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Water and the Culture of Peace: Adopting a Kyoto Protocol Model

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Introduction

Maintaining environmental quality and sustainability, including water resources and water quality, is part of the culture of peace.¹ It has been suggested that the causes of the Darfur conflict in Sudan, marked by atrocities against many thousands of innocent people, include not only human wickedness and ethnic hatred, but also water scarcity. The Middle East has been plagued by unremitting tension, in large measure due to claims over water.

Water is vital for life. Oceans are abundant, yet there is very little fresh water. Of the 1.39 billion cubic kilometers of water in the world, 97.5 percent, or 1.34 billion cubic kilometers, is salt, brackish or mineralized water; only 35,029,000 cubic kilometers, or 2.52 percent, is fresh water. "Rivers and streams account for 0.006 percent, fresh-water lakes for 0.26 percent, and water contained in the atmosphere for 0.001 percent of the total quantity of fresh water. The rest of the fresh water component occurs as soil moisture, permanent snow cover, marshes and active groundwater."² Potential groundwater reserves are estimated to be as high as 30 percent of total freshwater reserves.

However, in the Middle East, groundwater does not replenish, or else replenishes only minimally, due to scant rainfall. Most Middle East rainfall is negligible—between 250 and 400 millimeters annually—and concentrated in a rainy season lasting between six and eight months per year.³ This amount of rainfall is less than the minimum annual requirement for basic agriculture, which is at least 400 millimeters.⁴ Furthermore, due to the insufficient renewal of Middle East groundwater, it tends to be brackish.

There is uneven distribution of the world's stores of fresh water throughout the globe, due both to differing amounts of precipitation and to the existence or absence

of fresh water. It is estimated that by the year 2025, Middle Eastern average net water resources will drop to less than 700 cubic meters per person, which is half the level it was twenty years earlier.⁵

Although populations are rapidly increasing (the world's population tripled in the twentieth century⁶), the world's water supply remains static. As an illustration, the Nile River is no larger now than it was two thousand years ago, yet its water is used by nine countries whose total populations are expected to double within the next two decades.⁷

Water, of course, has been a pivotal resource throughout human history. It was the focus of miracles in the Torah, from the parting of the Red Sea⁸ to the story of water bursting forth from the rock.⁹ In the Christian parable of the salvation of Jesus, water, too, plays an important element; in fact, salvation, itself, is referred to as water.¹⁰ Christian scripture also teaches that Jesus walked on water¹¹ and calmed a storm on the Sea of Galilee.¹²

Today, thousands of years after the biblical period, water and its sustainability remain central issues. The Egyptian statesman Boutros Boutros-Ghali warned before taking his position as secretary general of the UN that "the next war in our region will be over water, not politics."¹³ Jordan's King Hussein declared that Jordan would go to war with Israel only over water.¹⁴ After signing the peace treaty with Israel in 1979, Egyptian President Anwar Sadat declared that Egypt would go to war again only to protect its water resources.¹⁵ Shimon Peres, then serving as prime minister of Israel, stated in 1996 that a peace treaty with Syria would be impossible without resolving Golan Heights water issues.¹⁶ Islamic law theoretically dictates punishment to those denying access to, or polluting, water, because water is viewed with reverence.¹⁷

The Middle East is a good case study of water rights in the world. The region suffers from a severe shortage of water and a rapidly increasing population. As the disparity between the available quantity of water and the amount required increases, water becomes an ever more volatile political flashpoint. Water is, therefore, a key component in the quest for enduring peace in the Middle East.

Water in the Middle East—An Overview

Due to their semi-arid to arid climates, most Middle Eastern countries face water shortages. An extreme example of such a country is Kuwait, which has no renewable sources of water at all. However, there are also exceptions, such as Turkey, which has abundant sources of renewable water, at least by Middle Eastern standards.

