

Addressing Environmental Modification in Post-Cold War Conflict

The Convention on the Prohibition of Military or Any other Hostile Use of Environmental Modification Techniques (ENMOD) and Related Agreements

by

Susana Pimiento Chamorro and Edward Hammond
The Sunshine Project

This is one in a series of essays meant to stimulate and inform discussion of the subject. The author invites readers with comments or suggestions to correspond with them directly:

Susana Pimiento and Edward Hammond
The Sunshine Project
1802 W 6th Street
Austin TX 78703 USA
tsp@sunshine-project.org

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"The right of belligerents to adopt means of injuring the enemy is not unlimited."

- Article 22. The Hague Regulations Respecting the Laws and Customs of War on Land, 1907

Introduction: Post-Cold War Conflict and Hostile Environmental Modification

Since the end of the Cold War, superpower confrontations have been replaced by new kinds of conflicts, tactics and weaponry. Military and political strategists have labeled narcotics, ethnic disputes (including indigenous peoples' grievances), competition for natural resources (including water), and protests against globalization as new or emerging threats to national and global security. (1) Traditional "army versus army" confrontations have been supplanted by complex combinations of law enforcement, peacekeeping, economic and military measures. New kinds of technology, including biotechnology, have been adopted by militaries seeking to adapt to the changing face of conflict.

The War on Drugs is an important example of the difficulty encountered when defining contemporary conflict in Cold War terms. Countries such as the US see drugs as not only a criminal problem but also a threat to national security. This security assessment is used not only to justify militarization of this peculiar and bloody conflict but to justify entry into other countries' internal disputes, such as counterinsurgency operations in Colombia, or to justify hostile conflicts between governments, such as that between the US and Afghanistan's Mujahideen.

In Colombia, the War on Drugs has included the massive spraying of broad spectrum herbicides in ecologically fragile areas. In a single two-week period in 2000, approximately 25,000 hectares were fumigated from the air with a glyphosate-based chemical agent. (2) The plant eradication effort is meant both to squelch narcotics production and to assist in regaining state control over rebel-held land. In addition to chemicals, biological crop eradication agents (mycoherbicides) have been developed for use in the Drug War. Like chemical herbicides, use of these biological agents is meant to accomplish both law enforcement and politico-military objectives. (3)

In Mexico, Zapatista rebels have denounced what they consider to be hostile environmental modification aimed at stopping their insurgency. According to villagers in Zapatista regions, the government's massive spraying of pesticides to control the Mediterranean fruit fly has deliberately hit food crops, ruining them. The villagers say the spraying is a thinly disguised attempt to destroy the food security of farming communities suspected of harboring rebel sympathizers. The Mexican government of Ernesto Zedillo, while admitting that the Army played a role in fruit fly control, insisted that spraying was purely for phytosanitary reasons. (4)

Zapatista communities have also voiced suspicion that the extensive fires recently experienced in their region could be the product of deliberate attempts to influence the course of their insurgency. (5) They are not

alone in their concern about the use of fire to achieve economic and political objectives. Angry at the damage caused by deliberately-set fires in the Amazon, in 1998 a Yanomami spokesman told Reuters: "*The white men started these fires and they have to put them out. If the fire is not put out, we will have nothing to hunt and nothing to fish... They will come and take the Indians' land. Our reservation will disappear.*" (6) Similarly, indigenous peoples accused corporate landowners in Kalimantan (Borneo), Indonesia, of allowing fires to rage out of control in 2000, thereby displacing traditional peoples and opening huge new areas of forest to industrialized agriculture (oil palm). (7)

Interestingly, Colombia's President Pastrana visited Malaysia in March 2001 and met with representatives of that country's oil palm industry. (8) Returning home, he encouraged investment by the oil palm industry in precisely those areas of Colombia in which small farmers and indigenous people were being uprooted by the Drug War and chemical fumigation. (9)

Environmental treaties offer one avenue for constraint on environmental modification in times of conflict. Unfortunately, in recent years, it has proven difficult to gain general ratification of new environmental agreements. The US in particular has balked at ratifying several important agreements ranging from the Biodiversity Convention to the Kyoto Protocol. This in mind, the use of existing legal instruments would appear to be a more practical approach to constraint of environmental destruction than the creation of new treaties.

Addressing emergent conflicts with an existing international legal instrument, however, may prove challenging. Many arms control treaties were tailored to suit the Cold War, not the 21st century. *The Convention on the Prohibition of Military or Any other Hostile Use of Environmental Modification Techniques* (ENMOD; see text in Appendix) was intended to address technologies capable of modifying the environment for hostile purposes. Provocation of earthquakes, cloud seeding, and manipulation of the atmosphere are examples of the kinds of possible attacks the authors of ENMOD foresaw. The treaty's preventative approach is both visionary and remarkable, considering that, at the time of negotiations, the technology to achieve many of the weapons contemplated was in its initial stages or entirely nonexistent.

Activities that could violate ENMOD include:

- Triggering earthquakes
- Manipulating ozone levels
- Alteration of the ionosphere
- Deforestation
- Provoking flood or drought
- Use of herbicides
- Setting fires
- Seeding clouds
- Introduction of invasive species
- Eradication of species
- Creation of storms
- Manipulation of El Niño / La Niña
- Destruction of crops

Today, almost a quarter century after ENMOD was negotiated, the treaty is all but forgotten. Only 70 countries ratified the agreement. Twenty were required to bring it into force. Parties to ENMOD have met only twice, in 1982 and 1992. Despite the fact that, early on, ENMOD was recognized as

flawed, no international civil society group has seriously tried to fix it.

This paper explores the possibility of reinvigorating (or reinventing) ENMOD to take advantage of its unique approach to prevention of hostile modification of the environment. The paper places particular emphasis on hostile modification by use of herbicides and other anti-plant technologies. The paper also describes ENMOD's main features, highlights its limitations and possibilities, places ENMOD in the context of other international arms control conventions, and compares ENMOD to other legal initiatives with potential for preventing use of environmental modifications in international conflicts.

I. The Law of War and Limitations on a State's Rights in Conflicts

International law recognizes the right of states to wage war based on the principles of sovereignty and self-defense. The right of states to engage in armed conflict, however, is not absolute. The Law of War prescribes restrictions on three aspects of armed conflict: the definition of war, relations between neutral and belligerent states, and the conduct of war, that is, weapons, treatment of prisoners, wounded, civilians in occupied territories, enemy nationals and their property, and non-military ships. (10)

International rules on the conduct of war are intended to avoid unnecessary suffering or damage to combatants, civilian populations and property. But under the Law of War, the definition of unnecessary is decidedly limited. Generally speaking, by declaring a military necessity, states can exempt themselves from the restrictions of the Law of War and sidestep the restrictions it imposes.

There are limitations, however, on states' ability to claim exceptions on the basis of military necessity. First, several multilateral and regional conventions regulate the weapons that can be used legally in armed conflicts. Restrictions on anti-personnel land mines are one example. (11) Secondly, international customary law constrains all use of weapons of mass destruction.

The International Court of Justice (ICJ) has recognized that weapons of mass destruction are subject to international customary law. In a recent ruling on nuclear weapons, the ICJ concluded that, "*States must never make civilians the object of attack and must consequently never use weapons that are incapable of distinguishing between civilian and military targets... it is prohibited to cause unnecessary suffering to combatants: it is accordingly prohibited to use weapons causing them such harm or uselessly aggravating their suffering. In application of that second principle, States do not have unlimited freedom of choice of means in the weapons they use.*" (12)

II. ENMOD

Among the multilateral agreements that restrict use of particular types of weapons is ENMOD, a "non-use" arms control treaty prohibiting intentional modification of the environment for hostile purposes. (13)

Historical examples of hostile modification of environment would include

the spreading of salt by the Romans in the fields of Carthage in 146 B.C. (14) A more recent example is the near extermination of the bison in the United States during the 19th century. A critical resource for indigenous peoples of the North American plains, bison were hunted to near extinction by immigrants from the Eastern parts of the US. The elimination of the bison assisted the campaign of the US government to extinguish Native American land rights and remove native peoples to reservations. By destruction of the bison, basic environmental resources were denied to Native Americans. Many Native Americans were forced to choose between capitulation or starvation and freezing. As a result, immigrants were rewarded with land and US sovereignty was extended to new areas.

