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Lessons Learned and Experiences with Governance of International Waters[1]

Abstract

The term "good governance" is being increasingly used in development literature. This paper identifies and critically reviews various elements of good governance in an international waters context where governance is defined as the process of decision-making and the process by which decisions are implemented (or not implemented). The analysis in this paper focuses on the formal and informal actors involved in decision-making and implementing the decisions made, as well as the formal and informal structures that have been set in place to arrive at and implement those decisions. More specifically, this paper focuses on six aspects of good governance in an international waters context: benefit sharing, data and information sharing and exchange, dispute resolution, funding, resilience, and institutional architecture. In our professional judgment, these represent the best combination of where the need is greatest, and where various lessons learned and experiences are reasonably available.

1.0 Introduction

This paper identifies and critically reviews various lessons learned and recent experiences with the governance of international waters. For the purposes of this paper, "international waters" are water resources that are shared by two or more sovereign states and include international freshwater, international groundwater and international Large Marine Ecosystems (LMEs).[2] International waters also include "boundary" water resources where the boundary between two or more sovereign states is formed by an international lake or river, and they include "successive" water resources where an international river (or underground aquifer) flows from one sovereign state to another.

International waters are critically important. Nearly half of the world's population is located within 1 or more of the over 260 international freshwater drainage basins that are shared by 2 or more sovereign states.[3] Even more striking than the absolute number of international freshwater drainage basins, is a breakdown of each nation's land surface which falls within them.[4] At least 145 nations include territory within international freshwater drainage basins. At least 21 nations lie in their entirety within international freshwater drainage basins, including 33 countries which have greater than 95% of their territory within international freshwater drainage basins. 19 international freshwater drainage basins are shared by 5 or more riparians countries. The Danube has 17 riparian nations. The Congo, Niger, Nile, Rhine and Zambezi drainage basins are shared by between 9 and 11 countries. The remaining 13 international freshwater drainage basins have between 5 and 8 riparian countries.

Agreements regarding governance of international waters serve not only to protect and promote sustainable development but also affect security throughout an entire area.[5] These international agreements tend to stabilize and enhance security at the regional level, and the security return generated is independent of the concrete ecological and economic benefits produced by such agreements. Severe deforestation, soil erosion, salinization, toxic contamination, resource exploitation, habitat destruction, drought, flooding, air pollution and water pollution are just some of the environmental calamities that can increase international

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[2] LMEs are regions of ocean space of 200,000 km^2 or greater, that encompass coastal areas from river basins to estuaries to the outer margins of a continental shelf or the seaward extent of a predominant coastal current. LMEs are defined by ecological criteria, including bathymetric, hydrographic, productivity and trophically linked populations.

[3] International Bureau of the Permanent Court of Arbitration (ed.), *The Resolution of International Water Disputes:* Papers emanating from the Sixth PCA International Law Seminar 08 November 2002, Kluwer Law International, The Hague/London/New York, at xix.

[4] Wolf, Aaron T. *Development and Transboundary Waters: Obstacles and Opportunities: Report submitted to the World Commission on Dams*, July, 2000, at 30.

[5] Paisley, Richard Kyle. *International Water Law, Transboundary Water Resources and Development Aid Effectiveness*. 1 Indian Jurid. Review 67 (2004).

tension and lead to war over international waters.[6] Conversely, the very process of reaching accommodation while developing bilateral resources and environmental and other mechanisms for cooperation in an international waters context creates a stabilizing and more transparent atmosphere. The mere fact of negotiation usually widens political participation, builds political stability and spreads confidence between sovereign states. Even in cases in which riparians merely agree to share information and exchange data, while agreeing to disagree on substantive issues, increased confidence usually emerges. For example, in the case of international freshwater drainage basins, according to Kraska:[7]

> *The role of transboundary river agreements in promoting sustainable development extends beyond simple economic and environmental factors. In South Asia, agreements have helped to strengthen political ties. The agreements have value as vehicles to ameliorate tension and reduce the likelihood of war. Although freshwater rivers, especially transnational ones, are frequently understood to contribute to international conflict, in South Asia the process and results of concluding transboundary river agreements have had positive ripple effect on the regional security environment.*

The authors of this paper acknowledge the support and encouragement of a wide range of individuals and institutions too numerous to mention by name, including through a GEF (Global Environment Facility) project entitled *Good Practices and Portfolio Learning in GEF Transboundary Freshwater and Marine Legal and Institutional Frameworks*. This three-year multi donor project is dedicated to facilitating good governance and more effective decision making in international waters through the identification, collection, adaptation and replication of beneficial practices and lessons learned from international experiences. The project also facilitates dialogue among individuals and organizations engaged in governance within, and between, freshwater, groundwater and marine international waters with particular emphasis on "South-South" cooperation and learning. The key measurable benefit of the project is in ensuring that various lessons learned from multi-country experiences, including identification of areas where problems and delays are commonly experienced, are assimilated by various target audiences in a meaningful way through experiential learning. These target audiences include local water managers, governments, civil society groups, academics and the portfolio of GEF projects.