Compounding the problem of water shortages is the fact that most Middle Eastern populations are increasing at a staggering rate. The population of Egypt increases by approximately one million every nine months, while the entire Middle Eastern population grows by about three percent annually.¹⁸

The fact is that water consumption rises with standards of living. Clearly, this increased water use is unconnected to the natural supply of available water; indeed, heavy use has just the opposite effect—polluting surface water and dirtying water tables, thus rendering more and more water unusable. Compounding the problem is the fact that countries are often hesitant to make honest disclosures about water use, as water is seen as a strategic resource.¹⁹

The net result of this situation is that there is less water for more people. Hence, the number of "water-scarce" Middle Eastern countries has continued to rise, increasing from three in 1955 (Bahrain, Kuwait, Jordan) to eight in 1990 (the aforementioned countries, plus Qatar, Saudi Arabia, United Arab Emirates, Yemen, Israel), with another five countries (Libya, Morocco, Egypt, Syria, Iran) likely to be added to this list within twenty years.²⁰

In an effort to make better use of existing water sources, countries have introduced various methods of conserving or increasing water supplies. While most water conservation efforts have minimal effects on neighboring countries, efforts to increase water sources are less benign, either damaging neighbors' water sources through pollution or diversion; increasing tensions between countries; or, less frequently, increasing the amount of water available to all, leading to a reduction in historical conflicts.

This is especially relevant to the Israel-Arab conundrum, which transcends the political differences between Israel and its Arab neighbors. The struggle for water, too, is an important element in relations between the Jewish State and the Arab world. Therefore, the peace treaty between Jordan and Israel addressed this issue. For example, provision was made for a Red-Dead Sea project, which has entered the feasibility stage. This project examines the possibility of transporting water from the Red Sea, rather than the Mediterranean Sea, to the Dead Sea. An agreement was entered into by Israel, Jordan, and the Palestinian Authority in May 2005 concerning a feasibility study to examine the possibility of building a canal from the Red to the Dead Sea.²¹ The Red-Dead Sea study is expected to cost \$20 million, which will be partially funded by the World Bank.²²

The Red-Dead Sea Project has its roots in a study performed by Harza Engineering of Chicago, carried out from the 1980s to September 1996. An important aspect of the Harza study is that it also focused on freshwater generation, not just the

creation of electricity. Indeed, the two would benefit one another as hydroelectric power generated by the project would serve the connected desalination plants.

The 180-kilometer canal is meant to achieve three main goals: to raise the level of the Dead Sea, which has dropped precipitously because Syria, Jordan and Israel together divert 95 percent of Jordan River waters;²³ to create water for Jordanian desalination plants; and to produce hydroelectric power by exploiting the approximately 400-meter difference in elevation between the Red and Dead Seas. This elevation difference creates hundreds of millions of dollars in savings because there is no need for an intake pumping station and a storage reservoir. The cost of the project itself is estimated at over \$3 billion, and will take up to five years to complete.

The Red-Dead Sea canal will be the first cooperative water project in the Jordan Valley. Its creation was tremendously facilitated by the signing of the 1994 Israel-Jordan Peace Treaty and the subsequent moves toward normalized relations between the two countries. The peace treaty and economic cooperation feed upon one another—being at peace makes economic cooperation easier, which, in turn, encourages the parties to remain at peace, as they all benefit from economic cooperation. Israel, for instance, has been able to shelve its plan for a more expensive Mediterranean-Dead Sea project due to cooperation with the Jordanians. Possibilities also exist for future economic cooperation between Israel and Jordan in the area of Dead Sea-focused tourism.

However, the project has its opponents, primarily environmentalists. They express grave concerns that rather than saving the Dead Sea, the influx of water from the canal will destroy it due to the different chemical composition of the Red Sea. Moreover, there is concern that there will be environmental damage to the Gulf of Eilat, the exit point of water headed for the Dead Sea; that the Jordanian desalinated water will be too expensive to be marketable; and that there will be seawater contamination of groundwater due to leakage during water transport.

