



[A plea of resource conservation]

Access and Benefit Sharing of Natural Resources : Adopting a Kyoto Protocol Model on Air Quality for Global and Regional Water Management

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I. Introduction

The significant issue of access and benefit sharing of natural resources is a central theme in scholarly writings and public discourse and is constantly on the agenda of decision makers both at the government and business levels.

Scholars have dealt at length with the topic of access and benefit sharing in the context of natural resource management and in particular water management. These scholars include Elinor Ostrom, Bruce Stiftel and John Scholz. This paper will analyze the water issues in the

Middle East and also emphasize the increasingly important role of human rights treaties and jurisprudence on the right of clean environment.

The author is of the view that we should approach the challenge of proper management of natural resources and ensure access and benefit sharing of natural resources in general, and water management in particular, as part of the concept of culture of peace.

The foundations of culture of peace are political and security peace, economic peace, cultural peace and religious peace. Maintaining environmental quality and sustainability including water resources and water quality is part of culture of peace.¹ It has been suggested that the Darfur conflict in Sudan coloured by atrocities against many thousands of innocent people has been caused not only by human wickedness and ethnic hatred but also due to water scarcity. The Middle East witnesses periods of tensions due to claims over water.

Water is vital for life. The oceans are abundant, and 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, and only 35,029,000 cubic kilometers, or 2.52 percent is fresh water. "Rivers and streams account for 0.006%, fresh-water lakes for 0.26%, and water contained in the atmosphere for 0.001% 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, ground waters do not replenish or else replenish only minimally, due to scant rainfall. Most Middle East rainfall is negligible, being between only 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 required for basic agriculture, which is at least 400 millimeters annually of regular rainfall.⁴ Furthermore, due to the minimal renewing of the Middle East groundwater, the groundwater tends to be brackish.

Of the world's stores of fresh water, there is uneven distribution throughout the globe, due both to differing amounts of precipitation, and to the existence or absence of freshwater. It is expected that by the year 2025, the Middle Eastern average net water resources are

¹ Greenblatt Professor of Public and International Law, Hebrew University of Jerusalem (This paper is based, to a large part on my article *Water and Culture of Peace: Adopting A Kyoto Protocol Model*, *Israel Journal of Foreign Affairs*, 77-90 (2008).

² S. Shetreet, *Peace Today -Reflections on Four Foundations of Culture of Peace 2005* in Prince Nikolaus Von und Zu Liechtenstein and Cheikh. Gueye, *Eds Peace and Intercultural Dialogue* at 195-205 (Universitaetverlag Winter Heidelberg and International Academy of Philosophy 2005)

³ M. Murakami, *Managing Water for Peace in the Middle East: Alternative Strategies* (New York: United Nations University Press, 1995) [hereinafter ("Water for Peace")]. 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) at 1756.

⁴ L. Grunfeld, "Jordan River Dispute", *ICE Case Studies*, Case Number 6, Spring 1997 [hereinafter "Jordan River Dispute"].

⁵ Ibid.

4 estimated to drop to less than 700 cubic metres per person, one half of the level twenty years earlier.⁵

Although populations are increasing, the world's water supply remains static. As an illustration, the Nile River is no larger now than it was 2000 years ago, and yet its water is used by the populations of nine countries whose total populations are expected to double within the next two decades.⁶ The world's population tripled in the twentieth century.⁷

The water issue has been pivotal throughout human history. It was the focus of miracles in the Torah, from the parting of the Red Sea to the story of water bursting forth from the rock⁸ to the Christian parable of Jesus' salvation being referred to as water⁹ and to the stories of Jesus walking on water¹⁰ and calming a storm on modern-day Lake Kinneret in Israel (also referred to as the Sea of Galilee).¹¹

Today, thousands of years after the time of the Torah, water and its sustainability remain central issues. 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."¹² Jordan's King Hussein declared that Jordan would go to war with Israel only over water.¹³ After signing the peace treaty with Israel in 1979, Egyptian President Anwar Sadat declared that Egypt would go to war again only over protecting its water resources.¹⁴ Former Israeli Prime Minister Shimon Peres stated that a peace treaty with Syria would be impossible without resolving Golan Heights water issues. Islamic law theoretically dictates punishment to those denying access to or polluting water, for the reasons that water is held as reverent.¹⁵

The Middle East is a good case study of water rights in the world. There is a severe shortage of water in the Middle East, and a fast-increasing population. As the difference between the amount of water that is available and the water, which is required enlarges, water is becoming an ever-increasing political flashpoint in the Middle East, and it is therefore a key in the quest for peace and sustainability in the Middle East.