While ENMOD provides protection against manipulation of the environment as a weapon of war, it does not provide protection against the environmental damage that might result from military actions. Consequently, intentional ruination of farmland or eradication of natural resources would be considered an illegal form of warfare, but the collateral environmental damage resulting from a bombing campaign would not.

Origin

ENMOD came in response to environmental modifications made by the US during conflicts in Vietnam, Laos, and Cambodia in the 1960s and 70s. The US used massive spraying of chemical herbicides - the defoliants Agent Orange (2,4,5-T & 2,4-D) and others - to deprive its foes of both food supplies and shelter.¹⁵ In "Operation Popeye" the US also attempted to change weather patterns by seeding clouds in order to worsen monsoons in Laos and North Vietnam and thereby impede delivery of supplies to insurgents in South Vietnam. (16)

The US strategy was developed to counter Viet Cong (Vietnamese National Liberation Front) (17) guerrilla tactics inspired by Mao Tse-Tung. Mao had advocated use of hidden bases and unpredictable attacks to maintain guerrilla initiative. The US attempted environmental modification in order to make the Southeast Asian environment serve US needs rather than those of the Viet Cong. According to one analyst, the idea was simple: *"If, as has been suggested, then the guerrilla is to his base area as fish are to the sea, the destruction of the sea would kill the fish and the elimination of the base area with its supports would destroy the guerrilla."* (18)

US attempts at environmental modification prompted action from dissidents in the US Congress. After investigation confirmed the cloud seeding attempts of Operation Popeye, in 1973 the US Senate passed a resolution urging President Nixon to initiate negotiations leading to a multilateral treaty. (19) US-USSR bilateral negotiations followed in 1974. In 1975, the Soviet Union and the United States submitted separate but identical texts of a draft convention to the UN. The draft was then finalized under the auspices of the Conference of the Committee of Disarmament (CCD) and adopted by the UN General Assembly on 10 December 1976. (20) ENMOD was opened for signature in May 1977 and entered into force on 5 October 1978 when Laos, the 20th party, deposited its instrument of ratification. (21)

US environmentalists were so intensely disappointed by the final text of ENMOD that they opposed US ratification. (22) In their view, the language defining modification techniques was so vague and the threshold for violations so high that ENMOD might legitimize the use of some environmental weapons. (23) (These issues are discussed in greater detail

later in this paper.) They also noted that ENMOD's scope of protection - which excluded weapons development, testing, and threats - was too narrow and its mechanism for verification too weak.

US environmentalists obtained a court order requiring an environmental impact assessment of ENMOD prior to its submission to the Senate for ratification. A few environmentalists even called for a renegotiation of ENMOD. Later, they withdrew their objections to US ratification and advocated improving the treaty through a rapid series of conferences of state parties to strengthen ENMOD's weaker provisions. The idea never came to fruition.

Environmental Modifications Covered by ENMOD

Under Article I, Parties commit not to engage in military or any other hostile use of environmental modification techniques having widespread, long-lasting or severe effects as the means of destruction, damage or injury to any other State Party. Also, Parties undertake not to assist, encourage or induce any State, group of States or international organization to engage in such activities.

Some environmental manipulation is permitted. For example, armies may use herbicides or other means to denude the perimeter of military bases in order to reduce the chance of sneak attack.

To violate ENMOD, an attempt to manipulate natural processes is required. The treaty does not protect states against environmental damages resulting from hostile actions. In other words, collateral damage incidental to warfare is not prohibited. Article II lists examples of environmental modification techniques and includes among them provocation of earthquakes, tsunamis, hurricanes (typhoons), disruption of ecological balance in climatic elements, change in ocean currents, and changes in the state of the ozone layer.

Article I provides a definition of environmental modifications the treaty is meant to cover. That definition entails two standards, the first on the magnitude of the modification itself, i.e., the scale of damage to the environment, and the second on the intent or purpose of the modification.

On magnitude, Article I establishes that for a technique to fall within the scope of ENMOD, at least **one out of three** criteria must be met: widespread, long lasting or severe. (24) These criteria together are known as the **troika**, and set the magnitude threshold for violation. If the threshold is met, the exception of military necessity cannot be claimed.

In 1984, the First Review Conference on ENMOD adopted an understanding of the troika that had been developed by the Geneva-based Conference of the Committee on Disarmament (CCD) in the course of ENMOD's negotiation:

- **Widespread**: refers to a geographic area; the environmental modification must cover an area of several hundred square kilometers;
- **Long lasting**: means effects lasting for a period of months, or over a season;

- **Severe:** means involving serious or significant disruption or harm to human life, natural and economic resources or other assets.

The First Review Conference of ENMOD in 1984 also reaffirmed its support for Article II, which contains the definition of the term "environmental modification techniques". Further, the Conference *"was of the opinion that that definition, taken together with the CCD understandings relating to articles I and II, was adequate to fulfill the purposes of the Convention."* (25)

The second standard in the definition of environmental modification relates to the intent of the modification. ENMOD only bans environmental modification for **military or hostile purposes**. Peaceful modifications of the environment, stemming from potential future developments of technology, are recognized as potentially desirable. "Military" refers to armed conflicts – those between States Parties (i.e. countries which have ratified ENMOD). "Hostile", a much wider concept, includes both armed and unarmed conflicts. For example, the spraying of herbicides by the United Kingdom on opium poppies in Burma without Burma's permission is a hypothetical example of a non-military hostile conflict. (26)

Development and testing of environmental modification techniques are not outlawed by ENMOD. A preventative approach had been apparent in US Senate Resolution 71, which included a draft text of the environmental modification convention. The draft did contain a prohibition of *"any research or experimentation directed to the development of such activity [environmental or geophysical modification] as a weapon of war"*. (27) Nevertheless, development and testing were not outlawed in the final version of ENMOD.

Scope of ENMOD

So, to what types of conflict does ENMOD apply? Generally, rules of international law apply to conflicts between states. Only exceptionally do they apply to domestic matters, including civil armed conflicts. Protocol II to the 1949 Geneva Conventions is an example of the extension of the Law of War to internal conflicts. ENMOD could also be said to apply to internal conflicts, because it prohibits both military and hostile modification of the environment. These kinds of civil armed conflicts potentially include ethnic conflicts, conflicts related to the aspirations of populations and territories aiming to secede and form new states, and insurgencies (i.e., conflicts involving groups that wish to establish a new government or type of state).

The distinction between internal and international conflicts is not always easy to make. Internal conflicts can quickly acquire an international dimension. This can happen, for example, when states obtain military assistance from other states or when a "neutral" party gives refuge to belligerents. In such cases, the principle of co-responsibility applies, as set forth in several international instruments, including Article 1 of all Geneva Conventions and Protocols.²⁸ Other "internal" conflicts may be international conflicts in disguise. For example, despite US claims at the time, who believed that the 1961 Bay of Pigs invasion of Cuba was an internal conflict?