There have also been alternative suggestions to a Red-Dead Sea link. On April 12, 2005, for instance, there was an organizational meeting for the Dead Sea Water Project, at which a preference was expressed for a link between the Mediterranean and Dead Seas. The reasons for this included increased water capacity and greater potential desalination and hydroelectric creating capacity. The Dead Sea Water Project calls for the construction of a large tunnel between Palmachim, Israel, to the mountains above Ovdad on the north end of the Dead Sea. A reservoir with one day's worth of capacity would be constructed on the mountain peak, from which Mediterranean water would be transported to Dead Sea hydroelectric and desalination stations.²⁴

How Water Can Be Used as a Platform to Peace and Sustainability Rather than as a Source of Conflict

Although it is true that international water law generally stipulates that riparian owners have equal rights to waterways, that the "development and protection of an international watercourse [must be] in an equitable and reasonable manner," and that rights between riparian owners must be balanced,²⁵ the above survey demonstrates that this rule is often ignored rather than followed. The importance of water and the powerful self-interest of nation-states often stand in the way of respect for international law.

Long-term, sustainable solutions to water problems and conflicts are possible only on a global level, but they will come about only if domestic and regional self-interest support such programs, thus creating the impetus to create and enforce sustainability. Unilateral domestic programs often increase conflict as they clash with one another and deplete already low water sources, encouraging still further disputes. There is no room, for instance, for both an Israeli Mediterranean-Dead Sea Canal and a Jordanian Red-Dead Sea canal. This is finally being recognized on a global level, and many international organizations now only provide funding for regional projects.²⁶

Inspired by a 1943 book by David Mitrany, *A Working Peace System*, political scientists developed the concept of "functionalism," the idea that a lasting peace can be achieved if political adversaries learn to cooperate on functional, rather than political, projects. Thanks to the vision of French statesman Jean Monnet, this concept was put into practice in 1951 when Belgium, France, Italy, Luxembourg, the Netherlands and West Germany established the European Coal and Steel Community (ECSC). The ECSC united its six member-nations in a single common market for the production and trade of coal, steel, iron ore and scrap metal, abolishing all trade barriers for these products.

This was the birth of increasing economic cooperation between European nations, which for centuries had fought bitter wars against each other. As regional cooperation grew, it became increasingly evident that it was feeding domestic self-interests, thus inspiring further collaboration. The ECSC eventually became the European Community (EC), eliminating all trade tariffs between member countries. In 1992 the EC, which had grown to twelve countries, created the European Union. The result of this economic cooperation has been half a century of peace and prosperity.²⁷

This wedding of cooperation and self-interest is also evident in past bilateral and multilateral water agreements and treaties. The bottom line of these treaties is

that member states believe it is in their self-interest to cooperate on a global level regarding shared water resources.

An example of a multilateral water treaty is the Convention on the Protection of the Rhine, entered into by Germany, France, Luxembourg, The Netherlands, Switzerland and the European Union.²⁸ With the objective of maintaining and improving the Rhine ecosystem, the Convention obliges the parties to cooperate for the benefit of all. Along with obligations to reduce pollution emissions, signatories are bound to advise one another of measures carried out on their territories that are aimed at protecting the Rhine River.²⁹

In 1993, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan entered into the Agreement on Joint Activities in Addressing the Aral Sea and the zone around the Sea Crisis, improving the environment, and enduring the social and economic development of the Aral Sea region.³⁰ The treaty stipulates that the signatories establish various committees in order to address the pollution problems of the Aral Sea. Specifically, state-participants agreed to draft a joint conception of how to address the Aral Sea crisis and rehabilitate the environment in the area surrounding the sea. They also agreed to draw up a coordinated program on scientific research and activities, and to create a common information system of monitoring the environment and to organize issuance of the "Information Review" on the Aral Sea Basin problems.³¹ The signatories recognized the global nature of the Aral Sea, while still appreciating that each had their own self-interests to satisfy.³²

The Elbe River in Europe has also been the subject of a water treaty between Germany, the Czech and Slovak Federal Republic,³³ and the European Economic Community.³⁴ In the Convention between the Federal Republic of Germany and the Czech and Slovak Federative Republic and the European Economic Community on the International Commission for the Protection of the Elbe, the contracting parties agree to strive to prevent the pollution of the Elbe River and its drainage area. They also agree to strive to enable the use of the Elbe, including the extraction of drinking and agricultural-use water, to substantially reduce the amount of pollution coming from the river, and to restore a healthy ecosystem within the river. These aims would be accomplished via the commission, composed of a maximum of five delegates and their deputies from each of the contracting parties, and cooperation between the parties.³⁵