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[6] Paisley, Richard Kyle and Glen Hearns. *Some Observations From Recent Experiences With the Governance of International Drainage Basins*, in Proceedings of the Symposium–Precious, Worthless, or Incalculable: The Value and Ethic of Water, Vol. 2, Center for Water Law & Policy and International Center for Arid and Semi-Arid Land Studies, Texas Tech University. A.C. Corrêa & Gabriel Eckstein, eds. (2006)

[7] Kraska, James, Sustainable Development is Security: the Role of Transboundary River Agreements as Confidence Building Measure (CBM) in South Asia. 28 Yale Journal of International Law 465. (2003).

2.0 Methodology

The methodology for this paper included working with a carefully chosen expert advisory board and a major international law firm to identify the legal and institutional frameworks that apply to the governance of 28 international waters situations; identifying and critically reviewing the detailed governance arrangements associated with an additional nine international waters situations; conducting an extensive computer assisted literature search; and, obtaining advice and assistance from individuals with practical experience with the governance of international waters through a series of hemispheric meetings in Asia, Africa and the Americas.

3.0 Analysis

The term "good governance" is being increasingly used in development literature.[8] This paper identifies and critically reviews various elements of good governance in an international waters context where governance is defined as the process of decision-making and the process by which decisions are implemented (or not implemented).[9] The analysis in this paper focuses on the formal and informal actors involved in decision-making and implementing the decisions made, as well as the formal and informal structures that have been set in place to arrive at and implement those decisions. Good governance assures that corruption is minimized, the views of minorities are taken into account and that the voices of the most vulnerable in society are heard in decision-making. Good governance is responsive to the present and future needs of society. Very few countries and societies appear to have even come close to achieving good governance in its totality.

This paper focuses on six aspects of good governance in an international waters context as follows: benefit sharing, data and information sharing and exchange, dispute resolution, funding, resilience and institutional architecture. In our professional judgment, these aspects represent the best combination of where the need is greatest and where various lessons learned and experiences are reasonably available.

[8] See: http://www.unescap.org/pdd/prs/ProjectActivities/Ongoing/gg/governance.asp

[9] According to UNESCAP good governance has at least 8 major characteristics. Those characteristics are: participatory, consensus oriented, accountable, transparent, responsive, effective and efficient, equitable and inclusive and follow the rule of law. See: http://www.unescap.org/pdd/prs/ProjectActivities/Ongoing/gg/governance.asp

3.1 Benefit Sharing[10]

International waters agreements are often negotiated between sovereign states to address particular issues regarding governance as well as to clarify how customary law obligations will be met, and in some cases, to jointly develop opportunities that neither state could fully capitalize on acting independently. It is this latter type of circumstance - the opportunity for mutual gain through cooperation - that arguably provide the most powerful, positive and sustainable incentives for sovereign states to cooperate in the good governance of international waters.[11]

When sovereign states identify and develop opportunities with reciprocal benefits, they position themselves to sustain their agreements on the basis of the ongoing benefits from doing so. Rather than simply adhering to principles of good neighbourliness, such as avoiding significant harm, sharing in a reasonable and equitable manner, providing timely notification of changes and developments, opportunities for mutual gain expand the potential rewards associated with cooperation. Mutual gains arrangements shed a whole new light on the implications of cooperation. The focus of negotiation can shift away from limiting impacts on sovereignty to planning and devising ways and means of maximizing benefits.