Applicability to and Protection of Non-parties

Who then is protected by ENMOD? There is no question that ENMOD protects State Parties to the Convention against environmental modification techniques undertaken by other State Parties. Unfortunately, Parties have never adequately clarified the Convention's applicability to cases in which a State Party attacks a non-Party (or vice-versa). Under a restrictive interpretation of ENMOD's applicability, protection has been interpreted as an incentive to promote ratification. That is, to avoid "free riders" (those who would gain the benefits of ENMOD without having to abide by its rules), ENMOD's logic has been interpreted to mean that countries can get little protection from ENMOD without ratifying the Convention. This interpretation has been criticized by those environmentalists and leaders in the US Senate who wanted the Convention to apply to the entire international community. (29)

Another interpretation of ENMOD grants limited protection to non-parties. This interpretation can be deduced from the wording of ENMOD's second obligation:

Article I. 2. Each State Party to this Convention undertakes not to assist, encourage or induce any State, group of States or international organization (emphasis added) to engage in activities contrary to the provisions of paragraph 1 of this article.

Under the second interpretation, it could be argued, for example, that the US is responsible for promoting massive use of chemical and biological herbicides in the Drug War and, should damage be proven, the US could be held responsible for encouraging and assisting non-parties (e.g., Colombia) and international organizations (e.g., the United Nations Drug Control Program [UNDCP]) to undertake hostile environmental modification in the form of counterinsurgency crop eradication programs. Of course, the hostility element would also have to be proven, but, in the case of Colombia at least, the US and UNDCP have argued explicitly and repeatedly that the situation is a hostile one and that anti-narcotics operations and counterinsurgency are inseparable. (30)

While ENMOD may offer some degree of protection to non-parties, it is clear that the responsibilities imposed by ENMOD are restricted to those who have ratified the Convention. Further, ENMOD does not include a system of compensation for damages resulting from breach of its obligations. Any compensation must be sought via other international legal instruments.

Complaints

In ENMOD, cooperation and consultation are the preferred methods of resolving alleged violations. Any State Party which has a reason to believe that another State Party has breached the treaty may lodge a complaint with the UN Security Council. The complaint is expected to include relevant information and, if possible, evidence. Following deliberation, the Security Council - applying its standard voting procedure - is expected to decide if a violation has taken place.

In addition to providing for the initiation of an investigation through the Security Council, ENMOD provides for creation of a Consultative Committee of Experts by the Secretary General at the request of any state

Party. Any state Party may appoint an expert to that Committee. The committee's functions are defined in Annex 1. Primarily, the Committee is to conduct fact-finding related to the application of the Convention and to provide its views to the Security Council. (31) The Committee is expected to review the facts prior to any Security Council action, (32) although the Committee cannot decide whether a violation has taken place and by whom. That power is reserved to the Security Council. (33)

The veto power granted to the Security Council's five permanent members is, without doubt, a major constraint on the effectiveness of ENMOD since it places five states in a permanently privileged position. During negotiation of ENMOD, Sweden advocated equal treatment of Parties and proposed to lift veto powers when voting on proposals to both investigate allegations and determine violations of the treaty. (34)

Updating and Expanding ENMOD

ENMOD includes a mechanism of periodic self-assessment: the Review Conference. The majority of States Parties may agree to convene a Review Conference at intervals no shorter than five years. If ten years pass without a Review Conference, the Secretary General will consult States Parties and, if one third agree, a new Review Conference will take place. (35)

Review Conferences may examine not only the operation of the Convention vis-a-vis its objectives, but also may provide understanding (i.e., agreed upon interpretations) of ENMOD's provisions. Such understandings can be changed by any subsequent Review Conference.

At the Second Review Conference, held in 1992, several important proposals were introduced, but all failed to gain consensus. (36) Among the "failed" proposals:

- Restricting Parties from threatening use of environmental modification techniques;
- Abolishing the threshold established by Article 1;
- Defining violations of Article 1 as crimes against the environment;
- Stating that customary international law prohibits harming the environment in areas beyond national jurisdiction;
- Defining Article 2 with greater clarity to render it more relevant;
- Reviewing the role of the Security Council in the complaint process.

ENMOD and other international treaties.

ENMOD complements multilateral environmental and humanitarian treaties. From the perspective of humanitarian law, ENMOD protects civilian populations from the suffering that would be caused by environmental modification. In this sense, the treaty complements the Geneva Convention on Prohibition of Mass Destruction and the Additional Protocol I to the Geneva Conventions of 1949 (Articles 35 and 55). (37)

Protocol I Additional to the 1949 Geneva Conventions reads:

35.3. It is prohibited to employ methods or means of warfare which are intended, or might be expected to cause widespread, long-term and severe damage to the environment.

55.1 Care should be taken in warfare to protect the natural environment against widespread, long-term and severe damage. This protection includes a prohibition of the use of methods or means of warfare which are intended or might be expected to cause such damage to the natural environment and thereby prejudice the health or survival of the population.

55.2. Attacks against the natural environment by way of reprisal are prohibited.

The 1977 Geneva Convention Protocols I and II, on the protection of the victims of international and non-international armed conflicts respectively, were also negotiated in the aftermath of the Southeast Asian war. (38) While the language used in Protocol I to define the scope of protection is nearly identical to that used in ENMOD, there are significant differences. The threshold to violate Protocol I is higher than ENMOD because the elements ("widespread", "long-term" and "severe") must be concurrent. Protocol I does not provide a definition or understanding of those terms. Unlike ENMOD, Protocol I does not require that the environmental damage be intended. If the damage can be reasonably expected, the Geneva Convention may be invoked. Thus, some protection is given against collateral damage. This standard of reasonable expectation is reinforced by Article 55, which outlaws methods of warfare that might be expected to harm the environment.

The agreements share an additional feature; in both ENMOD and Geneva Convention Protocol I, if the threshold standard is met, military necessity cannot be used as excuse for violation.

Protocol II to the 1949 Geneva Conventions provides very limited protection of the environment. It prohibits the destruction of objects indispensable for the survival of civilian populations (including crops) and it provides protection to some infrastructure.

ENMOD overlaps with other arms control agreements, such as the Convention on Biological and Toxin Weapons (BWTC), particularly where the tool used to modify the environment is a biological agent, as in the case of modification of the environment by dissemination of a disease. The BWTC excludes military necessity as a defense against accusation of violation. (39)

There are other treaties that offer limited environmental protection in conflicts. They include: the Treaty Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies (Outer Space Treaty) of 1967; the Treaty on the Prohibition of the Emplacement of Nuclear Weapons and Other Weapons of Mass Destruction on the Seabed and the Ocean Floor and the Subsoil Thereof (Seabed Treaty) of 1971; and the Agreement Governing the Activities of States on the Moon and Other Celestial Bodies (Agreement on Celestial Bodies) of 1979.

"Low" versus "High" Technology and Herbicides

The negotiators of ENMOD anticipated that future technological developments would open greater possibilities of hostile environmental modification. This is explicitly stated in the preamble:

Recognizing that scientific and technical advances may open new possibilities with respect to modification of the environment. . .