⁵ A. Nachamani, "A Commodity in Scarcity: the Politics of Water in the Middle East," *Jerusalem Center for Public Affairs*, March 1994 [hereinafter "Commodity in Scarcity"].

⁶ Ibid.

⁷ Hecht, J.L. "The Fight over Water in the Middle East," *The Christian Century*, June 19-26, 2002, at 22-24 [hereinafter "Fight over Water"].

⁸ Exodus 14.

⁹ Exodus 17.

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: Henry Holt and Company, 1995) at 47.

¹⁴ A. Darwish, "Analysis: Middle East Water Wars," *BBC News World Edition*, 30 May 2003.

¹⁵ Ibid.

¹⁶ N. Segal, "Water rights must be resolved before Syria treaty, Peres says," *The Jewish News Weekly of Northern California*, 16 February 1996.

¹⁷ V. Klump, *Hydro-Politics Along the Jordan River*, Georgetown University School of Foreign Service Program in Science, Technology and International Affairs [hereinafter "*Hydro-Politics Along the Jordan River*"]. 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: Island Press, 1998) at 316-321.

The aim of this paper is to present the water challenges in the Middle East and to offer a proposal for the development a Kyoto Protocol model for water.

II. Academic Discourse on Natural Resource and Water Management Models

I wish to mention a number of academic works on Natural Resource and Water Management Models:

Elinor Ostrom, *Governing the Commons: The Evolution of Institutions for Collective Action*, 1990 Cambridge University Press is a leading work on the topic. This is the contribution of the Nobel Prize laureate. The author criticizes the foundations of policy analysis as applied to natural resources, provides a unique body of empirical data to explore conditions of common pool resources and how such problems have been satisfactorily or unsatisfactorily solved.

It is to be noted that both state control and privatization of resources have been advocated, but neither the state nor the market have been uniformly successful in solving common pool resource problems.

Professor Ostrom identified three models most frequently used as the foundation for recommending state or market solutions and outlines theoretical and empirical alternatives to these models in order to illustrate the diversity of possible solutions. Ostrom uses institutional analysis to examine different methods- successful and unsuccessful- of governing the commons. In contrast to the proposition of the tragedy of the commons argument, common pool problems sometimes are solved by voluntary organizations rather than by a coercive state. Among the cases considered are communal tenure in meadows and forests, irrigation communities and other water rights, and fisheries.

Another book by Prof Ostro is *The Commons in the New Millennium: Challenges and Adaptation* 2003 MIT Press

The book analyzes new problems that owners, managers, policy makers, and analysts face in managing natural commons. It examines recent findings about the physical characteristics of the commons, their complexity and interconnectedness, and the role of social capital. It also provides empirical studies and suggestions for sustainable development.

Adaptive Governance and Water Conflict: New Institutions For Collaborative Planning by Bruce Stiftel and John T. Scholz (2005). This book focuses more broadly on adaptive governance, or the evolution of new institutions that attempt to resolve conflicts among competing authorities. *Adaptive Governance and Water Conflict* investigates new types of water conflicts among users in the seemingly water-rich Eastern United States.

Common Waters, Diverging Streams: Linking Institutions to Water Management in Arizona, California, and Colorado by William Andrew Blomquist, Edella Schlager, Tanya Heikkila, 2004. This book is a first hand investigation into water management in a fast-growing region of the arid American West.

Dividing The Waters: Governing Groundwater in Southern California by William

Andrew Blomquist (1992, ICS Press) The book shows how to put control of natural resources back into the hands of the people in the context of Southern California which has successfully managed its groundwater resources for the past thirty years through self-governing local institutions.

III. Water in the Middle East - Overview

Due to their semi-arid to arid climate, most Middle Eastern countries face water shortages. An extreme example of such a country is Kuwait, which is blessed with no renewable sources of water at all. However, there are also exceptions, which can be seen in the case of Turkey, which has abundant, at least by Middle Eastern standards, sources of renewable water.

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

A further stress on water supplies is that water consumption rises with standards of living. Clearly, this increased water use is not coupled with the naturally-occurring amount of available water – indeed, heavy use has the opposite effect, polluting surface water and dirtying water tables, thus rendering more and more water unusable. Compounding the problem is that countries are often hesitant to make honest disclosures about water use, it being a strategic resource.¹⁹

The net result is that there is less water from 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 previous 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 20 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 neighbouring countries, efforts to increase water sources are less benign, either damaging neighbour's water sources through pollution or diversion, increasing tensions between counties, or else, less often, increasing the amount of water available to all, leading to a reduction of historical conflicts.

