

Preserving the Flow: Legal Protection of Water in Times of Armed Conflict

by Rupesh Mishra

Editors' Summary: The threat of terrorism and other armed conflict calls into question the security of the planet's water resources. Few legal tools exist to protect this critical resource. In this Article, Rupesh Mishra examines the vulnerability of freshwater and evaluates the tools that might be used to protect it during armed conflict. Surveying international law, custom, and emerging principles, he identifies opportunities where existing law might be better utilized for preservation of water. He concludes with a broad set of recommendations, advocating the restructuring of the current international conflict and environmental legal regimes to offer more effective protection of water resources around the world.

I. Introduction

During times of armed conflict, our first concern is human beings: civilians, prisoners of war, or wounded combatants. We might next think of infrastructure such as schools, religious sites, hospitals, and cultural and historical monuments. We protect the former out of respect for human life and the latter because without these, life would hardly be worth living. Rarely, however, do we think of natural resources such as water, without which human life would be impossible.

The end of the 20th century saw increasing threats to water facilities, especially in Africa, the Balkans, and the Middle East. The vulnerability of water increases in times of armed conflicts, as modern water facilities systems are interconnected with electricity systems, which are often primary targets in wartime. Civilian populations are the first to suffer from the disruption of water supplies—and in some cases, thirst has proven to be more deadly than guns. How does international law address the need to protect both water facilities and the civilian population during such conflicts? What changes can be made to international law and policy to better address the challenges of water protection?

II. Why Water Needs Protection

“Access to safe water is a fundamental human need and, therefore, a basic human right. Contaminated water jeopardizes both the physical and social health of all people. It is an

affront to human dignity.”¹ Water is the essence of life. It is fundamental to poverty reduction, providing people with elements essential to their growth and development. Freshwater is crucial for: (1) human health; (2) food production; (3) disaster mitigation; and (4) environment protection and conservation of natural resources.² Water is essential for the food security of the poor, not just for agriculture but also for livestock and food collected from aquatic ecosystems.³ Improved health from better quality water increases productive capacity. Moreover, reduced vulnerability to water-related hazards boosts investments, production, and development.⁴

In the past century, the world's population tripled while global demand for water has increased sixfold.⁵ Over one billion people lack access to a basic water supply, while several billion do not have access to adequate sanitation, the primary cause of water contamination and diseases linked to water.⁶ The U.S. government estimates that by the

1. Kofi Annan (United Nations (U.N.) Secretary-General), as quoted in WORLD HEALTH ORGANIZATION (WHO), *THE RIGHT TO WATER* (Health and Human Rights Publication Series, No. 3, 2003), available at http://www.unhchr.ch/html/menu2/6/who_ohchr.pdf.
2. SANJAY UPADHYAY & VIDEH UPADHYAY, *HANDBOOK OF ENVIRONMENT LAW (VOL. II)—WATER LAWS, AIR LAWS, AND THE ENVIRONMENT* 3 (1st ed. 2000).
3. Asian Development Bank, *3rd World Water Forum: Water and Poverty Initiative*, <http://www.adb.org/Water/Theme/poverty.asp#reports> (last visited Feb. 26, 2007).
4. ASIAN DEVELOPMENT BANK, *POVERTY AND WATER SECURITY: UNDERSTANDING HOW WATER AFFECTS THE POOR* 11 (2004), available at http://www.adb.org/Documents/Books/Water_for_All_Series/Poverty_Water_Security/Poverty_02.pdf.
5. U.N. Population Fund, *Population Issues: Population and Sustainable Development*, <http://www.unfpa.org/6billion/populationissues/development.htm> (last visited Feb. 26, 2007).
6. In 2000, the WHO estimated that 1.1 billion persons did not have access to an improved water supply (80% of them rural dwellers) able

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year 2015, it is possible that up to 40% of the world's population will live in countries where water is in short supply.⁷ An estimated 14,000 to 30,000 people die each day from water-borne diseases.⁸ Of these, between 9,500 and 20,000 are children.⁹

The total freshwater supply on earth is decreasing because of pollution, diversion, and depletion.¹⁰ Only 0.77% of the total water on earth circulates as part of the water cycle, and even less circulates as rain water—the only source of renewable freshwater.¹¹ Less than one-half of 1% of the world's water is available for human consumption.¹² Population explosion, urbanization, industrialization, and agriculture have increased the demand for water while pollution has decreased the already limited supply.¹³

III. Protection of Water During Armed Conflicts: Legal Tools

In the last decade, the world has seen a renewed interest in the relationship between the environment, resource scarcity, and violent conflict. Though there has not been a documented “water war” in modern history, nevertheless, the changing nature of conflict and shortage of freshwater will certainly increase the potential for instability in the years ahead. As the potential for conflict increases, it is time to review some fundamental questions. To what extent are water facilities protected under the law, both domestic and international? What challenges to protection of water facilities does terrorism and the international response to it present? Finally, what lessons can be learned from recent conflict, in terms of the legal regimes that are designed to protect freshwater supplies?

Water facilities are protected under international humanitarian law through general and particular rules developed in the Hague and Geneva Conventions. Though water facilities are not mentioned explicitly, a number of rules are applicable. The Hague Conventions are concerned with rules relating to the methods and means of warfare, while the Geneva Conventions are concerned with the victims of war. By their terms, the conventions apply only during time of “war or other armed conflict.”¹⁴ Virtually all states have become parties to these agreements.¹⁵

to provide at least 20 liters of safe water per person a day; 2.4 billion persons were estimated to be without sanitation. See WHO, *THE GLOBAL WATER SUPPLY AND SANITATION ASSESSMENT 1* (2000). Furthermore, 2.3 billion persons each year suffer from diseases linked to water. See U.N. COMMISSION ON SUSTAINABLE DEVELOPMENT, *COMPREHENSIVE ASSESSMENT OF THE FRESHWATER FACILITIES OF THE WORLD* 39 (1997).