Contrast the following hypothetical, but not unrealistic, negotiation scenarios where the focus shifts from Limiting Impacts on Sovereignty (LIS) to Seeking Opportunities for Mutual Gain (SOMG):

Scenario # 1: A LIS negotiation often bogs down in trying to grapple with the definitions section of a treaty where country A is seeking to limit the definition of "tributary" in an international watercourse to just first order streams. The underlying interest of A is to reduce explicit obligations to consult with riparian neighbours' B and C regarding significant hydropower developments that A is planning on secondary and tertiary tributaries. This position flies in the face of the general principles of both integrated water resources management and international law. B and C protest that the proposed approach makes no

[10] The materials in this section have been abstracted from materials first presented by Richard Paisley and Steve MCaffrey at a conference entitled Critical Intersections for Energy & Water Law: Exploring New Challenges and Opportunities held in Calgary, Alberta, May 20-21, 2009, co-sponsored by the University of Calgary Faculty of Law, the Pacific McGeorge Institute for Sustainable Development, and the UNESCO Centre for Water Law, Policy, and Science, University of Dundee and subsequently published in Grzybowski, Alex, Stephen C. McCaffrey and Richard Kyle Paisley. Beyond International Water Law: Successfully Negotiating Mutually Beneficial Agreements for International Watercourses. 22 Pacific McGeorge Global Business & Development Law Journal 139 (2010).

[11] See: Dinar, Shlomi., Power Asymmetry and Negotiations in International River Basins. International Negotiation, Volume 14, Number 2, 2009 , pp. 329-360(32) who states that "…Cooperation, in general, materializes when both states, but particularly the stronger state, realize that benefits can accrue from coordination and joint action. In other words, to harness the river in an efficient manner, cooperation must ensue and the downstream state's participation is important. Even when the benefits to cooperation are not clear, i.e. when the upstream riparian does not foresee immediate economic incentives to cooperation, coordination may still be attained through the manipulation of incentives (or strategic interaction)….". See also: Zawahri, Neda A. and Gerlak, Andrea K., Navigating International River Disputes to Avert Conflict. International Negotiation, Volume 14, Number 2, 2009 , pp. 211-227(17).

sense from a technical watershed management perspective, or international legal perspective, and eventually discussions and negotiations get to the real issues which are related to the extent to which obligations to consult create unnecessary transaction costs, requirements to adjust plans in response to legitimate concerns regarding harm, or in a subtle manner establish a veto for other states. All of this dialogue is set in a context of uneasy suspicion about hidden motives and concern about the political implications of appearing to sacrifice independence to neighbouring states. After considerable time and expense, compromises are eventually reached and obligations are set out that are not dissimilar to the customary international legal obligations and, more practically speaking, with the requirements of international funding institutions from which financing may be required.

Scenario # 2: A SOMG negotiation starts by recognizing that international legal obligations are what they are, and that much time and effort should be spent exploring potential opportunities for mutual gain through cooperative development of water resources. Country A has considerable potential for hydropower production and water storage. Country B has untapped agricultural potential that requires irrigation and a favourable flow regime. It also lies between A and international markets for electricity and is committed to shifting away from coal fired generation plants as a source of domestic energy supply. It needs a source of cleaner cheaper electricity and A may be able to provide it. Country C needs flood control in order to develop agricultural and tourism opportunities on a delta downstream from A as well as more energy for domestic and industrial use.

Country representatives from A, B and C engage in extensive technical discussions of alternative scenarios that attempt to maximize benefits for all countries through hydropower development, energy transmission and trade, flow regime management, and agricultural trade. These discussions require explicit commitment that ideas and information are exchanged on a without prejudice and confidential basis in order to create opportunities to safely consider a wide range of options without implying any commitments. Country representatives dispense with excessive formalities and collaboratively define potential opportunities. If it turns out that there are no opportunities for mutual gain through cooperation (a highly unlikely prospect) then the fall back is a simple acknowledgement of international legal principles. After considerable negotiation, fuelled by detailed analysis of various options, an agreement is reached that involves joint investment in infrastructure needed to facilitate development opportunities that would not be possible without cooperation. A develops hydropower facilities and sells electricity to B and C. B and C get flow regime commitments needed to facilitate development of agricultural and tourism

opportunities in the delta. B sells transmission rights through its territory to A. As in the LIS scenario the negotiations take time and money to complete but the resulting stream of benefits associated with the final agreement is quite different.

The contrasts between these scenarios are obvious. If co-riparians are not going to get beyond what is already customary international law then why bother negotiating a transboundary water agreement? It is not as if treaty obligations are backed up by strong enforcement provisions. Consider how few international water disputes (of a large number of disputes) have actually found their way to the International Court of Justice. Recognizing of course that this requires the agreement of all states concerned either as part of the treaty (a very rare occurrence) or at the time of the dispute (an even rarer occurrence).