An offshoot of the Peace Treaty between Jordan and Israel has been the Dead-Red Sea Project, which has entered the feasibility stage. This project looks at the possibility of

¹⁸ *Commodity in Scarcity*.

¹⁹ *Ibid.*

²⁰ “Water Scarce Countries,” from *Sustaining Water: Population and the Future of Renewable Water Supplies*: source: Population Action International, 1120 19th Street, N.W., Suite 550, Washington, D.C. 20036, USA. 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, 25 October 1992).

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 the conducting of a feasibility study to study the possibility of building a canal from the Red to the Dead Seas.²¹ The Red-Dead Sea Study is expected to cost 20 million dollars, which will be partially funded by the World Bank.²²

The Red-Dead Sea Project has its roots in a study performed by the Harza Engineering of Chicago which spanned from the 1980s to September 1996. An important difference with the Harza study is that it also focused on fresh water generation, and not just the creation of electricity, and that indeed, the two would feed one another as hydroelectric power generated by the project would feed the connected desalination plants.

There are several goals of the 180 kilometres canal: to raise the level of the Dead Sea, which has been suffering because Syria, Jordan and Israel together divert 95 percent of Jordan River waters from the Dead Sea;²³ to create water for Jordanian desalination plants, and to produce hydroelectric power by exploiting the approximately 400 metres difference in elevation between the Red and the Dead Seas. Taking advantage of the elevation difference creates financial savings of several hundred million dollars due to the ability to go without an intake pumping station and a storage reservoir. The project itself is estimated at over 3 billion dollars, and will take up to five years to construct.

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 towards normalized relations between the two countries. The peace treaty and the economic cooperation feed one another – being at peace makes the economic cooperation easier, which in turn encourages the parties to remain at peace, for they all benefit from economic cooperation. Israel, for instance, has been able to shelve her plan for a more expensive Mediterranean-Dead Sea project due to cooperation with the Jordanians. There are possibilities for future economic cooperation between Israel and Jordan for the benefit of both sides in the area of Dead Sea-focused tourism.

Along with supporters of the project there are opponents, primarily coming from the environmental side. There are serious concerns that rather than saving the Dead Sea, that the influx of water from the canal will destroy it due to the different chemical composition of the Red Sea, 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 sea-water contamination of groundwater due to leakage during the water transport.

²¹ The three signatories were Israeli Minister of National Infrastructures Benjamin 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," (2003) *The Journal of Environment Development* 12 at 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 *Will It Save the Dead Sea*.

Bids for the project include bids suggesting alternates to a Red-Dead Sea link. On April 12, 2005, for instance there was an organizational meeting for the Dead Sea Water Project, which prefers a link between the Mediterranean and Dead Seas, for reasons of increased water capacity, and potential desalination and hydro-electric creating capacity is arguably greater. The Dead Sea Water Project prefers that a large tunnel be constructed between Palmachim, Israel, to the mountains above Ovnat 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

IV. How can Water be used as a Platform for Peace and Sustainability rather than as a Source of Conflict?

Although it is true that international water law provides 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. Water's importance and the consequential 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 this will occur only if domestic and regional self-interest supports 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 further disputes. There is no room, for instance, for both an Israeli Mediterranean-Dead Sea Canal and a Jordanian Red Sea-Dead Sea canal. This is finally being recognized on a global level, with many international organizations now providing funding only 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 a 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 (the "ECSC"). The ECSC

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, P.C.I.J., 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, I.C.J. Reports 1997, at 7.

²⁶ *Commodity in Scarcity*.

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 cooperation grew, it became increasingly evident that regional cooperation was feeding domestic self-interests, thus inspiring further collaboration. The European community eventually became the European Community (the "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 a 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 that it is in their self-interests 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 an objective of maintaining and improving the Rhine ecosystem, the Convention obliges the parties to a degree of cooperation. 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 provides that the signatories would establish various committees in order to address the pollution problems of the Aral Sea. Specifically, States-participants agreed to draft a joint conception of addressing the Aral Sea crisis and rehabilitating the environment in the area around the Sea, and to draw up a coordinated program on the scientific research and activities, and also 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 signing states recognized the global nature of the Aral Sea, while at the same appreciating that each had their own self-interests to satisfy.³² Ultimately, the signatories decided that it was in their own self-interest to sign the agreement.