7. Douglas Jehl, *Introduction*, in *WHOSE WATER IS IT?* xvi (Bernadette McDonald ed., Nat'l Geographic Soc'y 2003).
8. Jason Astle, *Between the Market and the Commons: Ensuring the Right to Water in Rural Communities*, 33 DEV. J. INT'L L. & POL'Y 585 (2005).
9. Jehl, *supra* note 7.
10. See MAUDE BARLOW & TONY CLARKE, *BLUE GOLD* 5 (2000).
11. *Id.*
12. Jehl, *supra* note 7.
13. BARLOW & CLARKE, *supra* note 10.
14. *Protocol Additional to the Geneva Conventions of August 12, 1949, and Relating to the Protection of Victims of International Armed Conflicts*, U.N. Doc. A/32/144, 16 I.L.M. 1391, pmb., art. 56(2) (June 8, 1977) [hereinafter *Protocol I*]; *Protocol Additional to the Geneva Conventions of August 12, 1949, and Relating to the Protection of Victims of Non-International Armed Conflicts*, U.N. Doc.

A. Hague Convention

A few provisions of the Hague Regulations, Annex to the Hague Convention Respecting the Laws and Customs of War on Land (Fourth Hague Convention),¹⁶ can be applied to the protection of water resources. Article 23(a) prohibits the employment of “poison or poisoned weapons.” The rule has been recognized as a customary rule¹⁷ and although the wording does not refer directly to water or water facilities, the prohibition extends to water.¹⁸ Article 23(g) states that it is forbidden “to destroy or seize the enemy's property, unless such destruction or seizure be imperatively demanded by the necessities of war.”¹⁹ However, while Article 53 of IV Geneva Convention is limited to destruction resulting from the action by the occupying power, Article 23(g) of the Hague Regulations covers all property in the territory involved in a war. Therefore, the scope of Article 23(g) is much wider than that of Article 53 of IV Geneva Convention.

This rule is substantiated by other provisions, such as the prohibition of the confiscation of private property and the prohibition of pillage, which applies to occupied territories.²⁰ Moreover, the United Nations (U.N.) General Assembly stressed in the preamble of its Resolution on the Protection of the Environment in Times of Armed Conflict that “the destruction of the environment, not justified by the military necessity and carried out wantonly, is clearly contrary to existing international law.”²¹

In the light of Hague Regulations and this U.N. Resolution we can infer that the general principle of wanton destruction has been expanded to apply to the natural environment and freshwater resources.

A/32/144, 16 I.L.M. 1442, pmb. (June 8, 1977) [hereinafter *Protocol II*].

15. As of June 27, 2006, IV Geneva Convention has been ratified by 194 countries. A list of countries that have ratified the IV Geneva Convention is available at <http://www.icrc.org/ihl.nsf/WebSign?ReadForm&id=375&ps=P> (last visited Feb. 26, 2007). As of April 28, 2006, 1907 Hague Convention IV has been ratified by 106 countries. A list of countries that have ratified the 1907 Hague Convention No. IV is available at <http://www.pca-cpa.org/ENGLISH/CSAI> (last visited Feb. 26, 2007).
16. HAGUE CONVENTION NO. IV, RESPECTING THE LAWS AND CUSTOMS OF WAR ON LAND (1907) [hereinafter 1907 HAGUE CONVENTION NO. IV]; 1907 HAGUE CONVENTION NO. IV, ANNEX: REGULATIONS RESPECTING THE LAWS AND CUSTOMS OF WAR ON LAND (1907) [hereinafter HAGUE REGULATIONS], available at <http://www.yale.edu/lawweb/avalon/lawofwar/hague04.htm>.
17. A great number of Conventions refer to this rule. *E.g.*, *Lieber Code*, art. 16 (1863); *Brussels Declaration*, art. 13 (1874); *Oxford Manual*, art. 8 (1880) (adopted by the Institute of International Law in 1880). Moreover, *Rome Statute of International Criminal Court*, art. 8, at 1002, 37(5) I.L.M., U.N. Doc. A/CONF.183/9 (July 17, 1998), considers the employment of poison or poisoned weapons as a war crime.
18. Mara Tignino, *Water in Times of Armed Conflict*, in *THE INTERNATIONAL BUREAU OF THE PERMANENT COURT OF ARBITRATION* 319, 323 (Kluwer Law Int'l, 2003).
19. The same principle reappears in the Charter of International Military Tribunal of Nuremberg, art. 6(b), 82 U.N.T.S. 279 (Aug. 8, 1945), and in the Convention relative to the Protection of the Civilian Persons in Times of War, art. 53, 74 U.N.T.S. 287, (Aug. 12, 1949) [hereinafter IV Geneva Convention].
20. HAGUE REGULATIONS, *supra* note 16, arts. 28, 46, 47; IV Geneva Convention, *supra* note 19, art. 33; *Protocol II*, *supra* note 14, art. 4.2(g).
21. *Protection of the Environment in Times of Armed Conflict*, U.N. Doc. A/RES/47/37 (Nov. 25, 1992).