However, there is a persuasive argument to be made that such basic treaties do create a foundation and institutional structures that foster good relationships and make meeting international legal obligations easier to achieve. They can also attract considerable investment by international funding organizations with the consequential economic benefits from expenditure of those investments – some of which are on projects that result in sustainable developments on the ground. While these may be the benefits of an LIS type approach to treaty negotiation, it is notable that co-riparians that pursue and actually implement a SOMG approach can achieve all of these benefits, which are set within the context of economic returns that are sustained by the developments that are facilitated through the treaty, and which may have been impossible to achieve acting independently or through an LIS negotiation. In this circumstance, good relations are founded in and reinforced by mutual gain, and the institutional arrangements are sustained by the desire to maintain the stream of benefits created by the associated developments. This is very different than commitments to do what customary international law and IFI rules already require with institutional arrangements that are funded by external sources that are unlikely to be sustained over the long term.

Closely related to the LIS and SOMG scenarios are very different approaches to negotiation that alternately make the process awkward and inefficient with respect to finding solutions or make it constructive and creative.[12] The first approach is most often positional and lacks coordinated and impartial administrative, technical, legal and mediation support. In contrast the second approach is interest based, and has coordinated and impartial administrative, technical, legal and mediation support. The former approach suffers from all of the inefficiencies associated with applying positional negotiations in a context where it is

[12] See footnote XX infra. and accompanying text.

relatively easy to miss opportunities for mutual gain because underlying interests are not well understood. The parties are focused on maintaining positions rather than exploring alternatives that may integrate their respective interests. If administrative support is viewed as biased, the negotiation platform itself can become tangled up in the negotiation as parties bring process issues to the negotiating table while substantive issues are being addressed. If technical and legal advice are not provided through an impartial mechanism that ensures transparent understanding of conflicting perspectives, then the negotiation can be diverted into a dialogue or conflict between experts as opposed to focusing on how well national interests are being addressed. Finally, if mediation and facilitation support is either separated from these other functions, or nonexistent, then the opportunities for these functions to help maximize the potential to expedite a productive outcome are hard to deliver because the capacity to do so is not effectively engaged.

The latter approach is much different. Administrative, technical, legal and mediation support is coordinated, and process design issues are worked through and agreed upon separately from substantive matters. The process is designed to maximize opportunities for safe and constructive discussion of alternatives that may deliver valuable outcomes for all riparian parties. Technical and legal advice are provided in response to issues raised through investigation of alternative solutions. They are not driving the discussion; they are servicing it. Mediation support provides capacity to both manage the process for success for all parties, and capacity to investigate alternatives where direct discussions may be difficult or impossible.

In summary, if the process is interest based and well supported, time is spent on constructive problem solving and relationship building rather than on unproductive exchanges of positions and negotiation tactics that have little or no relationship to the mutually beneficial opportunities that may well exist. In practice, there are a growing number of SOMG type international agreements which provide for the return, either in kind or in cash, of a share of the benefits resulting from cooperation as follows:

- The Treaty of Versailles, 1919; Article 358 of the Treaty of Versailles, 1919, gave France the exclusive right to use the waters of the Rhine for power production, subject to France's paying Germany one-half the value of the energy produced.[13]
- The Barcelona Convention, 1921; The Barcelona Convention, 1921, Article X contains the idea of sharing downstream benefits, and even upstream benefits, providing that where a state is obliged under the Convention to take steps to improve the river or is put to expense to maintain it for navigation, it is entitled to demand a reasonable contribution to the costs involved.[14]

[13] 11 Martens, N.R.G., 3rd Ser., 323 (1922).

[14] 7 L.N.T.S. 35.

- The Kunene River Agreement (South Africa and Portugal) 1926; The agreement between South Africa and Portugal regulating the use of the waters of the Kunene River, 1926, gave South Africa the right to build a dam upstream in Angola and certain diversion works. Article 12 further provided as follows:

  No charge shall be made for the water diverted from the Kunene River for the purpose of provided means of subsistence for the Native Tribes in the Mandated Territory; but should it be desired to utilize a portion of the water referred to in Article six above [one half of the flood water of the river] for any other purposes, being for purposes of gain, ... South Africa ... shall pay, for such portion of the water so utilized, to ... [Portugal] such compensation as may be mutually agreed upon.[15]

