be seen in every region where forest fire damage escalates. The states that are members of IUCN and support its work would benefit from examining how this intergovernmental organization, founded in 1948, with its forest and wildlife ministry members and NGO members, can address the new global threats of forest fires. IUCN may be able to catalyze the international cooperation which is presently so disproportionate to the need.

161. See *Siberian Tiger Habitat Threatened—This Time, It's Fire*, RUSSIAN CONSERV. NEWS, Summer 1998, at 32.

The major tools for fighting fires were haversacks with water, shovels, and motor saws. Crews were transported to the place of fires by cars and bulldozers. Firefighters then raked aside the soil to prevent further spread of fires, extinguished fires with water, destroyed the deadfall. Helicopters, due to high costs, were used only to supplement ground crews.

Id.

Put positively, it is the local authority that must be the first defense against fire. In the parlance of the European Union, considerations of subsidiarity support this conclusions. At the same time, regionally there must be a shared effort towards training and transferring forest fire prevention knowledge and technology. At the inter-regional or international level, there must be sharing of remote sensing data for the detection of forest fires and gathering and disseminating information on climatic and weather conditions. Environmental law can shape the links between sustaining and managing forests in ways to prevent fires and coordinating the fire detection and fighting. It is a continuum, from the local to the global levels, transcending the traditional lines between governmental authority, and international and municipal law.

What animates the progressive development of international law today? Principles of state responsibility and international cooperation provide scant help in coping with forest fires around the world because of the way they treat, in a static way, the status of relations among states. The law must evolve to be relevant to social problems or it becomes a dead letter. Environmental law emerges as a legal system that is evolving as the needs of nations, people, and nature dictate, and with the scientific advances in better understanding nature. The Earth's people cannot add more concentrations of larger numbers of people to fragile forest areas and fail to also improve their management of the forest ecology.

Forest fires are a clear and present danger, not merely to territory within a nation, but globally and transnationally. It is unlikely that a worldwide approach to fires will become a priority, at least until the next wave of El Niño induced forest fire tragedies. Until that time, the role of environmental law must be to support procedures that provide remediation to those afflicted by fires and catalyze reforms to avert such afflictions were possible. This transformational mission is the hallmark of environmental law.