B. Geneva Conventions

During times of conflict, the Geneva Conventions of August 1949 provide protection to combatants and civilians alike. They are founded on the idea of respect for the individual and his/her dignity and provide for the supply of basic needs, including water. The Additional Protocols stipulate that the parties to the conflict and the combatants shall not attack the civilian population and civilian objects, including water installations, and shall conduct their military operations in conformity with the recognized rules and standards of humanity.²²

The Geneva Conventions' Additional Protocol I²³ offers protection to victims of international armed conflict. Provisions relevant to protection of water include the following:

Article 35(3) strengthens the protection of the environment by stating that “it is prohibited to employ methods of warfare which are intended, or may be expected, to cause widespread, long-term, and severe damage to the natural environment.”

Article 54 prohibits, “whatever the motive,” the attacking, destroying, and removing of “objects indispensable to the survival” of civilian population, such as “drinking water installations and supplies and irrigation works.”

Article 55 represents the only truly “environmental” provision in Protocol I. It states:

1. Care shall 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 may be expected to cause such damage to the natural environment and thereby prejudice the health or survival of the population.
2. Attacks against the natural environment by way of reprisals are prohibited.

Article 56 prohibits attacks against “works and installations containing dangerous forces, namely dams, dykes and nuclear electrical generating stations.”

Although only one of these provisions expressly mentions water, it can be inferred that water, an integral part of the environment, is afforded protection under these rules as well as all rules that have been established to protect the environment.

Geneva Conventions' Additional Protocol II²⁴ contains a provision explicitly mentioning water:

Article 14: It is prohibited to attack, destroy, remove or render useless for that purpose, objects indispensable to the survival of the civilian population such as food-stuffs, agricultural areas for the production of food-stuffs, crops, livestock,

drinking water installations and supplies and irrigation works.

C. Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques

The Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques (ENMOD) was convened in response to the severe environmental damage suffered by Vietnam as a result of the use of chemicals and defoliants by the United States. The Convention was intended to prohibit the military use of climate modification techniques that are intended or could be expected to cause “widespread, long-lasting, or severe” destruction or damage to the enemy.²⁵ However, it could be potentially applied more broadly to cover water facilities. These three terms are defined in the first Understanding as follows:

1. *Widespread*: encompassing an area on the scale of several hundred square kilometers.
2. *Long-lasting*: lasting for a period of months, or approximately a season.
3. *Severe*: involving serious or significant disruption or harm to human life, natural and economic facilities, or other assets.²⁶

Article II of ENMOD defines the phrase “environmental modification techniques” as any technique that modifies “the dynamics, composition or structure of the Earth, including its biota, lithosphere, hydrosphere and atmosphere, or of outer space.”²⁷ By including the hydrosphere in this provision, ENMOD provides some degree of protection for water and the facilities that contain or transport it. ENMOD also uses the much broader term of “military or any other hostile use” in place of the phrase “armed conflict.” Use of the word “war” throughout seems to further suggest the broadened application of the convention.²⁸

While ENMOD does not preempt the customary principle of military necessity, it does refine the balancing of environmental damage with military necessity by providing an upper limit on the acceptable level of environmental damage.

D. International Law Association

The *Helsinki Rules on the Uses of the Waters of International Rivers*, adopted by the International Law Association (ILA) at its Helsinki Conference in 1966, contain only one provision (Article XX) which refers to problems arising from armed conflict and it is confined to the limited subject

22. *Protocol I*, *supra* note 14, arts. 1(2), 51, 54(2), 57(1); *Protocol II*, *supra* note 14, arts. 13, 14.

23. *Protocol I*, *supra* note 14.

24. *Protocol II*, *supra* note 14.

25. *Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modifications Techniques*, art. I (May 18, 1977) [hereinafter *ENMOD*], reprinted in ADAM ROBERTS & RICHARD GUELF, *DOCUMENTS ON THE LAWS OF WAR* 410 (3d ed. 2000) [hereinafter *LAWS OF WAR*].

26. *Understanding Relating to Article*, in *LAWS OF WAR*, *supra* note 25, at 407.

27. *ENMOD*, *supra* note 25, art. II.

28. See Walter G. Sharp, *The Effective Deterrence of Environmental Damage During Armed Conflict: A Case Analysis of the Persian Gulf War*, 137 *MIL. L. REV.* 1, 19 (1992).

of navigation.²⁹ Realizing the lacuna in the legal protection of water in wartime, the ILA addressed the issue 10 years later. Thus, during its 57th Conference held at Madrid in 1976, the ILA adopted a resolution on the protection of water facilities and water installations in wartime.³⁰

E. Customary International Law

The incorporation of customary international law into modern international conventions indicates that in the absence of treaty provisions that derogate from customary international law, custom is binding on all states. Because the applicable treaty laws discuss the protection of water only tangentially, customary international law becomes invaluable when addressing the issue of the targeting of water facilities by State actors during armed conflicts.

The fundamental principles of customary international law applicable to the protection of water facilities are those of humanity, discrimination, proportionality, and military necessity.

Principle of Humanity: Also known as the “principle of unnecessary suffering and destruction,” this principle proscribes the use of means of warfare which cause unnecessary suffering not justified by legitimate military objectives.³¹ The poisoning of water supplies or the disastrous environmental and economic consequences of destroying a dam, such as the destruction of the Huayuankow Dam by Chinese Nationalist forces during the Japanese invasion of China, are examples of indiscriminate acts that cause unnecessary suffering. Article 35(3) of Protocol I strongly prohibits methods of means of warfare intended or expected to harm the environment.