The understanding that "high" technologies are covered by ENMOD leads to the question of whether "low" technologies (e.g. fire, water) are also covered. Some, like the US Army, have maintained that low technologies are not included. Under one US Army interpretation, actions such as diverting rivers with a dam would not be covered. (40)

One answer to the question of what is covered by ENMOD may be found in debates over herbicides. Herbicide formulations change over time, but generally speaking, herbicides present a low technological approach to activities that can be violative of ENMOD, such as deforestation and crop destruction. Although herbicides were linked to chemical warfare research during the 1940s, the first reported military use of herbicides was in pre-independence Malaya (now Malaysia) in the 1950s. (41) Later use of herbicides in Southeast Asia, as already mentioned, provided the motivation to create ENMOD. The US government's draft environmental assessment of the Convention expressly cites certain uses of defoliants as among the environmental modification activities outlawed by ENMOD:

Similarly, it is possible to imagine uses of defoliation techniques in armed conflict as a means of destruction, damage or injury to the enemy. However, under the convention, the hostile use of defoliants as an environmental modification technique would be prohibited if it caused effects over several hundred square kilometers, or for a period of months, or having serious or significant disruption or harm to human life, natural and economic resources or other assets. Furthermore, as indicated above, most countries regard the use of chemical defoliants in war as a violation of the Geneva Protocol of 1925, and the United States has renounced the first use of herbicides in war, except for control of vegetation within the U.S. bases or around their immediate defensive perimeters. (42)

The Second Review Conference explicitly reiterated this idea in 1992. At that time, the US delegation stated: (43)

Many delegations have raised the question of herbicides and proposed that our final declaration address this issue. The US position has not changed on this question since our interpretation was offered to the Conference of the Committee on Disarmament on 26 April 1976, that is, that the convention prohibits the use of herbicides "as an instrument for upsetting the ecological balance of a region" as a means of destruction, damage, or injury if the effects were widespread, long-lasting, or severe. The United States is prepared to restate this uncontested position in full in order to leave the record clear that the United States does not intend to use herbicides in wartime except in defensive modes or as specified in the US 1976 statement.

State Parties at the Second Review Conference agreed, and included

language on herbicides. The Conference noted that the hostile use of herbicides as an environmental modification technique was a method of warfare prohibited by ENMOD "*if such use of herbicides upsets the ecological balance of a region, thus causing widespread, long-lasting or severe effects as the means of destruction, damage or injury to any other State party*". (44)

A related issue is whether forbidden activities have to be manipulations of natural processes themselves or, more broadly, may be actions that simply have direct negative impact on the environment, such as poisoning the soil or poisoning bodies of water. Arguably, considering advances in scientific understanding of the complexity of ecosystems, the distinction is impossible to make in practice. The Second Review Conference's conclusion that use of herbicides (which destroy, rather than manipulate a natural process per se) can constitute a violation of ENMOD strongly favors the interpretation that impact alone is sufficient for violation. (45)

Limitations of ENMOD

Clearly, ENMOD's palette of wording and conditionalities make the treaty less effective than it might be. Some of the problems are discussed below.

The Troika: Too High a Threshold?

Critics of ENMOD have focused on the troika, arguing that it sets a threshold so difficult to cross that the treaty is practically unusable. Among these critics are Parties to the Convention such as Argentina, Mexico, Mauritius, and Turkey. (46) The US environmental organizations that opposed US ratification of ENMOD felt that the subjective nature of the third condition - severity - could permit environmental modifications such as cloud seeding and defoliation,⁴⁷ a view that was not shared by Senate proponents of the treaty.

To resolve the ambiguity, President Jimmy Carter committed the US to removing the severity condition at the First Review Conference. (48) Secretary of State Cyrus Vance responded that the US would undertake the request within the suggested time period, (49) but the conference did not take place until 1984, well after the Carter Administration left office.

Unused, Lack of Political Will

During the quarter century ENMOD has existed, no state Party has been formally accused of a violation. The two review conferences held so far have stated that "*the obligations assumed under article I of the Convention had been faithfully observed by the States parties.*" (50)

Severe environmental modification techniques, however, have been used in conflicts subsequent to ENMOD's coming into force. Examples include the use of defoliants in Central America during the 1980s and the severe environmental modifications made during the Gulf War. In the latter, Iraq set fire to over 600 oil wells and targeted Kuwait's water desalination plants by polluting the nearby sea. The UN Security Council passed a resolution condemning Iraq's invasion of Kuwait and holding it liable for damages. ENMOD, however, was not applied because Iraq is not a Party

to the Convention. (51)

Restrictions Too Limited

ENMOD does not outlaw development and testing of hostile environmental modification techniques, nor does it include verification mechanisms for identifying attempts by Parties to develop environmental modification techniques. These omissions were not accidental; at the time of ENMOD's negotiation, the USSR and the US agreed that environmental techniques could be used for peaceful purposes.⁵² In contrast, the Biological Weapons Convention (BTWC), negotiated during the same period as ENMOD, banned the production and stockpiling of biological agents for non-peaceful purposes. (Dual use technologies related to the production of biological agents present other problems to the BTWC that are beyond the scope of this paper.)

The lack of prohibition of development and testing in ENMOD was debated at US Senate hearings during the late 1970s. In an alliance with the environmentalists who opposed ENMOD, outspoken treaty proponent US Senator Claiborne Pell fought US Department of Defense efforts to research hostile environmental modification. (53)

The US Arms Control and Disarmament Agency attempted to defuse concerns about US environmental modification research and to avoid abandoning such research programs. The Agency said that research on environmental modification was being conducted on an unclassified basis and anyone might examine it. (54) That view was supported by the US State Department's Thomas Pickering, who claimed, (55)

The United States carries all of its research and development activities in this area on an open basis; it shares its results with other nations, and has in fact taken the lead in working out international arrangements for conducting experiments in weather modification for peaceful purposes.

In addition to its lack of prohibition of development and testing, ENMOD does not prohibit anyone from threatening to use hostile environmental modification. Further, damage in ENMOD must be proven. Thus, difficulty arises in reconciling ENMOD - which requires after the fact scientific assessment of damages - with the Precautionary Principle, (56) a cornerstone of environmental law whose emphasis on avoiding environmental damage is quite different than ENMOD.

Questions of damage become even more complicated when the affected ecosystems are complex and poorly understood, as is the case in many areas of the tropics containing high levels of biodiversity. The relative lack of scientific knowledge of particular ecosystems may hamper accurate assessment of the effects of hostile environmental modification. Because ENMOD invokes its (Article I) assessment after damage is done, the true environmental extent of the damage can never be known in ecosystems not fully characterized before the damage is done.

Lack of liability system

ENMOD lacks provisions for penalizing state Parties that breach its

provisions. A state Party can be held responsible, but not liable. Liability and redress, therefore, must be sought through other international legal instruments. In lieu of imposing liability, or as a mechanism to force acceptance of liability, the Security Council could decide to punish violators through the application of trade or other sanctions.

Limited number of Parties

Although many major powers are Parties to ENMOD, the overall number of ratifications is limited, particularly in the political South. To date, ENMOD has only 70 State Parties, less than half the number that are party to the BTWC. The UN General Assembly has called for global ratification on several occasions, but without much success.

III. Other Attempts to Achieve Environmental Protection in Times of War

As already noted, ENMOD is not so much a treaty about environment protection as it is an arms control instrument designed to protect human populations against severe environmental damages. A reference to this objective was included in the preamble of the Convention:

Recognizing, however, that military or any other hostile use of such techniques could have effects extremely harmful to human welfare,...

To date, environmental law relating to armed conflicts provides only collateral protection of the environment. (57) Many humanitarian law conventions use another approach, only offering environmental protection pursuant to the protection of property.

Unlike humanitarian law, there is no customary law that imposes an obligation on states to avoid environmental damages in armed conflicts. The International Court of Justice (ICJ) has ruled that,

The Court does not consider that the [environmental protection] treaties in question could have intended to deprive a State of the exercise of its right of self-defense under international law because of its obligations to protect the environment. Nonetheless, States must take environmental considerations into account when assessing what is necessary and proportionate in the pursuit of legitimate military objectives. Respect for the environment is one of the elements that go to assessing whether an action is in conformity with the principles of necessity and proportionality.(58)

Addressing the issue of protection of the environment in times of conflict requires states to go beyond the notion that environment protection is wholly derived from protection of human beings. Even the "source" of international environmental law, the UN Conference on Human Environment's Stockholm Declaration, bases the need to protect the environment on the rights of present and future generations. Overcoming this obstacle is important, because under an anthropocentric point of view, an action would be unlawful only when it engendered a negative impact on a human population. Such a standard is problematic and near-sighted,

although understandable. International environmental law is in its infancy and since its origin, environmental protection has been marked by an anthropocentric approach. Only recently have other treaties, such as the Convention on Biological Diversity, changed this approach, recognizing an intrinsic value in other species, natural resources and existing ecosystems.