A. The Kyoto Protocol

The Kyoto Protocol to the United Nations Framework Convention on Climate Change (the "Kyoto Protocol") is the international protocol aimed at reducing

greenhouse gas emissions through a series of credits and sanctions. The object of the Kyoto Protocol is to delay global warming and to clean the environment through domestic policies and measures. It is a legally binding amendment to the UN International Treaty on Global Warming, the UN Framework Convention on Climate Change (UNFCCC), and covers emissions of the six main greenhouse gases, namely carbon dioxide (CO²), methane (CH⁴), nitrous oxide (N²O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF⁶). Pursuant to the protocol, signatories to Annex I (industrialized countries) commit to either reducing greenhouse gas emissions, or else to participate in emissions credits trading if they maintain or increase emissions. The UNFCCC was reconfirmed as the "appropriate forum for negotiating future action on climate change" in the Gleneagles Plan of Action which followed the July 2005 G8 conference.³⁶

Industrialized countries, as a whole, are required to reduce certain types of greenhouse emissions by 5.2 percent for the 2008 to 2012 commitment period,³⁷ whereas non-industrialized countries are not legally bound to any reductions at all. This division between industrialized and non-industrialized countries was established, as it was felt that since non-industrialized countries generally produce lower levels of emissions than industrialized countries, they should not be bound by the same requirements.

Pursuant to the Kyoto Protocol, each country has its own target levels, based on a percentage of base-year emissions. This results in some countries not having to reduce levels at all, while others have to significantly reduce emissions. Generally, the base year is 1990.³⁸ Countries must show "demonstrable progress" prior to the 2012 deadline.³⁹

Article 6 of the Kyoto Protocol provides flexibility for signatories, allowing them to meet targets while not reducing domestic emissions to the extent that they are required by the protocol.⁴⁰

For the purpose of meeting its commitments under Article 3, any party included in Annex I may transfer to, or acquire from, any other such party emission reduction units resulting from projects aimed at reducing anthropogenic emissions by sources or enhancing anthropogenic removals by sinks of greenhouse gases in any sector of the economy, provided that:

- a) Any such project has the approval of the Parties involved;
- b) Any such project provides a reduction in emissions by sources, or an

enhancement of removals by sinks, that is additional to any that would otherwise occur;

- c) It does not acquire any emission reduction units if it is not in compliance with its obligations under Articles 5 and 7; and
- d) The acquisition of emission reduction units shall be supplemental to domestic actions for the purposes of meeting commitments under Article 3.⁴¹

Joint Implementation (JI) allows developed countries, on a project-by-project basis, to receive credits through investment in greenhouse emission reduction projects in other Annex I countries, whereas the Clean Development Mechanism (CDM) permits the earning of credits through the investment in greenhouse emission reduction projects in developing countries. In JI and CDM, the investing country gains credits whereas the host country loses credits.⁴² JI and CDM were developed in order to make it simpler for developed countries to meet their emission reduction goals and to encourage investment in emissions reduction. CDM projects tend to be large-scale hydroelectric, gas capture and fuel switch projects, whereas JI projects are, more often than not, more diverse in nature, with a slight preference given to energy efficiency projects.⁴³ International Emissions Trading (IET) allows developed countries to buy or sell portions of their emissions commitments among themselves.⁴⁴

The Kyoto Protocol was opened for signature on March 16, 1998, following ratification by consensus by the Conference of the Parties (COP3) in Kyoto, Japan in December 1997. Due to a provision in the agreement providing that the Kyoto Protocol becomes legally binding only upon the ratification of at least fifty-five countries, composing at least 55 percent of the world's emissions addressed by the Protocol as of the year 1990,⁴⁵ the Kyoto Protocol did not come into effect until 2004, when Russia ratified the treaty.