Principle of Discrimination: This principle provides that the means and methods of warfare must distinguish between military and civilian objects and objectives.³² For an object to be considered a military objective, “its total or partial destruction, capture or neutralization, must offer a definite military advantage”³³ to the acting party. Any object that is not militarily advantageous should not be considered an appropriate military objective. Harm to the water facilities can no longer be a military objective in any circumstances.

Principle of Proportionality: According to this principle, the force employed by the attacker should not be disproportionate to the military advantage sought.³⁴ Some confusion arises, however, when considering how this principle should be ap-

plied.³⁵ For example, if underground water delivery systems are in the vicinity of an otherwise legitimate military target, should the military commander refrain from attacking because of undesirable collateral effects? The answer may differ depending on the values and the background of the decisionmaker. The military commander is required to weigh the relative military advantage against the potential injury to noncombatants or the damage to civilian objects. If the destruction of a water supply of an entire town or village were certain, that must be heavily weighed against the possible military advantage.

Principle of Military Necessity (or Military Advantage): This principle states that a combatant may use only the level of force “required for the partial or complete submission of the enemy” that incurs the least “loss of time, life, and physical resources” in the attainment of a legitimate military objective.³⁶ This principle is subject to the limits of humanity, discrimination, and proportionality.

In addition to these four established principles, a fifth has recently emerged providing that “nature is no longer fair game in humankind’s conflicts.”³⁷ This can be seen in the World Charter for Nature, which provides that “nature shall be secured against degradation caused by warfare” and “military activities damaging to nature shall be avoided.”³⁸

F. International Humanitarian Law

1. Prohibition on Poisoning of Water

Use of poison in water facilities is prohibited because of its clandestine and insidious character. Poisoning an enemy’s water supply is an antique war strategy that was often employed to bring an enemy into submission. Prohibition of poisoning water has been recognized as a customary rule for centuries before it was codified at the Hague Peace Conferences of 1899 and 1907.³⁹ The codification of this customary rule is further demonstrated by the introduction of the Lieber Instructions in 1863 to restrict the conduct of the armies during the U.S. Civil War. The code stated that military necessity “does not admit the use of poison in any way.”⁴⁰

29. ILA, *Report of the Fifty-Second Conference Held at Helsinki* (Aug. 14, 1966 to Aug. 20, 1966), at 484 (1967).

30. ILA, *Report of the Fifty-Seventh Conference Held at Madrid* (Aug. 30, 1976 to Sept. 4, 1976), at xxxiv (1978) [hereinafter ILA, *Fifty-Seventh Conference*].

31. FRITS KALSHOVEN, *CONSTRAINTS ON THE WAGING OF WAR* 29-30 (Int’l Comm. of the Red Cross 1991).

32. *LAW OF WAR*, *supra* note 25, at 10.

33. *Protocol I*, *supra* note 14, art. 52, ¶ 2.

34. *LAW OF WAR*, *supra* note 25, at 9-10.

35. See INTERNATIONAL CRIMINAL TRIBUNAL FOR THE FORMER YUGOSLAVIA, FINAL REPORT TO THE PROSECUTOR BY THE COMMITTEE ESTABLISHED TO REVIEW THE NATO BOMBING CAMPAIGN AGAINST THE FEDERAL REPUBLIC OF YUGOSLAVIA ¶ 8 (2001), available at <http://www.un.org/icty/pressreal/nato061300.htm> [hereinafter ICTY REPORT].

36. See *Naval War College*, in ANNOTATED SUPPLEMENT TO THE COMMANDER’S HANDBOOK ON THE LAW OF NAVAL OPERATIONS ¶ 5.2. (A. R. Thomas & James Duncan eds. 1999).

37. Paul C. Szasz, *The Gulf War: Environment as a Weapon*, 85 AM. SOC’Y INT’L L. PROC. 214, 217 (1991) (remarks made during a panel discussion).

38. *World Charter for Nature*, G.A. Res. 37/7, U.N. GAOR, 37th Sess., princ. 5, 20, U.N. Doc. A/RES/37/7, 22 I.L.M. 455 (1982).

39. HAGUE REGULATIONS, *supra* note 16, art. 23(a); see also *supra* note 17.

40. *Instructions for the Government of Armies of the United States in the Field*, General Orders No. 100, art. 16 (Apr. 24, 1863) (referred to as the Lieber Instructions), reprinted in DIETRICH SCHINDLER & JIRI TOMAN, *THE LAWS OF ARMED CONFLICT* 6 (1988).

Article 23(a) of the Hague Convention also incorporates this customary rule, stating that it is especially forbidden “to employ poison or poisoned weapons.”⁴¹ However, of more significance is the Geneva Protocol of 1925, which provides that the “use in war of asphyxiating, poisonous, or other gases, and all analogous liquid materials or devices, has been justly condemned by the general opinion of the civilized world.”⁴²

During the ILA conference in New Delhi in 1975, it was suggested that the prohibition of poisoning is too narrow and that prohibition should be extended to all measures which render water unusable for human consumption.⁴³

2. Prohibition on the Destruction of Water as Property

Water and water facilities, regardless of location and ownership, are considered property under international humanitarian law.⁴⁴ Hague Regulations, Article 23(g), states that it is forbidden “to destroy or seize the enemy’s property, unless such destruction or seizure is imperatively demanded by the necessities of war.”⁴⁵

Geneva Convention IV of 1949 provides that the “extensive destruction and appropriation of property, not justified by military necessity and carried out unlawfully and wantonly” is qualified as a “grave breach,” and thus, a war crime.⁴⁶ Article 6(b) of the Charter of the International Military Tribunal of Nuremberg also describes these actions as “war crimes.”⁴⁷ Although the terminology differs, each of these conventions views unjustified actions against property as serious violations of international humanitarian law.