- The Cunene River Basin Agreement (South Africa and Portugal), 1969. A more recent treaty between Portugal and South Africa for the Kunene River (under the name of the Cunene River) sees one watercourse state paying another for benefits received by it as a result of developments of the watercourse in the other state. Under this agreement Portugal was to construct the Gove dam and South Africa agreed "to participate in the financing of the dam in respect of components forming part of the storage function, but excluding costs incurred for hydro-power generation purely in the interest of the Portuguese government".[16] In return, Portugal agreed not to extract more than 50 percent of the resulting regulated flow of the river, and to operate the dam so as to provide a regulated flow (Articles 4.1.3; 4.1.11 and 12). The treaty also provided for the construction and operation of works for the diversion by means of pumping water from the Cunene River for human and animal requirements in SW Africa and for irrigation there. South Africa agreed to pay for the construction of the works, and for their operation which would be done by the Portuguese authorities; South Africa was also to pay a fixed amount for the ground occupied and for the flooding caused by these works (Article 4).[17]

- The Rhine Chlorides Agreement, 1977; The Rhine Chlorides agreement provides that the Netherlands is to pay a substantial share of the cost to France of disposing of waste salts from the Mines de Potasse d'Alsace in ways other than discharging them into the Rhine. Thus, in this example the downstream state pays the upstream state for the conferral of a benefit (freedom from pollution harm).[18]

- The Lesotho Highlands Project Treaty, 1986; The Lesotho Highlands Project Treaty is a treaty pursuant to which the downstream state, South Africa, was to pay a substantial share of the cost of constructing the project in Lesotho in return for the downstream benefits it would receive.[19]

- Gabčíkovo-Nagymaros Treaty (Czechoslovakia (Slovakia) and Hungary), 1977; The 1977 Treaty between Czechoslovakia (now Slovakia) and Hungary which gave rise to the 1997 Gabcikovo-Nagymaros ICJ Case provided for the development of a series of dams and a hydroelectric plant, chiefly on a stretch of the Danube that forms the border between the two countries. Under the Treaty, this project was to produce the bulk of the electricity on a bypass canal wholly within what is now Slovakia. The majority of Danube water is diverted into that canal and then rejoins the bed of the Danube. Under the Treaty,

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[15] 70 L.N.T. S. 316

[16] Agreement between the government of the Republic of South Africa and the government of Portugal in regard to the first phase of development of the water resources of the Cunene river basin Lisbon, 21 January 1969 as found at http://www.fao.org/docrep/w7414b/w7414b11.htm

[17] See: Treaties concerning the Utilization of International Water Courses for Other Purposes than Navigation: Africa, Natural Resources/Water Series No. 13 (1984), (UN Publication ST/ESA/141; Sales No. E/F.84.II.A.7) It is not known if this treaty came into force.

[18] 16 I.L.M. 265 (1977)

[19] The Treaty can be found at : http://www.lhwp.org.ls/projecthistory/institutional-framwork/treaty.htm (visited 29 September 2009)

> Hungary was to receive power from that plant, as well as flood control and navigation benefits, all at least in part downstream benefits.[20]

These, and the more detailed examples below regarding the Nile, Senegal and Mekong international river basins, highlight a number of different approaches that co-riparians have used to achieve mutual gains through cooperation in relation to international watercourses.

The Nile River Basin

The Nile River Basin is a paradigmatic example of how the upstream-downstream dynamic can produce a zero-sum game in the absence of benefit-sharing. The Nile Basin spans portions of the territories of 10 countries: Burundi, the Democratic Republic of Congo, Egypt, Eritrea, Ethiopia, Kenya, Rwanda, Sudan, Tanzania and Uganda. It is said to be the longest river in the world, flowing some 4,000 miles from its source in the Lake Victoria basin to the Mediterranean Sea. But this is only one branch of the great river, the White Nile. The other branch is the Blue Nile, which flows from Lake Tana in the Ethiopian highlands through a deep gorge to Khartoum, where it joins the White Nile to form the Nile proper. The flow of the Blue Nile is around twice that of the White Nile and is characterized by seasonal torrents, accounting for the historic Nile floods and associated flood-recession agriculture in Egypt. Egypt contributes virtually no water to the Nile and is almost entirely dependent upon it. It therefore decided to capture the flow of the Nile behind the Aswan High Dam (Sadd el Aali Dam), completed in 1970, in the Lake Nasser reservoir, with a storage capacity of about twice the Nile's average annual flow. Egypt uses this water for both irrigation and hydroelectric power production, but suffers losses of some fifteen percent of the reservoir's water from evaporation.[21] Early British studies had concluded that storage in the upper basin would offer a technically preferable solution,[22] but for Egypt the massive dam and reservoir symbolized its post-World War II nationalism and were considered necessary to Egypt's water security in view of the country's dependence on the Nile.