As of November 2007, 174 countries have ratified the Kyoto Protocol. Israel signed the Protocol in 2004. Thirty-six of the ratifying parties are developed countries, including Brazil, China and India. The so-called developing countries have no obligation beyond monitoring and reporting emissions. The developed countries are required to reduce greenhouse gas emissions to the levels specified in the treaty (representing over 61.6 percent of emissions from Annex I countries), with three more countries intending to participate (Cyprus, Malta and Kazakhstan). The United States withdrew from the Kyoto Protocol in 2001. President Bush partly explained his country's decision to withdraw from the Kyoto Protocol by claiming that emission reduction changes would be too costly for the United States to introduce, that they would harm the US economy, and that the Kyoto Protocol

is, itself, flawed.⁴⁶ Australia, also a non-signatory, asserts that without the United States, the Kyoto Protocol will not be effective, and that there is no "clear pathway for action by developing countries."⁴⁷ Some progress on this matter was achieved in the Conference of the Parties to the UN framework Convention on Climate Change, held in Bali, Indonesia in December 2007.

Despite the reservations voiced by its skeptics, the Kyoto Protocol has the potential to introduce sustainability to the environment by committing industrialized countries to clean up their own backyards, and also by providing them with the motivation to reduce emissions in other countries.

B. A Kyoto Protocol for Water

In order to protect the world's water resources and introduce aqua sustainability, a similar protocol could be developed for water: a "Kyoto Protocol for Water" (KPW). In a KPW, signatory countries could be assigned water conservation goals, equivalent to baseline water resources. Water resources could be measured in terms of quantity and quality. The protocol would take into account:

- The amount of a country's nonrenewable water resources, including aquifers and groundwater, freshwater sources and ice caps;
- Water from renewable sources, including rainwater;
- The preservation of rivers and other water bodies;
- The level of cleanliness of a country's water resources, measured by salinity and pollution levels;
- And the cleaning of sewage waters.

The goals of a KPW would be sustainability, the maintenance of water resources including nonrenewable water sources, increasing renewable water sources and improving water quality. Water quantity and pollution baselines could be adopted, with countries needing to reach baseline levels either through domestic improvements, or by receiving credits for enhancing water sustainability in other countries.

A KPW might be more complicated than the Kyoto Protocol, due to the existence of riparian owners. Controls would need to be instituted in order to ensure that riparian owners would not gain credits at the expense of downstream owners. Problems could be reduced or eliminated by awarding credits for increasing benefits to other riparian owners, and by imposing sanctions when flows are unreasonably decreased to other riparian owners. Credits and sanctions would need to take

into account that some amount of diversion is normal, realistic and necessary. Sanctions could be imposed on those who use dams that divert large amounts of water flows from downstream neighbors. A county's baseline could be tied to its naturally occurring water resources, creating different water requirements for water-rich and water-poor countries.

Using the Kyoto Protocol model, KPW credits could be traded by creating water programs in other nations. Thus, an irrigation program could provide credits for a country that sponsors it—investing resources into increasing water sustainability in a second country. This is the idea upon which the Kyoto Protocol is based—that the sustainability, preservation and cleanliness of water anywhere on earth benefit us all.

A further impetus for a KPW is that the pattern of population demographics and water resources demands a flexible system of credits and sanctions in order to be effective. The relationship between areas of population growth and regions of water shortages leads to those countries with the smallest amounts of available water often being most in need of increasing their scant resources.

A KPW might not distinguish between the obligations of developed and non-developed countries, as the Kyoto Protocol does. Unlike the situation with air pollution, water shortages are not concentrated in industrialized countries. Consequently, acceptance of, and even enthusiasm for, a KPW would be generated.

Ideas contained in the concept of a KPW are not new. The Convention on Wetlands of International Importance especially as Waterfowl Habitat 1971, with 146 signatures as of June 2005, contains a credit/sanction provision. Article 4, section 2 provides that:

Where a Contracting Party in its urgent national interest, deletes or restricts the boundaries of a wetland included in the List, it should as far as possible compensate for any loss of wetland resources, and in particular it should create additional nature reserves for waterfowl and for the protection, either in the same area or elsewhere, of an adequate portion of the original habitat.⁴⁸

In other words, the sum total of wetland preservation is the bottom line, which is the concept behind a credit/sanction system such as in the Kyoto Protocol and in a KPW.