3. Prohibition of the Destruction of Objects Indispensable to the Survival of the Civilian Population

Article 54 of Protocol I prohibits the attacking, destroying, removing, or rendering useless of “objects indispensable to the survival of civilian populations, such as . . . drinking water installations and supplies, and irrigation works.”⁴⁸ Similar language is restated in Article 14 of Protocol II.⁴⁹

Article 54 contains specific provisions allowing an attack on “indispensable objects” in cases where the objects are used by an adverse party as “sustenance solely for members of its armed forces” or in “direct support of the military action.”⁵⁰ However, the Article further provides that “in no event shall actions against these objects be taken that may be expected to leave the civilian population with such inadequate food or water as to cause its starvation or force its movement.” It also prohibits reprisals against indispensable objects.⁵¹

Principle 24 of the Rio Declaration on Environment and Development specifically provides protection for the environment during war: “Warfare is inherently destructive of sustainable development. . . . States shall therefore respect international law providing protection for the environment in times of armed conflict and cooperate in its further development, as necessary.”⁵²

Water, as an integral part of the environment and a necessary and vital element in a country’s economic development, would be protected under this principle. However, similar to the other provisions discussed earlier, this principle does not apply to situations outside armed conflict, including terrorism.

4. Prohibition of Attacks on Dams and Dykes

In modern conflicts the strategic vulnerabilities of dams and dykes have been successfully exploited through dam or dyke-busting military missions. Noteworthy examples are: the British Air Force’s attack on two key dams in the Ruhr Valley in Germany,⁵³ Korean War operations against dams and dykes by the U.S. Air Force,⁵⁴ damage caused to dykes by systematic bombing during the Vietnam War,⁵⁵ and recent “water war” in Sri Lanka.

In response to the catastrophic damage or destruction endured by civilian populations as a result of attacks on dams and dykes and the threat of future attacks on such installations, especially in agricultural countries where dykes are of greater economic importance, Article 56 of Protocol I was adopted. It provides: “Works or installations containing dangerous forces, namely dams, dykes, and nuclear electrical generating stations, shall not be made the object of attack, even where those objects are military objectives, if such attack may cause the release of dangerous forces and consequent severe losses among the civilian population.”⁵⁶

Furthermore, Article 56 prohibits the attack of other military objectives “located at or in the vicinity of these works or installations” due to the possibility that the dangerous forces

41. 1907 HAGUE CONVENTION NO. IV, *supra* note 16, art. 23(a).

42. *Geneva Protocol for the Prohibition of the Use in War of Asphyxiating, Poisonous or Other Gases, and of Bacteriological Methods of Warfare*, pmbl. (June 17, 1925), reprinted in LAWS OF WAR, *supra* note 25, at 158-59.

43. According to the ILA, all measures that render water unusable for human consumption by whatever means are illegal at least, *de lege ferenda* “in conformity with the Rule No.7 of the 1969 Edinburgh Resolution of the *Institut de Droit International*.” This rule prohibits “the use of all weapons which, by their nature, affect indiscriminately both military and non-military objects, or both armed forces and civilian population.” However, this principle has been violated by the practice of many countries. S. BOGDANOVIC, INTERNATIONAL LAW OF WATER FACILITIES: CONTRIBUTION OF THE INTERNATIONAL LAW ASSOCIATION (1954-2000) 234 (Kluwer Law 2000).

44. See DEPARTMENT OF THE ARMY, INTERNATIONAL LAW, PAMPHLET NO. 27-161-2, at 174-75 (1962); see also INTERNATIONAL COMMITTEE OF THE RED CROSS, COMMENTARY: GENEVA CONVENTION RELATIVE TO THE PROTECTION OF CIVILIAN PERSONS IN TIME OF WAR 300-02 (Jean Pictet ed. 1958).

45. 1907 HAGUE CONVENTION NO. IV, *supra* note 16, art. 23(g).

46. IV Geneva Convention, *supra* note 19, art. 147.

47. Charter of International Military Tribunal of Nuremberg, Aug. 8, 1945, art. 6(b), 82 U.N.T.S. 279.

48. *Protocol I*, *supra* note 14, art. 54(2).

49. *Id.* art. 14.

50. *Id.* art. 54(3)(a), (b).

51. *Id.* art. 54(4).

52. *United Nations Conference on Environment and Development: Rio Declaration on Environment and Development*, 47th Sess., princ. 24, U.N. Doc. A/CONF.151/5/Rev. 1, 31 I.L.M. 874, 879 (June 14, 1992) [hereinafter *Rio Declaration*].

53. Dambusters, *The Dams Raid: Dams of the Ruhr Valley*, <http://www.dambusters.org.uk/dams.htm> (last visited Jan. 26, 2007).

54. ICTY REPORT, *supra* note 35.

55. H. LEVIE, PROTECTION OF WAR VICTIMS: PROTOCOL I TO THE 1949 GENEVA CONVENTIONS 286 (1980) (quoting statement of delegate from the Democratic Republic of Vietnam at the Meeting of Committee III).