The notion of military necessity, referred to in the ICJ opinion previously mentioned, must be changed significantly (or understood differently). A perceived lack of objective standards in the application of this principle is one of the main obstacles to environmental protection in armed conflicts. (59) As a starting point, to better address environmental harm resulting from hostile or military activities, we might begin by including two principles of current international environmental law in all international agreements: the principle of state responsibility for transboundary environmental damage and the Precautionary Principle.

The Stockholm Declaration is significant for its recognition of state responsibility for environmental damages caused to other states:

Principle 21.- States have, in accordance with the Charter of the United Nations and the principles of Environmental law, the sovereign right to exploit their own resources pursuant to their own environmental policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other states or of areas beyond the limits of national jurisdiction. (60)

This principle was restated in the 1992 Rio Declaration, and is also an obligation under the Convention on Biological Diversity (Article 3), and other international conventions, such as the Law of the Sea.

Liability is another important consideration, given the transboundary nature of many environmental damages incurred during armed conflicts. Liability is also mentioned in the Rio Declaration and reiterated in the Convention on Biological Diversity and its Cartagena Biosafety Protocol. (61)

Initiatives

The environmental disasters of the Gulf War and the inadequacy of existing international law to address those disasters disturbed both governments and civil society. This motivated several conferences to explore the constraints on environmental protection, (62) including a UN General Assembly special session on war and the environment. In June, 1991, the Ottawa Conference of Experts on the Use of the Environment as a Tool of Conventional Warfare was convened by the Canadian Government in co-operation with the UN Secretary General and the London Conference was convened by the London School of Economics, Greenpeace and the Centre for Defense Studies. In December of the same year, the Munich Consultations on the Law concerning the Protection of the Environment during times of Armed Conflict was convened by the International Council of Environmental Law and the International Union for Conservation of Nature (IUCN).

The London Conference reviewed available legal instruments addressing environmental impacts of armed conflicts and explored the possibility of promoting a new "Geneva-style" agreement, the Fifth Geneva Convention

on the Protection of the Environment in Time of Armed Conflict. The hope was that a new Geneva Convention would protect environment per se, as opposed to indirectly protecting the environment through provisions on property or protection of population. (63)

The first issue that the London conference tried to resolve was the quantum of damage for which a Fifth Geneva Convention would grant protection. Several options were considered. All of them included collateral damage.

Other issues were discussed, including the types of weapons that might be banned, limits to the principle of military necessity, criminal responsibility, (64) special protection of particularly sensitive environmental areas, and creation of a special body – the Green Cross – to provide immediate environmental assistance.

Not all London Conference participants favored creation of a Fifth Geneva Convention. Some advocated for a more ambitious instrument that would give protection against environmental damage not only in wartime, but also in peace. (65) Some argued that there could be no credible and effective international instrument to protect the environment in wartime as long as there was no ban on all weapons of mass destruction, including nuclear weapons. (66)

Still others argued against any new international instrument. The US claimed that a strict environmental treaty would work in favor of countries with nuclear weapons. It argued that, under a strict agreement, nuclear warships could not be sunk, even in self-defense, because of the disastrous environmental consequences that such a sinking might entail. (67)

A representative of the US argued that environmental restrictions would hamper less developed states' self defense because more technologically advanced weapons would be less likely to cause collateral environmental damage. According to the representative, *"if we took the position of some people at this table in favor of an environmental prohibition on war, we would be, I believe, encouraging aggressors at the expense of small states."* (68)

Some London Conference participants felt that high-tech countries were merely taking whatever point of view worked best to impede progress toward a new Geneva Protocol. It was pointed out that during negotiation of the First Geneva Protocol to protect civilian populations during international armed conflicts, NATO countries insisted on more freedom to produce collateral damage, while developing countries had argued for more restrictions. (69)

North-South relations presented a challenge to the idea of a new international agreement. Some argued that a Geneva-style convention would be designed to address international conflicts, and, therefore, would fail to address problems of the political South and so-called "low intensity conflicts", including the War on Drugs. Raul Sohr, a Southern expert at the London Conference, held this view: 70

...how does one deal, for example, with a situation where a host government agrees to large chunks of its country being defoliated, although the environment would suffer? Situations of insurgency, such as the scorched-earth policy being carried out in Guatemala and El Salvador by local military governments, might also not be covered by a Geneva-style convention or

similar instrument.

Regulation of internal conflicts, Sohr noted, could clash with the principle of national sovereignty over a country's natural resources. Unless the internal war resulted in transboundary environmental damage, a country could argue that the environmental impacts of its internal war should remain outside the scope of international law.

Ecocide

The idea of establishing international criminal responsibility for serious environmental harm is not new. Using as their model the 1948 Convention on Prevention and Punishment of Genocide, developed in the wake of the Holocaust, many people have favored an international instrument that punishes grave environmental damage, whether incurred in war or in peace. (71) Influential among this contingent is US academic Richard Falk, who drafted a "Proposed Convention on the Crime of Ecocide". (72)

At the June 1992 UN Conference on Environment and Development in Rio de Janeiro, Russia and the European Community introduced a proposal calling for "international condemnation of crimes against the environment". Criminal responsibility for ecocide was established in the European Union in 1988 by the Convention on the Protection of the Environment through Criminal Law. The idea was discussed during the preparatory conferences for Rio. At the time, some European Union countries did not do themselves any political favors and alienated potential allies by calling for, to use a French example, international intervention in Brazil to prevent forest destruction. Eventually, the US, allied with some Southern states, kiboshed the proposal. (73)

A Missed Opportunity: The Rome Statute

The Rome Statute, the recent convention to form the International Criminal Court, was signed in July 1998 but has not yet entered into force.⁷⁴ While the Statute contains a provision to prosecute those who cause "unacceptable" environmental damage during wartime, sadly, the restrictive language of the Statute offers only very limited protection against hostile environmental modification. Article 8(3)(b)(iv) prohibits:

Intentionally launching an attack in the knowledge that such attack will cause incidental loss of life or injury to civilians objects or widespread, long-term and severe damage to the natural environment which would be clearly excessive in relation to the concrete and direct overall military advantage anticipated.

Not only does the statute require a higher standard than ENMOD for violation - all three of the threshold conditions must be met - but the Rome Statute also requires foreknowledge that the requisite degree of damage will take place. Still worse, the Rome Statute allows almost unlimited acceptance of "military necessity" by weighing environmental damage against "overall military advantage anticipated".

Other Attempts

Other regional efforts have been made to impose limits on environmental damage from war making, including the Central American Water Tribunal, which imposes moral sanctions in cases of severe pollution and the Lusaka Agreement on Cooperative Enforcement Operations Directed at Illegal Trade in Wild Fauna and Flora ("African Interpol"), established by six African countries in 1999 to fight wildlife crime. (75) The European Union established criminal responsibility for ecocide in 1988 with its Convention on the Protection of the Environment through Criminal Law.

IV. Conclusions and Options

Threats to peace persist in the form of armed confrontation between states and, increasingly, from "low intensity" and internal conflicts that are often tinged with economic and law enforcement concerns, such as the Drug War. In many of these conflicts, the environment - especially biodiversity - is manipulated as a weapon. Those that cause the damage are generally not held accountable. It is urgent to find tools to limit such adverse effects to protect both the environment and people.