As is typical throughout the world, Egypt, the ultimate downstream state on the Nile, developed its water resources far earlier, by thousands of years, than any of the upstream riparians. Egypt's use of Nile water is so intensive that little actually flows into the Mediterranean Sea. This has led Egyptian leaders to threaten military action against Ethiopia

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[20] See: *Case concerning the Gabčíkovo-Nagymaros Project* (Hungary/Slovakia), Judgment of 25 September 1997, 1997 ICJ 7; repr. in 37 ILM 162 (1988). For a more complete description and analysis of this case please see: Stephen C. McCaffrey, The Law of International Watercourses 210-221, (2nd ed. 2007).

[21] *See generally* STEPHEN C. MCCAFFREY, THE LAW OF INTERNATIONAL WATERCOURSES 261 (2nd ed. 2007).

[22] SIR WILLIAM GARSTIN, REPORT UPON THE BASIN OF THE UPPER NILE (1904).

if that country "touch[es] the waters of the Nile."[23] Thus the zero-sum game: whatever Ethiopia (or, theoretically, upstream states on the White Nile) uses, Egypt loses. Ethiopia has emphasized that it has a right to utilize Nile waters in a manner that is equitable and reasonable vis-à-vis Sudan and Egypt. Indeed, equitable utilization theoretically avoids the harm to an upper riparian state that would result from locking in quantities used historically by a lower riparian. This is, however, of little comfort to Egypt, which continues to develop Nile water resources,[24] utilizing virtually all of the water that enters her territory. Egypt tends to rely more heavily on the "no-harm" principle as support for its argument that it is entitled to the same quantity of Nile water it has used historically and is currently using.[25]

It is apparent that reconciling Egypt's insistence on continuing to receive present quantities of Nile water resources with Ethiopia's development plans cannot be accomplished through apportionment of water alone. The two countries have therefore been discussing possibilities for benefit-sharing within the framework of the Nile Basin Initiative (NBI), a development program supported by the World Bank and various bilateral donors.[26] In 2002 Nile Basin states established the NBI as an international organization with its headquarters in Entebbe, Uganda. Nile Basin countries developed a Benefit Sharing Framework at a meeting in June, 2009 and Egypt, Ethiopia and Sudan continue to work on identification of benefit-sharing projects relating to their sub-basin through the Eastern Nile Subsidiary Action Program, one of two Investment Programs under the umbrella of the NBI. An example of these projects is the Eastern Nile Regional Power Trade Investment Program, whose objective is: "To promote regional power trade through coordinated planning and development of power projects and transmission interconnection in the context of multi-purpose water resources development."[27] As with the basin as a whole, major investment in the Eastern Nile will have to await approval of the Nile Basin Cooperative Framework Agreement, the first basin-wide treaty governing the Nile, on which the riparian states have been working since the late 1990s. At their meeting in Alexandria, 27-28 July 2009, the Nile Council of Ministers in charge of water affairs decided to allow a period of six months for the conclusion of an inclusive Cooperative Framework Agreement – i.e., one that is participated in by all nine Nile Basin

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[23] Anwar el-Sadat, as quoted in ROBERT O. COLLINS, THE NILE 214 (2002). *See also* JOHN WATERBURY, THE NILE BASIN 71 and 83 (2002).

[24] On the "Peace Canal" under the Suez Canal to the Sinai, and the "New Valley" or Toshka project, which pumps water from Lake Nasser west to the desert, *see* JOHN WATERBURY, THE NILE BASIN 70-71 and 85, respectively (2002).

[25] Egypt also relies on a 1929 treaty with Great Britain which it says is now binding on the Nile riparian states that were British colonies at the time, including Sudan, Kenya, Tanzania and Uganda. *See* MCCAFFREY, *supra* note 21, at 265. The latter three states contest this assertion; the relations between Egypt and Sudan are governed by the Agreement between the United Arab Republic and the Republic of Sudan for the Full Utilization of Nile Waters, Cairo, 8 Nov. 1959, 453 U.N.T.S. 51.

[26] Information on the NBI is available at its website, http://www.nilebasin.org/ (last visited September 5, 2009).