56. *Protocol I*, *supra* note 14, art. 56(1).

contained by these installations may be released causing "severe losses among the civilian population."⁵⁷

G. Emerging Principles for the Protection of Water

The above discussion illustrates how water facilities are covered under a number of provisions of international humanitarian law, either by treaty or through customary law. In addition to these, some new principles are emerging that afford protection to water resources.

Each State has a legal and moral duty not to allow its territory to be used in a manner that is injurious to another State's environment. This principle was first set forth in the decision of the International Court of Justice (ICJ) in the *Trail Smelter Case*,⁵⁸ which stated: "Under international law no State has the right to use or permit the use of its territory in such a manner as to cause injury by fumes in or to the territory of another or the properties or person therein, when the case is of serious consequence and the injury is established by clear and convincing evidence."⁵⁹ The ICJ later reiterated the principle of limited territorial sovereignty laid down in the *Trail Smelter Case* by incorporating it into the *Corfu Channel Case*.⁶⁰ The *Corfu Channel Case* arose from incidents that occurred on October 22, 1946, in the Corfu Strait. Two British destroyers struck mines in Albanian waters and suffered damage, including serious loss of life. In a judgment given on April 9, 1949, the ICJ held Albania responsible, under international law, for the explosions which occurred on October 22, 1946, in Albanian waters, and for the damage and loss of human life that resulted to the United Kingdom. The Court found that it is "every State's obligation not to allow knowingly its territory to be used for acts contrary to the rights of other States."⁶¹

Standards laid down in these cases were incorporated into Principle 21 of the Declaration of the U.N. Conference on the Human Environment, better known as the Stockholm Declaration, by providing that States have the "responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States."⁶² The World Charter for Nature, in language similar to that used in the Stockholm Declaration and Rio Declaration, provides that states shall "ensure that activities within their jurisdictions or control do not cause damage to the natural systems located within other States."⁶³ Like the Rio Declaration's Principle 24, the World Charter for Nature specifically addresses the protection of the environment by declaring that "nature shall be secured against degradation caused by warfare or other hostile activities."⁶⁴

The principles developed in the cases dealing with transboundary environmental harm and the aspirational provisions of the Stockholm Declaration, the World Charter for Nature, and the Rio Declaration do not provide express

guidance on the protection of water and water facilities. However, within these provisions lies the implicit understanding of the interconnected and vital nature of water to the survival of the human race. They also provide precedent for a new international declaration that expands and clarifies the protection of water under international humanitarian law in times of armed conflict and terrorist acts.

IV. Other Norms of International Law

Given the crucial importance of water in today's political and economical affairs, there is a need to adopt a holistic approach along with a more coherent and integrated legal framework to address global water safety.

International human rights law could be better used to strengthen the existing legal framework. In this context, the General Comment on the Right to Water adopted in 2002 by the U.N. Committee on Social, Economic, and Cultural Rights affirms the obligation for States to refrain "from limiting access to, or destroying water services and infrastructures as a punitive measure" during armed conflicts.⁶⁵ This statement signifies the progressive convergence between international humanitarian law and human rights law which has also been confirmed by the ICJ in its advisory opinion on the *Legal Consequences of the Construction of a Wall in the Occupied Palestinian Territory*.⁶⁶

The continued validity of water-related treaties after the outbreak of war is of vital importance for the protection of water and survival of the civilian population, especially when these treaties concern the delivery of water for drinking purposes and for irrigation, or measures of flood control.

Article 29 of the U.N. Watercourses Convention declares that "international watercourses and related installations . . . shall enjoy the protection accorded by the principles and rules of international law applicable in international and non-international armed conflict and shall not be used in violation of those principles and rules."⁶⁷ This provision does not explain the relationship between the U.N. Watercourse Convention and international humanitarian law in a clear manner. Same is the case with Article VII of the ILA Resolution on Protection of Water Facilities in Times of Armed Conflict, which reads as follows:

The effect of the outbreak of war on the validity of treaties of parts thereof concerning the use of water facilities

65. COMMITTEE ON ECONOMIC, SOCIAL, AND CULTURAL RIGHTS, GENERAL COMMENT NO. 15 ON THE RIGHT TO WATER, E/C.12/2002/11 (Nov. 26, 2002), available at <http://www.unhcr.ch/html/menu2/6/cesr.htm>.

66. In its advisory opinion, the ICJ points out that:

the Court considers that the protection offered by human rights conventions does not cease in case of armed conflict, save through the effect of provisions for derogation of the kind to be found in Article 4 of the International Covenant on Civil and Political Rights. As regards the relationship between international humanitarian law and human rights law, there are thus three possible situations: some rights may be exclusively matters of international humanitarian law; others may be exclusively matters of human rights law; yet others may be matters of both these branches of international law.

INTERNATIONAL COURT OF JUSTICE, *Legal Consequences of the Construction of a Wall in the Occupied Palestinian Territory*, (July 9, 2004), available at <http://www.icj-cij.org/icjwww/idocket/imwp/imwppframe.htm>.

67. The U.N. Convention on the Non-Navigational Uses of International Watercourses, reprinted in 36 I.L.M. 700 (1997).

57. *Id.* art. 56(2)(a).

58. 3 R.I.A.A. 1905 (1941).

59. *Id.*, reprinted in 35 AM. J. INT'L L. 684, 684 (1941).

60. 1949 I.C.J. 4, 22 (Apr. 1949) (determination on the merits).

61. *Id.*

62. *Report of the United Nations Conference on the Human Environment*, princ. 21, U.N. Doc. A/CONF.48/14/REV.1 (1972), available at <http://www.un-documents.net/unchedec.htm>.