The Elbe River in Europe has also been the subject of a water treaty between Germany,

²⁷ *Fight over Water*, at 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*, dated March 26, 1993.

³¹ *Ibid.*, Article 2.

³² *Ibid.*, recitals.

the Czech and Slovak Federal Republic, and the European Economic Community.³³ 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, and to aim to enable use be made 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 through the use of the commission, composed of a maximum of five delegates and their deputies from each of the contracting parties, and cooperation between the parties.

V. 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 United Nations' (the "UN") international treaty on global warming, the UN Framework Convention on Climate Change (the "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.³⁵

Industrialized countries as a whole are required to reduce certain types of greenhouse emissions by 5.2 percent for the 2008 to 2012 commitment period³⁶ whereas non-industrialized countries are not legally bound to any reductions. This division between industrialized and non-industrialized countries was made as it was felt that as non-industrialized countries generally produce lower levels of emissions than industrialized countries they should not be bound to the same reductions.

Pursuant to the Kyoto Protocol each country has its own target levels, based on a percentage of base year emissions, resulting in some countries not having to reduce levels at all, while others have to reduce emissions by a tremendous amount. Generally the base year is

³³ *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*, done at Megdeburg on 8 October 1990.

³⁴ *Ibid.*, Articles 2 and 5.

³⁵ *Gleneagles Plan of Action: Climate Change, Clean Energy, and Sustainable Development*, point 14 at 3: "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."

³⁶ *The Kyoto Protocol to the United Nations Framework Convention on Climate Change*, Article 3, Section 1 [hereinafter "Kyoto Protocol"].

1990.³⁷ Countries must show “demonstrable progress” prior to the 2012 deadline.³⁸

Parties may offset their emissions by increasing the amount of greenhouse gases removed from the atmosphere by so-called carbon “sinks” in the land use, land-use change and forestry sector. However, only certain activities in this sector are eligible. These are afforestation, reforestation and deforestation (defined as eligible by the Kyoto Protocol) and forest management, cropland management, grazing land management and revegetation (added to the list of eligible activities by the Marrakesh Accords). Greenhouse gases removed from the atmosphere through eligible sink activities generate credits known as removal units (RMUs). Any greenhouse gas emissions from eligible activities, in turn, must be offset by greater emission cuts or removals elsewhere.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 Article 6 provides that:

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 the¹ purposes of meeting commitments under Article 3.⁴¹

Joint Implementation (“JI”) allows developed countries, on a project basis, to receive credits through the 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.

³⁷ Ibid., Article 3, Sections 1, 7-8.

³⁸ Ibid., Article 3, Section 2.

³⁹ United Nations Framework Convention on Climate Change, Kyoto Protocol, URL: http://unfccc.int/essential_background/kyoto_protocol/items/3145.php

⁴⁰ Kyoto Protocol, Article 3, Sections 10-13, Article 6.

⁴¹ Ibid., Article 6, Section 1.

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

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 type, with a slight preference for energy efficiency projects.⁴³ International Emissions Trading ("IET") allows developed countries to buy or sell portions of their emissions commitments amongst themselves.⁴⁴

The Kyoto Protocol was opened for signature on 16 March 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 shall become legally binding only upon the ratification of at least 55 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 16 February 2004, following Russia's 18 November 2004 ratification.

As of August 2005, 153 countries have ratified the Kyoto Protocol. Israel was the fifteenth signatory, signing in March 2004. The United States withdrew from the Kyoto Protocol in 2001. President Bush's 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 cause harm to the US economy, and that the Kyoto Protocol is 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

As of 2010, 172 countries have ratified the KP. Developed countries (Annex I Parties) have a heavier burden than developing countries (non-Annex I Parties) under the principle of 'common but differentiated responsibilities' (article 10 KP).⁴⁸ Because of their high industrial activity, the former are mostly responsible for the GHG emissions and consequently their high levels in the atmosphere. The major feature of the KP is that it sets binding targets for the Annex I Parties for reducing GHG emissions.⁴⁹ Overall emissions must be reduced by at least 5% below the 1990 levels within the commitment period from 2008 to 2012 (article 3 [1] KP). This measure applies for six different GHG (mainly carbon dioxide). The KP introduces new market-based mechanisms to help them meet these new commitments.⁵⁰

Despite 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

⁴³ Coninck, H.C. de; Linden, N.H. van der, *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* (UK: ECN Beleidsstudies, April 2002) and P.R. Koutstaal et al, *Tradable CO2 emission permits - a quantitative analysis of TEP-system between Annex I countries*, (The Netherlands: ECN Beleidsstudies, November 1999) (in Dutch).