[27] Information on the NBI is available at its website, http://www.nilebasin.org/ (last visited September 5, 2009).

states that have participated in the negotiations.[28] It is to be hoped that these final negotiations will meet with success.

The Senegal River Basin

The management of the Senegal River Basin offers a unique example of benefit sharing between the riparian states. The river rises in Guinea and drains portions of that country, Mali, Mauritania and Senegal. The most recent agreement concluded by the riparians is the 2002 Senegal Water Charter,[29] which responded to problems created by the construction of two dams pursuant to earlier agreements. These are the Manantali hydroelectric dam in Mali, completed in 1988; and the Diama saltwater intrusion barrier, near the mouth of the river where it forms the border between Mauritania and Senegal, completed in 1986.

The dams had given rise to a number of problems in the downstream portion of the basin, including the degradation of ecosystems, the elimination of traditional flood-recession agriculture, and a variety of public health problems (including malaria, diarrhea, and schistosomiasis (bilharzia).[30] In adopting the Senegal Water Charter, the riparians made the decision to alter the flow regime to mimic natural, pre-dam conditions to some extent, by creating artificial floods through releases from the Manantali Dam. While this was done at the cost of some hydropower, benefits were gained by the amelioration, and possible elimination, of the conditions that gave rise to the problems incurred on the lower Senegal. This cooperative solution was made possible in part by the fact that the works constructed on the Senegal are jointly owned, pursuant to a 1978 treaty.[31] The Water Charter seeks to allocate water equitably among the different sectors, chiefly agriculture, fishing, navigation and power production. It also contains the following innovative provision, one of a number of progressive features of the agreement:

> *"The guiding principles of any distribution of the River's water will guarantee to the populations of the riparian States the full enjoyment of the resource, with respect for the safety of the people and the works, as well as the basic human right to clean water, in the perspective of sustainable development."*[32]

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[28] Information on the NBI is available at its website, http://www.nilebasin.org/ (last visited September 5, 2009). Eritrea is the one Nile Basin state that has not participated in the negotiations. It participates in meetings of the Council of Ministers as an observer.

[29] Charte des Eaux du Fleuve Sénégal (Water Charter of the Senegal River), 18 May 2002, official French text available at http://bd.stp.gov.ml/padelia/pdf/CHARTEDESEAUXDUFLEUVESENEGAL.pdf (last visited September 5, 2009). For a discussion of the earlier treaties concerning the Senegal *see* Margaret J. Vick, *The Senegal River Basin: A Retrospective and Prospective Look at the Legal Regime*, 46 NAT. RES. J. 211 (2006).

[30] *See* IDA, *Regional Cooperation and Benefit Sharing in the Senegal River Basin*, available at http://siteresources.worldbank.org/EXTWAT/Resources/Senegal_River_Bain_Feature_Story.pdf (last visited September 5, 2009); and MCCAFFREY, *supra* note 21, at 274.

[31] Convention relative au statut juridique des ouvrages communs (Convention concerning the Legal Status of Jointly-Owned Structures), 12 December 1978, available at http://faolex.fao.org/docs/texts/mul16005.doc (last visited September 5, 2009); supplemented by the Convention relative aux financements des ouvrages communs (Convention concerning the Financing of Jointly-Owned Structures), 12 March 1982).

[32] Senegal Water Charter, *supra* note 29, art. 4.

This provision of the Water Charter brings the focus back to the people who are affected by the large projects on the river. It clearly signals the intent of the parties to remedy the unforeseen problems mentioned earlier. It is especially interesting that the provision invokes the human right to water, the first time a treaty concerning international watercourses has done so.

The Columbia River Basin

The Columbia River Basin is also among the world's largest international drainage basins covering 670,810 km². Due to its position between the 41st and 53rd northern latitudes, the Basin receives a significant amount of precipitation. The Columbia River is the largest river in the Americas to drain into the Pacific Ocean and has the fourth-largest annual discharge volume in North America. The water flow in the Columbia River system is extremely variable with annual flows fluctuating by as much as 50 percent from long-term average values. The Basin network drains water from glaciers, mountains, and plains in one Canadian province and seven US states. Close to 10 percent of British Columbia (BC) lies within the river's catchment; and relatively larger percentages of Washington, Oregon, Idaho and Montana have from 69 and 17 percent respectively of their territories within the system. The Basin also covers smaller portions of Wyoming, Nevada, and Utah states.