63. *World Charter for Nature*, *supra* note 38.

64. *Id.*, princ. 5.

should not be termination but only suspension. Such suspension should take place only when the purpose of the war or military necessity imperatively demand the suspension and when the minimum requirements of subsistence for the civil population are safeguarded.⁶⁸

In its commentary to Article 29 of U.N. Watercourses Convention, the U.N. International Law Commission (ILC) opined that, in time of armed conflict, the rules and principles of the *ius in bello* apply unaltered by the Convention, and “the obligation of States to protect and use international watercourses and related works in accordance with the Articles of the U.N. Watercourses Convention remains in effect during an armed conflict.”⁶⁹

V. Terrorism and the Threat to Water Facilities

The importance and vulnerability of water utilities, including plants, dams, pipelines, and other infrastructure, make them the prime targets of terrorism in the new millennium. Damage to the nation’s water supply and water quality infrastructure by terrorist attack could disrupt the delivery of vital human services, threatening public health and the environment.

A number of recent terrorist attacks have been directed at water facilities, including the dumping of chemicals into the Meuse River in France, the placing of a bomb in a water reservoir in South Africa, and the destruction of water pipes in the Israeli settlement of Yitzhar.⁷⁰ The 9/11 terrorist strikes have drawn attention to the security of water supply and treatment infrastructure in the United States.⁷¹

There is currently no single, internationally accepted definition of terrorism that could be applied to the attacks on water facilities.⁷² The customary law of armed conflict and the Geneva Conventions apply only in times of war or armed conflict.⁷³ But terrorist activity will not be limited to ongoing conflicts in or near war zones. Defining terrorist acts as the peacetime equivalent of war crimes would fulfill most of the gaps, but there are dangers in this approach. By including terrorism as a war crime, terrorists could be immune from prosecution for common crimes, and might even be entitled to protection as prisoners of war.⁷⁴

VI. Do Existing Laws Provide Adequate Protection?

The analysis of existing legal tools shows that there is an apparent lack of an appropriate and potent legal framework for the protection of water during armed conflict. This inadequacy can be explained, on the one hand, by water’s dual role as a weapon and target and, on the other hand, by the

very manner in which it is treated in international humanitarian law. Water is taken into consideration only in connection with those laws having basic objectives of protecting victims of war and regulating the conduct of hostilities—and even then only in its capacity as one of man’s basic needs. Water per se is not given legal shield.

This inadequacy of legal tools can be summarized in the following manner:

- Water is not expressly mentioned in the principal conventions and treaties of international humanitarian laws. It is considered as part of environmental issues, and thus given very vague status in terms of protection.
- No unanimity exists in the ratification of the 1977 Protocols. Only 159 States have ratified them, and politically strong countries like the United States were opposed to their ratification.⁷⁵
- Some forms of conflict, like terrorism and internal conflict, are not within the scope of international humanitarian law. The term “armed conflict” does not include isolated attacks on water facilities from terrorist groups.
- An adequate enforcement mechanism is lacking. There is no effective international authority to apply these laws. The U.N. Center for International Crime Prevention has been under funded and powerless, and INTERPOL has been only marginally useful.⁷⁶ No effective international criminal court exists, and domestic legal systems are often unavailable as a result of the same conflict that results in damage to water facilities.
- There is a general lack of understanding of the rules and how they apply to protection of water. Aggressors are either unaware of the provisions of international humanitarian law, or they choose to disregard them.

VII. Recommendations

The above discussion has identified two broad areas in which water facilities need a greater degree of protection. The first is the protection afforded under international humanitarian law, and the second is protection from terrorist attacks. This author recommends the following measures to address the need for water protection.

A. Develop New Standards

The Rio and Stockholm Declarations are important milestones in the development of international humanitarian law. States who failed to adopt these formulations as law should do so immediately. Then, new standards should be developed to recognize the current state of freshwater resources and the need for their protection.

68. ILA, *Fifty-Seventh Conference*, *supra* note 30, art. VII.

69. ILC, *Report of the ILC to the General Assembly on the Work of Its Forty-Sixth Session*, vol. II, pt. II, at 131 (1994).

70. ELIZABETH CHALECKI, A NEW VIGILANCE: IDENTIFYING AND REDUCING THE RISKS OF ENVIRONMENTAL TERRORISM (Pac. Inst. for Studies in Dev., Env’t, and Sec., Report 10, 2001), available at www.pacinst.org.

71. Martin Sieff, UNITED PRESS INTERNATIONAL, Jan. 30, 2002.

72. Tasia E. McIntyre, *Protecting Against Terrorism or Symbolic Politics?: Fatal Flaws in Ohio’s Criminal Terrorism Statute*, 56 CASE W. RES. L. REV. 203, 205 (2005).

73. M. Cherif Bassiouni, *Legal Control of International Terrorism: A Policy Oriented Approach*, 43 HARV. INT’L L.J. 83, 88 (2002).

74. Michael Scharf, *Defining Terrorism as the Peace Time Equivalent of War Crimes*, ILSA J. INT’L & COMP. L. 391, 398 (2001).

75. As of January 14, 2007, Protocol I has been ratified by 167 countries. A current list of states party to Protocol I is available at <http://www.icrc.org/ihl.nsf/WebSign?ReadForm&id=470&ps=P> (last visited Feb. 26, 2007); see also Abraham Sofaer, *AGORA: The U.S. Decisions Not to Ratify Protocol I to the Geneva Conventions on the Protection of War Victims (Cont’d): The Rationale for the United States Decision*, 82 AM. J. INT’L L. 784, 785 (1988).