Any effort to revitalize ENMOD first must consider whether an attempt would be worthwhile. As discussed in this paper, ENMOD's general disuse and weaknesses raise serious questions about whether it will ever be an effective means to prevent hostile environmental modification. If, in 2001, civil society organizations concluded that ENMOD is a hopeless cause, they would not be the first to do so.

Another option might be to re-invent ENMOD - to take its ideas and legal precedents and transfer them to where they can achieve greater effect. This would mean promoting a new international instrument for the protection of the environment in conflicts. The idea of a new instrument has its own problems. To the unanswered questions raised at the London Conference, this option adds the dilemma of how to ensure that a new instrument would cover conflicts in a broader sense. Given recent governmental performance on existing agreements - the lack of commitment to a strong Kyoto Protocol or an effective Cartagena Biosafety Protocol or a strengthened Biological Weapons Convention - is it realistic to expect that governments will be able to make meaningful new commitments? What could be done to create a favorable climate?

An international treaty in force presents considerable advantages over a new treaty. Countries that have ratified ENMOD have made legally binding commitments. The treaty is the fruit of considerable work and compromise that should not be cast aside lightly. ENMOD's dispute resolution mechanism, despite its weaknesses, is remarkably simple and direct. Its broad applicability to hostile acts, arguably extendable even to economic conflicts (e.g., conflicts related to use of genetically modified organisms in agriculture), may be difficult to achieve in a new treaty.

In any case, it is useful to consider what, if anything, civil society might contribute to revitalizing ENMOD. To begin with, the following issues will have to be addressed:

- Can civil society groups articulate and achieve practical goals at a Third ENMOD Review Conference which might happen as early as 2002? The last Review Conference took place in 1992 and Article 8.3 establishes that if no conference has taken place in ten years, the UN General Secretary will consult states Parties. Affirmative responses from one third would

necessitate the convening of a Conference.

- Which constraints on ENMOD are the most problematic? Can they be prioritized and overcome? Are they best addressed by civil society groups working with governments?

- There is little history of North-South politics in ENMOD, and geopolitical alliances in arms control negotiations are often different than those in environmental, agricultural, or other international processes. What possibilities and problems does this pose?

- The South potentially can gain from ENMOD, but it would also be understandably wary. Countries with powerful militaries (e.g, NATO) are often those who get to interpret the Law of War. Would the same priority be given to the powerful in ENMOD? Is wider ratification of ENMOD a feasible option? If so, how can it be achieved? Could governments, for example, ratify ENMOD while at the same time pointing to Drug War crop eradication efforts or water concerns as evidence that ENMOD offers protection for the South?

- Would it be useful to initiate a complaint of violation through one of the current State Parties as a way of dramatically enhancing the treaty's profile and perceived relevance? Do "test cases" exist? Which countries would it be key to engage in this approach? Could the approach backfire?

- How can the constituents of civil society - NGOs, indigenous peoples' groups, labor unions, etc. - be involved in the effort? Who would lead the campaign?

- Is ENMOD a tool that people's organizations really want, and is the international will strong enough for the job of revitalizing it?

Appendix

CONVENTION ON THE PROHIBITION OF MILITARY OR ANY OTHER HOSTILE USE OF ENVIRONMENTAL MODIFICATION TECHNIQUES

Adopted by the United Nations General Assembly on December 10, 1976. The Convention opened to signatures at Geneva on May 18, 1977 and entered into force October 5, 1978

The States Parties to this Convention,

Guided by the interest of consolidating peace, and wishing to contribute to the cause of halting the arms race, and of bringing about general and complete disarmament under strict and effective international control, and of saving mankind from the danger of using new means of warfare,

Determined to continue negotiations with a view to achieving effective

progress towards further measures in the field of disarmament,

Recognizing that scientific and technical advances may open new possibilities with respect to modification of the environment,

Recalling the Declaration of the United Nations Conference on the Human Environment adopted at Stockholm on 16 June 1972,

Realizing that the use of environmental modification techniques for peaceful purposes could improve the interrelationship of man and nature and contribute to the preservation and improvement of the environment for the benefit of present and future generations,

Recognizing, however, that military or any other hostile use of such techniques could have effects extremely harmful to human welfare,

Desiring to prohibit effectively military or any other hostile use of environmental modification techniques in order to eliminate the dangers to mankind from such use, and affirming their willingness to work towards the achievement of this objective,

Desiring also to contribute to the strengthening of trust among nations and to the further improvement of the international situation in accordance with the purposes and principles of the Charter of the United Nations,

Have agreed as follows:

Article I

1. Each State Party to this Convention undertakes not to engage in military or any other hostile use of environmental modification techniques having widespread, long-lasting or severe effects as the means of destruction, damage or injury to any other State Party.
2. Each State Party to this Convention undertakes not to assist, encourage or induce any State, group of States or international organization to engage in activities contrary to the provisions of paragraph 1 of this article.

Article II

As used in Article I, the term "environmental modification techniques" refers to any technique for changing -- through the deliberate manipulation of natural processes -- the dynamics, composition or structure of the Earth, including its biota, lithosphere, hydrosphere and atmosphere, or of outer space.

Article III

1. The provisions of this Convention shall not hinder the use of environmental modification techniques for peaceful purposes and shall be

without prejudice to the generally recognized principles and applicable rules of international law concerning such use.

2. The States Parties to this Convention undertake to facilitate, and have the right to participate in, the fullest possible exchange of scientific and technological information on the use of environmental modification techniques for peaceful purposes. States Parties in a position to do so shall contribute, alone or together with other States or international organizations, to international economic and scientific co-operation in the preservation, improvement, and peaceful utilization of the environment, with due consideration for the needs of the developing areas of the world.

Article IV

Each State Party to this Convention undertakes to take any measures it considers necessary in accordance with its constitutional processes to prohibit and prevent any activity in violation of the provisions of the Convention anywhere under its jurisdiction or control.

Article V

1. The States Parties to this Convention undertake to consult one another and to cooperate in solving any problems which may arise in relation to the objectives of, or in the application of the provisions of, the Convention. Consultation and cooperation pursuant to this article may also be undertaken through appropriate international procedures within the framework of the United Nations and in accordance with its Charter. These international procedures may include the services of appropriate international organizations, as well as of a Consultative Committee of Experts as provided for in paragraph 2 of this article.

2. For the purposes set forth in paragraph 1 of this article, the Depositary shall, within one month of the receipt of a request from any State Party to this Convention, convene a Consultative Committee of Experts. Any State Party may appoint an expert to the Committee whose functions and rules of procedure are set out in the annex, which constitutes an integral part of this Convention. The Committee shall transmit to the Depositary a summary of its findings of fact, incorporating all views and information presented to the Committee during its proceedings. The Depositary shall distribute the summary to all States Parties.

3. Any State Party to this Convention which has reason to believe that any other State Party is acting in breach of obligations deriving from the provisions of the Convention may lodge a complaint with the Security Council of the United Nations. Such a complaint should include all relevant information as well as all possible evidence supporting its validity.

4. Each State Party to this Convention undertakes to cooperate in carrying out any investigation which the Security Council may initiate, in accordance with the provisions of the Charter of the United Nations, on the basis of the complaint received by the Council. The Security Council shall inform the States Parties of the results of the investigation.

5. Each State Party to this Convention undertakes to provide or support assistance, in accordance with the provisions of the Charter of the United

Nations, to any State Party which so requests, if the Security Council decides that such Party has been harmed or is likely to be harmed as a result of violation of the Convention.

Article VI

1. Any State Party to this Convention may propose amendments to the Convention. The text of any proposed amendment shall be submitted to the Depository who shall promptly circulate it to all States Parties.
2. An amendment shall enter into force for all States Parties to this Convention which have accepted it, upon the deposit with the Depository of instruments of acceptance by a majority of States Parties. Thereafter it shall enter into force for any remaining State Party on the date of deposit of its instrument of acceptance.