⁴⁵ Kyoto Protocol, Article 25, section 1.

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

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

⁴⁸ BOISSON DE CHAZOURNES, p. 4 ; http://unfccc.int/kyoto_protocol/items/2830.php (last access 17 May, 2010).

⁴⁹ http://unfccc.int/kyoto_protocol/items/2830.php (last access 17 May, 2010).

⁵⁰ BOISSON DE CHAZOURNES, p. 2.

also by providing them the motivation to reduce emissions in other countries. The main challenge is to expand the implementation of the Kyoto Protocol. Further conventions on the climate change that took place in Bali, in Copenhagen (2009) and in Cancun, Mexico recently (December 2010), were able to achieve further progress in getting the major economic powers like the United States and China to commit themselves to a process of negotiations that will produce a certain perspective formula to air pollution reduction.

VI. A Kyoto Protocol for Water

In order to protect the world's water resources and to 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 amount of a country's non-renewable water resources, including aquifers and ground water, fresh-water sources, and ice caps, water from renewable sources including rainwater, the preservation of rivers and other water bodies, the level of purity of a country's water resources, measured by salinity and pollution levels, and the cleaning of sewage waters. A KPW's goals could be sustainability, the maintenance of water resources including non-renewable 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 else 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 instated in order to ensure that riparian owners do 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 were decreased to an unreasonable degree 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 associated with dams that diverted large amounts of water flows from downstream neighbours. A county's baseline could be tied to its naturally occurring water resources, creating different water requirements for water rich and water poor countries.

Like in the Kyoto Protocol, KPW credits could be traded by creating water programs in other nations. Thus a sponsored irrigation program could provide credits for a sponsoring country that is investing resources into increasing water sustainability in a second country. The idea behind this is that on which the Kyoto Protocol is premised – that the sustainability, preservation, and purity of water anywhere on earth benefits 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 with the situation with air pollution, water shortages are not focused in industrialized countries. This variation might increase global acceptance of and enthusiasm for a KPW.

Ideas contained in the concept of a KPW are not new. The Convention on Wetlands of International Importance especially as Waterfowl Habitat 1971, with 160 parties, 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.⁵¹

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

Similarly, in the United States, the National Wildlife Federation,⁵² the Environmental Protection Agency ("EPA"), and many states, including the states of Virginia,⁵³ Connecticut,⁵⁴ Utah,⁵⁵ and Michigan have all developed or proposed water credit trading systems.⁵⁶

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

⁵¹ UNESCO *Convention on Wetlands of International Importance especially as Waterfowl Habitat 1971*, Article 4, Section 2.

⁵² Tool for Water Quality at 4-26.

⁵³ S. Harper, "Virginia program to let facilities trade water-pollution credits," *The Virginian-Pilot* (April 9, 2005): 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.

⁵⁴ In 2002, Connecticut was the first US state to adopt a water credit trading program. The program has been credited with reducing 2.7 million pounds of nitrogen.

⁵⁵ The city of Orem developed a storm runoff credit system whereby businesses that clean storm water runoff before it enters ditches, drains, waters, or sumps through a device or structure that it installs are liable for water credits: City of Orem Public Works, *Storm Water Quality Credit Program*, URL: <http://pw.orem.org/html/credits.html>.

⁵⁶ See also Environomics, *A Summary of US Effluent Trading and Offset Projects*, prepared for Dr. Mahest Podar, US Environmental Protection Agency, November 1999. Consider also some of the arguments against the EPA's plans for trading. The US's Natural Resources Defense Council ("NRDC") has opposed proposed EPA trading policies for not imposing a cap on polluters – by not requiring polluters to reduce discharges over time, the NRDC argues that toxic "hot spots" can be created by water pollution credit trading: NRDC Press Release, *New Administration Water Pollution Trading Policy is Illegal, Says NRDC: EPA Scheme Will Worsen Water Pollution, Threaten Public Health* (Washington, January 13, 2003).

water sustainability, conservation and purity from a local or a regional vantage, a KPW could have the ability of dealing with water issues from a global perspective, encouraging cooperative sustainability at the macro-level.

A KPW could thus be a strong harbinger of peace. By binding signatories to sustainable water conservation and purity globally, water sustainability could be dealt with universally, allowing water sustainability to act as a platform for peace.