76. Bassiouni, *supra* note 73, at 93.

B. Utilize the World Water Forum

Concerned States should use the World Water Forum as a platform to clarify and implement applicable provisions of international humanitarian law. This would help in extending legal protection to a wide range of water facilities and persons not clearly covered under existing law. The World Water Forum should issue a declaration calling on all aggressors to abstain from attacking water treatment plants and distribution systems for civilian use. The challenge of terrorism against water must be addressed and some creative measures developed to protect water infrastructure.

C. Limit the Damage of Embargoes

The international community should recognize the calamitous effects for civilians of wide-ranging embargoes imposed for extended periods. It should take these effects into consideration when formulating new laws and policies that cover the delivery of water. Lessons can be learned from the international experience in Iraq, and embargoes should be tailored to avoid similar negative impacts on water infrastructure and civilian populations.

D. Develop Guidelines and Instructions for Military Manuals

With the support of the International Committee of the Red Cross (ICRC) and the U.N. General Assembly, guidelines for the protection of water during armed conflict should be developed. It should be noted that this type of document would be of use only for organized military forces that make some attempt to comply with international humanitarian law.

E. Call for a U.N. General Assembly Resolution

Resolutions of the General Assembly are an important tool in establishing customary international law to advance the standards of international humanitarian law. The Secretary-General's report of August 19, 1994, to the General Assembly referred to guidelines for environmental protection that could be used as a model for a resolution concerning the protection of water during armed conflict. It was stated in paragraph 11 of Resolution 49/50 of December 9, 1994, that the General Assembly:

Invites all States to disseminate widely the revised guidelines for military manuals and instructions on the protection of the environment in times of armed conflict received from the [ICRC] and to give due consideration to the possibility of incorporating them into their military manuals and other instructions addressed to their military personnel.⁷⁷

F. Strengthen the International Criminal Court

The international community should support the International Criminal Court (ICC). Provisions of the ICC Statute should be expanded and clarified to cover attacks on water facilities and installations. This will strengthen the existing provisions concerning environmental damage. Potential gaps in coverage should be filled to include terror-

ist attacks on water facilities during peacetime. Large-scale terrorist attacks should be formally designated as crimes against humanity.

G. Publicize the Nature of the Problem

Protection of water facilities during armed conflict should be clearly listed as a "critical problem." As part of the UNESCO World Water Development Report, particular attention should be directed to the protection of water facilities during armed conflict and terrorist attacks.⁷⁸ In addition, the International Water Academy, in cooperation with the ICRC, should spread awareness of existing legal provisions and emphasize the importance of protecting water in times of conflict. The ICRC Water and Habitat Unit should be directly involved in the coordination of efforts related to the protection of water facilities.

In conclusion, a new international treaty designed to protect water facilities is unnecessary. By taking the action recommended above, existing international legal obligations and state practice can be clarified and strengthened. This will promote an active interest in, and concern for, the protection of water facilities by the armed forces of all states. Declarations of new standards and promulgation of guidelines, though not legally binding, could achieve many of the same objectives. By placing increased emphasis on the international law of terrorism, we can hope to increase the prospects that those who attack water facilities will be brought to justice, and further acts of terrorism will be deterred. Finally, support for the ICC will improve the climate of accountability and enforcement of international law.

VIII. Conclusion

There is no doubt that population growth, economic development, and changing regional values have intensified competition over water resources worldwide.⁷⁹ In spite of these developments, the most crucial challenge to solving water problems is the protection of water in times of armed conflict.

Most of the world's water is shared water. Consequently, arrangements are necessary for the nations which share them in order to manage them efficiently. Water facilities in one State also affect water facilities in neighboring States. The *Trail Smelter Case*⁸⁰ and *Nuclear Tests Case*⁸¹ are classic examples, proving that the pollution in one country will affect the people in other countries. An growing set of issues related to water protection, such as persistent armed conflicts, terrorism, proliferation of nuclear weapons, and lack of international legal mechanisms, demand an effective, coordinated response from States across the globe.

Devised during the infancy of environmental awareness, when problems were perceived as largely local, relatively distinct, and subject to technological fixes, the current legal regime protecting water facilities is weak, fragmented, lack-

78. See The International Water Academy, http://www.thewateracademy.org/index_main.html (last visited Jan. 26, 2007).

79. Meredith A. Giordano & Aaron T. Wolf, *The World's International Freshwater Agreements*, http://www.transboundarywaters.orst.edu/publications/atlas/atlas_html/foreword/internationalAgreements.html (last visited Jan. 29, 2007).

80. 3 R.I.A.A. 1905 (1941).

81. 1974 I.C.J. 253 (1974) (judgment).

77. G.A. Res. 40/50, ¶ 11, U.N. Doc. A/RES/49/50 (Dec. 9, 1994) (emphasis added).

ing in facilities and handicapped by a narrow mandate. The methods and techniques available in international humanitarian law are unable to cope with the new challenges. The emerging issues are so big and so embracing that current ways of doing things will not solve these problems. It has been realized that the institutional mechanisms within the U.N. system are not capable of handling these issues. The time has come for something more innovative, for a conceptual leap forward, in institutional terms.

Given the expanding challenges for global freshwater availability and the fragmented approach to international action, the international community needs to consider whether the existing international institutional machinery can confront the challenges of the current century. It is the need of the hour to reaffirm, review, restructure, and revitalize the present international environmental regime to have an efficient global water resource protection system.