Similarly, in the United States, the National Wildlife Federation,⁴⁹ the Environmental Protection Agency (EPA), and many states, including Virginia,⁵⁰ Connecticut,⁵¹ Utah,⁵² and Michigan, have all developed or proposed water credit trading systems.⁵³

The difference between these current and previous programs and a KPW is that a KPW could introduce a global perspective to water sustainability. Rather than regarding water sustainability, conservation and cleanliness from a local or a regional vantage point, a KPW could deal with water issues from a global perspective, encouraging cooperative sustainability at the macro level.

By binding signatories to global cleanliness and a sustainable water conservation treaty, water sustainability could be dealt with universally, allowing it to act as a most effective impetus to peace.

Notes

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- ² M. Murakami, *Managing Water for Peace in the Middle East: Alternative Strategies* (New York, 1995). Also see V.I. Korzun et al, *World Water Balance and Water Resources of the Earth* (UNESCO-USSR Committee for the International Hydrological Decade, 1976), p. 1756.
- ³ L. Grunfeld, "Jordan River Dispute," *ICE Case Studies*, Case Number 6, Spring 1997.
- ⁴ Ibid.
- ⁵ A. Nachamani, "A Commodity in Scarcity: The Politics of Water in the Middle East," Jerusalem Center for Public Affairs, March 1994.
- ⁶ J.L. Hecht, "The Fight over Water in the Middle East," *The Christian Century*, June 19-26, 2002, 22-24.
- ⁷ Ibid.
- ⁸ Exodus 14.
- ⁹ Exodus 17:1-7.
- ¹⁰ St. John 4:1-42.
- ¹¹ Matthew 14:22-32.
- ¹² Mark 4:35-41.
- ¹³ J.S. Starr, *Covenant Over Middle Eastern Waters* (New York, 1995), p. 47.
- ¹⁴ A. Darwish, "Analysis: Middle East Water Wars," BBC News World Edition, May 30, 2003.
- ¹⁵ Ibid.
- ¹⁶ N. Segal, "Water rights must be resolved before Syria treaty, Peres says," *The Jewish News Weekly of Northern California*, February 16, 1996.

¹⁷ V. Klump, "Hydro-Politics along the Jordan River," Georgetown University School of Foreign Service Program in Science, Technology and International Affairs. Also see R. Hassoun, "Water Between Arabs and Israelis: Researching Twice-Promised Resources," *Water, Culture, and Power: Local Struggles in a Global Context*, John M. Donahue and Barbara Rose Johnston (eds.) (Washington, 1998) pp. 316-321.

¹⁸ Nachmani, op. cit.

¹⁹ Ibid.

²⁰ "Water Scarce Countries," from Sustaining Water: Population and the Future of Renewable Water Supplies: <http://populationaction.org>. For general reference on the problem of water shortages in the Middle East, see "Problems of Water in the Middle East," (London: Background Brief, Foreign and Commonwealth Office, January 1992); "Water in the Middle East: Managing a Strategic Resource," (Washington: Middle East Research Institute, October 25, 1992).

²¹ The three signatories were Israeli Minister of National Infrastructures Benyamin Ben-Eliezer, Jordanian Minister of Water and Irrigation Raed Abu Saud, and Palestinian Authority Minister of Planning and International Cooperation Ghassan al-Khatib.

²² *Globes—Israel Business News*, April 21, 2005, May 9, 2005. See also "The Science and Politics of the Dead Sea: Red Sea Canal or Pipeline," *The Journal of Environment Development*, 12 (2003), 325-339; for a discussion of Israel—Jordanian cooperation regarding the Red-Dead Sea pipeline see Hattar, S.G., "Red-Dead Sea Conveyance Pipeline Planned to Raise Water Level," *Jordan Times*, March 5, 2002.

²³ G. Bromberg, "Will It Save the Dead Sea?" *Time in Palestine*, August 14, 2005.

²⁴ See Organizational Meeting, Dead Sea Water Project, April 12, 2005, Tel Aviv, Israel, Speaker: Randolph Gonce, Design Concepts Engineer.