Article VII

This Convention shall be of unlimited duration.

Article VIII

1. Five years after the entry into force of this Convention, a conference of the States Parties to the Convention shall be convened by the Depository at Geneva, Switzerland. The conference shall review the operation of the Convention with a view to ensuring that its purposes and provisions are being realized, and shall in particular examine the effectiveness of the provisions of paragraph 1 of Article I in eliminating the dangers of military or any other hostile use of environmental modification techniques.
2. At intervals of not less than five years thereafter, a majority of the States Parties to the Convention may obtain, by submitting a proposal to this effect to the Depository, the convening of a conference with the same objectives.
3. If no conference has been convened pursuant to paragraph 2 of this article within ten years following the conclusion of a previous conference, the Depository shall solicit the views of all States Parties to the Convention, concerning the convening of such a conference. If one third or ten of the States Parties, whichever number is less, respond affirmatively, the Depository shall take immediate steps to convene the conference.

Article IX

1. This Convention shall be open to all States for signature. Any State which does not sign the Convention before its entry into force in accordance with paragraph 3 of this article may accede to it at any time.
2. This Convention shall be subject to ratification by signatory States. Instruments of ratification or accession shall be deposited with the Secretary-General of the United Nations.

3. This Convention shall enter into force upon the deposit of instruments of ratification by twenty Governments in accordance with paragraph 2 of this article.

4. For those States whose instruments of ratification or accession are deposited after the entry into force of this Convention, it shall enter into force on the date of the deposit of their instruments of ratification or accession.

5. The Depositary shall promptly inform all signatory and acceding States of the date of each signature, the date of deposit of each instrument of ratification or accession and the date of the entry into force of this Convention and of any amendments thereto, as well as of the receipt of other notices.

6. This Convention shall be registered by the Depositary in accordance with Article 102 of the Charter of the United Nations.

Article X

This Convention, of which the English, Arabic, Chinese, French, Russian, and Spanish texts are equally authentic, shall be deposited with the Secretary-General of the United Nations, who shall send certified copies thereof to the Governments of the signatory and acceding States.

IN WITNESS WHEREOF, the undersigned, being duly authorized thereto by their respective governments, have signed this Convention, opened for signature at Geneva on the eighteenth day of May, one thousand nine hundred and seventy-seven.

DONE at Geneva on May 18, 1977.

ANNEX TO THE CONVENTION CONSULTATIVE COMMITTEE OF EXPERTS

1. The Consultative Committee of Experts shall undertake to make appropriate findings of fact and provide expert views relevant to any problem raised pursuant to paragraph 1 of Article V of this Convention by the State Party requesting the convening of the Committee.

2. The work of the Consultative Committee of Experts shall be organized in such a way as to permit it to perform the functions set forth in paragraph 1 of this annex. The Committee shall decide procedural questions relative to the organization of its work, where possible by consensus, but otherwise by a majority of those present and voting. There shall be no voting on matters of substance.

3. The Depositary or his representative shall serve as the Chairman of the Committee.

4. Each expert may be assisted at meetings by one or more advisers.

5. Each expert shall have the right, through the Chairman, to request from States, and from international organizations, such information and assistance as the expert considers desirable for the accomplishment of the Committee's work.

Endnotes:

(1) See, for example, US Central Intelligence Agency. 2000. Global Trends 2015, National Foreign Intelligence Board, Washington. URL: <http://www.cia.gov/cia/publications/globaltrends2015/>

(2) See Statement of Rand Beers, US Assistant Secretary of State for International Narcotics and Law Enforcement Affairs, given at the Senate Caucus on International Narcotics Control, 28 February 2001. URL: <http://drugcaucus.senate.gov/beers2-28-01.htm>

(3) Several publications on the use of mycoherbicides in the Drug War are available from the Sunshine Project, online at <http://www.sunshine-project.org>.

(4) Castillo, A. 2000. Guerra Química en la Selva Lacandona, in La Jornada (Mexico City), 13 September. URL: <http://www.jornada.unam.mx/2000/sep00/000911/oja-guerra.html>

(5) Bellinghausen, H. 1998. Sin precedente, la proliferación de incendios en la zona de conflicto, in La Jornada, 13 May. URL: <http://www.jornada.unam.mx/1998/may98/980513/conflicto.html>

(6) Davi Yanomami quoted in Schomberg W. 1998. Yanomani Chief Seeks Help from Raging Amazon Fires, Reuters Wire Service, 14 March.

(7) Aditjondro, G. 2000. The Driving Force of Indonesia's Catastrophic Forest Fires, in Eco-Politics Journal, October.

(8) See ANACOL (Colombia's official news agency) 2000. "Pastrana presenta Megaproyecto Palimicultor en Malasia", 2 March. URL: <http://www.presidencia.gov.co/webpresi/noticias/2001/marzo/infenot.htm>

(9) Under Plan Colombia, palm oil plantations are to be established in the guerrilla-controlled coca producing area of Southern Colombia. See Plan Colombia at the Colombian National Planning Department's website, <http://www.dnp.gov.co>.

(10) Henkin, L., R. Pugh, O. Schachter and H. Smit. 1998. International Law: Cases and Materials, West Publishing, St. Paul, p. 802.

(11) See the Convention on the Prohibition of the Use, Stockpiling, Production and Transfer of Anti-Personnel Mines and on Their Destruction. Opened for signature 3 December 1997, entered into force 1 March 1999. URL: <http://domino.un.org/MineBan.nsf>

(12) International Court of Justice. 1996. Advisory Opinion on "Legality of the threat or use of Nuclear Weapons". General list No. 958, 8 July, para

78. URL: http://www.dfat.gov.au/intorgs/icj_nuc/unan5a_a.html

(13) ENMOD is often described as a "non-use" agreement because it prohibits use of environmental modification as a weapon, rather than the development of modification techniques per se. Many other arms control agreements take a different approach, for example, the Biological and Toxin Weapons Convention which prohibits development and stockpiling of a whole class of weapons, or nuclear arms control agreements that place restrictions on the number of weapons that may be deployed.

(14) Juda, L. 1978. Negotiating a treaty on environmental modification warfare: the convention on environmental warfare and its impact on the arms control negotiations, in *International Organization*, v. 32:4, p. 975-991.

(15) Almquist and Wiksell. 1976. Anti-plant chemicals, Chapter 3 in *Ecological Consequences of the Second Indochina War*. SIPRI, Stockholm, p. 24-45.

(16) Wunsch, C. 1980. The Environmental Modification Treaty, in *ASILS Intern'l L. J.* v. 4:91, p. 117.

(17) Yuzon, F. 1996. Deliberate Environmental Modification Through the Use of Chemical and Biological Weapons: 'Greening' the International Laws of Armed Conflict to Establish an Environmentally Protective Regime, in *Am. U. J. Inter'l. L & Policy*, v. 11:5, p. 804.

(18) Juda, L. 1978, p. 976.

(19) See United States Senate, Committee on Foreign Relations. 1978. Environmental Modification Treaty. Hearing on Ex. K, 95-2, Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques, 95th Congress, 2nd Session, 3 October.

(20) Wunsch, C. 1980, p. 4-5.

(21) Article IX deals with ratification and entry into force. A current list of Parties can be found online at: <http://domino.un.org/TreatyStatus.nsf>

(22) The groups were the Natural Resources Defense Council, Sierra Club, Environmental Policy Center, Wilderness Society and the Federation of American Scientists. (Wunsch 1980:121)

(23) Statements given at US Senate hearings by Leonard Meeker (3 October 1978) and James Barnes (10 May 1979) are to be found in: United States Senate, Committee on Foreign Relations. 1978. and United States Senate, Committee on Foreign Relations. 1979. Hearing to hear the testimony on Ex. K, 95-2, Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques, 96th Congress, 1st Session, 10 May.

(24) Tarasofsky R. 1993 Legal Protection of the Environment during International Armed Conflicts. In *The Netherlands Yearbook of International Law*, v. XXIV, p. 51.

(25) United Nations Department for Disarmament. 1985. The ENMOD convention: Results of the First Review Conference of the Parties to the Convention on the Prohibitions of Military or Any Other Hostile Use of Environmental Modification Techniques. 10-20 September 1984, Fact

Sheet No. 39, New York.

(26) Wunsch, C. 1980, p. 126.

(27) See Article I, paragraph 2 of Senate Resolution 71/73 in: United States Senate, Committee on Foreign Relations. 1978.

(28) See intervention of Marino in: Plant, G. 1992. Environmental Protection and the Law of War: A Fifth Geneva Convention on the Protection of the Environment in Time of Armed Conflict, Belhaven Press, London & New York, p. 107-109.

(29) United States Senate, Committee on Foreign Relations, 1978, p. 41.

(30) The Taliban government of Afghanistan and Colombian guerrillas are both alleged to participate in, protect, and be financially dependent upon the revenues derived from production and trafficking of illicit drugs. See, for example, interview with UNDCP's Klaus Nyholm in *Conflicto disparó producción de drogas*, El Tiempo (Bogotá), 25 January 2001.

(31) Anastassov, A. 1991. The Convention on the Prohibition of Military or Any other Hostile Use of Environmental Modification Techniques, Chapter 11 in Verification of Current Disarmament and Arms Limitation Agreement, UN Institute for Disarmament Research, Geneva, p. 272-3.

(32) Wunsch, C. 1980, p. 129.

(33) Anastassov, A. 1991, p. 273.

(34) Egypt, Netherlands, Germany and Japan also expressed concern on this issue. See: Anastassov, A. 1991, p. 272. Also in: Wunsch, C. 1980, p. 129.

(35) See Article VIII of ENMOD.

(36) Tarasofsky R. 1993, p. 48.

(37) The text of the Geneva Conventions and Protocols, along with the status of ratification is available at the International Committee of the Red Cross website, URL: <http://www.icrc.org>

(38) Westing, A. H. 1996. Environmental Warfare: Manipulating the Environment for Hostile Purposes, Presentation delivered at the Woodrow Wilson Center on 7 May 1996.

(39) Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on their Destruction. URL: <http://www.un.org/Depts/dda/WMD/page6.html>

(40) Environmental Law Institute. 1998. Addressing Environmental Consequences of War, background paper for the First International Conference on Addressing Environmental Consequences of War: Legal, Economic, and Scientific Perspectives, Environmental Law Institute, Washington. p. 24-25.

(41) Almquist and Wiksell. 1976, p. 24.

(42) United States Senate, Committee on Foreign Relations, 1978, p.44.

- (43) Moodie, M. 1992. Statement by Michael Moodie Head of the Delegation of the United States of America before the Second Review Conference of the Convention on the Prohibition of Military or Any other Hostile Use of Environmental Modification Techniques. URL: <http://dosfan.lib.uic.edu/acda/speeches/other/moodiemi.htm>
- (44) United Nations General Assembly. 1992. Second Review Conference of the Parties to the Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques, 81st Plenary Meeting, 9 December 1992, section E. URL: <http://heiwww.unige.ch/humanrts/resolutions/47/52GA1992.html>
- (45) Tarasofsky R. 1993, p. 47.
- (46) Yuzon, F. 1996, p. 807 and Juda, L. 1978, p. 983.
- (47) United States Senate, Committee on Foreign Relations. 1978, p. 41.
- (48) Carter, J. 1978. Message from the President of the United States transmitting the Convention on the Prohibition of Military or Any other Hostile Use of Environmental Modification Techniques, signed at Geneva on May 18, 1977, USGPO, Washington.
- (49) See text of the letter in United States Senate, Committee on Foreign Relations. 1979, p. 2.
- (50) See: United Nations Department for Disarmament, 1985 and United Nations General Assembly, 1992.
- (51) As usual, the Law of War was applied to the defeated party and not the victors. Coalition forces did not use environmental modification; but they did use weapons that resulted in severe environmental damage, including napalm and dispersal of depleted uranium. There were no attempts to punish coalition forces for environmental impacts stemming from their choice of weapons, for example, by applying the First Geneva Protocol's provisions against permitting large-scale collateral environmental damage that can be reasonably expected.
- (52) Anastassov, A. 1991.
- (53) United States Senate, Committee on Foreign Relations. 1978, p. 21.
- (54) United States Senate, Subcommittee on Oceans and International Environment. 1976. Hearing on the Draft Convention on the Prohibition of Military or any Other Hostile Use of Environmental Modification Techniques, 21 January 1976, p. 17. Also: United States Senate, Committee on Foreign Relations. 1978; and United States Senate, Committee on Foreign Relations. 1979.
- (55) United States Senate, Committee on Foreign Relations. 1979. p. 5
- (56) The Precautionary Principle holds that given a threat to biodiversity, the lack of full scientific certainty should not be used as a reason for postponing measures to avoid or minimize such a threat.
- (57) Yuzon, F. 1996, p. 842.
- (58) The Court was asked to examine nuclear weapons vis à vis international law protecting the environment. See: International Court of

Justice. 1996. Paragraph 30.

(59) Yuzon, F. 1996, p. 844.

(60) United Nations Conference on Environment and Development. 1972. Declaration of the United Nations on the Human Environment, Stockholm, June. URL: <http://www.unep.org>

(61) The texts of the UN Convention on Biological Diversity and its Biosafety Protocol can be found at URL: <http://www.biodiv.org>

(62) Plant, G. 1992, p. 4-6.

(63) Plant, G. 1992.

(64) Yuzon, F. 1996, p. 842-45.

(65) Plant, G. 1992, p. 33-34.

(66) See Marino's intervention during the London Conference, at Plant, G. 1992, p. 107.

(67) The USA's almost amusing *secundum quid* argument that environmental restrictions would make conventionally armed states unable to defend themselves against nuclear-powered and nuclear warhead-toting navies radically contrasts with US tactics at the Biological and Toxin Weapons Convention. There, US seeks to separate discussion of nuclear capabilities from other weapons of mass destruction. See: Plant, G. 1992, p. 124.

(68) See Rostow's intervention during the London Conference in Plant, G. 1992, p. 123.

(69) See Bothe's intervention during the London Conference in Plant, G. 1992, p. 124-125.

(70) See Sohr's intervention during the London Conference in Plant, G. 1992, p. 115.

(71) Ecocide and genocide are often linked, as in the case of the extermination of the bison, a major factor in the destruction of some Native American populations.

(72) Falk, R. 1989. Revitalizing International Law, Iowa State University Press, Ames, p. 187-193.

(73) Sand, P. 1993. International Environmental Law after Rio, in European Journal of International Law, v. 4:3. URL: <http://www.ejil.org/journal/Vol4/No3/art4.html>.

(74) Rome Statute of the International Criminal Court, 1998. The text, status of ratification and additional information can be found at URL: <http://www.un.org/law/ilc/texts/romefra.htm>.

(75) Drumbl, M. 2000. International Human Rights, International Humanitarian Law, and Environmental Security: Can the International Criminal Court Bridge the Gaps?, in ILSA Journal of International & Comparative Law, v.6:2 (Spring 2000). URL: <http://www.nsulaw.nova.edu/student/organizations/ILSAJournal/6->

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