²⁵ "[the] community of interest in a navigable river becomes the basis of a common legal right, the essential features of which are the perfect equality of all riparian States in the user of the whole course of the river and the exclusion of any preferential privilege of any one riparian State in relation to the others," Territorial Jurisdiction of the International Commission of the River Oder, Judgment No. 16, 1929, PCIJ, Series A, No. 23, p. 27, and "Watercourse States shall participate in the use, development and protection of an international watercourse in an equitable and reasonable manner. Such participation includes both the right to utilize the watercourse and the duty to cooperate in the protection and development thereof, as provided in the present Convention," (General Assembly Doc. A/SI/869 of 11 April 1997.), both quoted in Gabcikovo-Nagymaros Project (Hungary/Slovakia), Judgment of 25 September 1997, ICJ Reports, p. 7.

²⁶ Nachmani, op. cit.

²⁷ Hecht, op. cit., pp. 22-24.

²⁸ The Convention on the Protection of the Rhine, January 22, 1998.

²⁹ Ibid., Article 5.

³⁰ Agreement on joint activities in addressing the Aral Sea and the zone around the Sea crisis, improving the environment, and enduring the social and economic development of the Aral Sea region, March 26, 1993.

³¹ Ibid., Article 2.

³² Ibid.

³³ It later split into two separate republics.

³⁴ Convention between the Federal Republic of Germany and the Czech and Slovak Federative Republic and the European Economic Community on the International Commission for the Protection of the Elbe, Megdeburg on October 8, 1990.

³⁵ Ibid., Articles 2 and 5.

³⁶ "We acknowledge that the UNFCCC is the appropriate forum for negotiating future action on climate change. Those of us who have ratified the Kyoto Protocol welcome its entry into force and will work to make it a success." Gleneagles Plan of Action: Climate Change, Clean Energy, and Sustainable Development, point 14 p. 3.

³⁷ The Kyoto Protocol to the United Nations Framework Convention on Climate Change, Article 3, Section 1 [hereinafter "Kyoto Protocol"].

³⁸ Ibid., Article 3, Sections 1, 7-8.

³⁹ Ibid., Article 3, Section 2.

⁴⁰ Ibid., Article 3, Sections 10-13, Article 6.

⁴¹ Ibid., Article 6, Section 1.

⁴² Ibid., Article 12, see also: Ministry of Economic Affairs of the Netherlands, "Operational Guidelines for Baseline Studies, Validation, Monitoring and Verification of Joint Implementation Studies," May 2000.

⁴³ H.C. de Coninck and N.H. van der Linden, "An overview of Carbon transactions: General Characteristics and Specific Peculiarities," (ECN Beleidsstudies), March 2003.

⁴⁴ See J.P.M. Sijm et al, Economic effects of grandfathering CO2 emission allowances (ECN Beleidsstudies), April 2002 and P.R. Koutstaal et al, "Tradable CO2 emission permits—a quantitative analysis of TEP-system between Annex I countries," (ECN Beleidsstudies), November 1999.

⁴⁵ Kyoto Protocol, Article 25, section 1.

⁴⁶ "Kyoto Protocol comes into Force," BBC News, February 16, 2005.

⁴⁷ Australian Government, Department of the Environment and Heritage, Australian Greenhouse Office. URL: <http://www.greenhouse.gov.au/international/kyoto/>

⁴⁸ UNESCO Convention on Wetlands of International Importance especially as Waterfowl Habitat 1971, Article 4, Section 2.

⁴⁹ Tool for Water Quality, pp. 4-26.

⁵⁰ "The Virginia program is narrow, focusing on the cleaning of Chesapeake Bay. The program awards credits for reducing emissions. Credits may be traded, or saved for the future. In place of reducing discharges, companies have the option of paying to sustain a riverside forest or stream, or else contribute to a state water-quality fund, which will finance other activities. The program aims to contribute to the reduction of the total annual input to Chesapeake Bay of nitrogen by 110 million pounds and phosphorus by 6.3 million pounds by 2010," S. Harper, *The Virginian-Pilot*, April 9, 2005.

⁵¹ In 2002, Connecticut was the first US state to adopt a water credit trading program. The