Although BC has only 15 percent of the Columbia's drainage area, it produces close to 30 percent of the runoff. More significantly, east of the Cascades, where most of the major hydroelectric facilities are situated, 40 percent of the Columbia runoff originates in Canada.[33] Several large mountain ranges are included within the Basin, in particular, the Cascades and Northern Rocky Mountains. The northern regions have a snowmelt regime with lowest flows from September through March, which generally coincides with the season of highest energy demand.

The governments of the early 20th century, particularly on the US side of the border, placed special importance on the development of the Columbia and the full harnessing of natural resources.[34] The US Congress passed the Reclamation Act of 1902 which granted the federal government the authority to provide irrigation to farmers in the West.[35] Consequently, the Pacific Northwest experienced a shift to intensive farming coupled with a regional population boom. This led to human activities and impacts such as industrial and biological wastes. Wildlife habitat was also affected as logging and road building commenced. In 1928, the US Army Corps of Engineers undertook a detailed investigation of navigation, hydropower, irrigation and flood control possibilities on the Columbia River with a specific focus on the feasibility of installing a dam on the northern US portion of the Columbia.[36] In 1932 the Bureau of Reclamation endorsed the Corp's proposal for the construction of the Grand Coulee

[33] Keith A. Muckleston, "International Management in the Columbia River System" prepared for UNESCO's International Hydrological Programme to the World water Assessment Programme, undated, p. 6.

[34] Keith A. Muckleston, "International Management in the Columbia River System" prepared for UNESCO's International Hydrological Programme to the World water Assessment Programme, undated, p. 6.

[35] The **Reclamation Act** (also known as the **Newlands Reclamation Act** or **National Reclamation Act**) of 1902 (P.L. 57-161, as amended) funded irrigation projects for the arid lands of 17 states in the American West.

[36] Keith A. Muckleston, "International Management in the Columbia River System" prepared for UNESCO's International Hydrological Programme to the World water Assessment Programme, undated, p. 6.

Dam, with hydroelectric facilities. In the same year, private power companies completed Rock Island Dam the first significant source of hydropower on the Columbia.

The Grand Coulee Dam was authorized through the *US Rivers and Harbours Act* of 1935 for the purposes of flood control, navigation, stream flow regulation, storage for and delivery of stored waters, and reclamation of public lands and Indian reservations.[37] Development of the Columbia River, both in regulating river flow and producing a large amount of power, was intended to provide employment and foster growth in the Pacific Northwest.

In 1944, the United States and Canadian governments asked the already existing International Joint Commission (IJC) to investigate the possibilities of developing the Columbia River basin on a unified basis. As these investigations progressed it became apparent that more upstream storage, particularly in Canada, would greatly facilitate and optimize power production and flood control, especially in the US. By the early 1950s the process of transforming the US Pacific Northwest from a relatively arid place into a productive heartland was well underway. The water stored behind the Grand Coulee Dam, Lake Roosevelt and Banks Lake provided irrigation for over 1.1 million acres. When a large-scale energy shortage spread across the region in the period following World War II, methods of increasing hydroelectric power were more thoroughly investigated. In 1951, the US government applied to the IJC for permission to build Libby Dam, which would provide a large volume of upstream storage (over 6 km^3) to regulate power output at existing and planned hydropower plants. The project was not approved at that time due to the cross-border inundation by the reservoir. However a damaging flood in the spring of 1948, that decimated Oregon's second largest town and killed nearly 60 people, also served to fuel the public demand for stream-flow regulation and dam construction on the Columbia.

The Columbia River Treaty (CRT) and complementary international water and energy management agreements were negotiated at an intra governmental and international

[37] After months of debate, the 1935 Rivers and Harbors Act (Public Law 409) was passed. While many water projects received approval, the House of Representatives insisted on voting separately on Parker and Grand Coulee Dams. Representative Culkin, Republican from New York, claimed the project was "uneconomical either as a reclamation or a power project." Rufus Woods responded by declaring, "Your talk aggravates me so much that I can scarcely write you a decent letter; but if you will come west, I will be glad to give you some much-needed information." Instead, Woods put together an eight-page special telling the "truth" about the Columbia Basin Project and sent it to every member of Congress. In August of 1935, the Seventy-fourth Congress authorized Grand Coulee for the purposes of flood control, navigation, stream flow regulation, storage for and delivery of stored waters, reclamation of public lands and Indian reservations, and for the generation of electrical power to finance those undertakings. Passage of the bill was the most difficult and significant legislative hurdle to construction of the dam. With Congressional approval, Washington became a dam state and Grand Coulee became a national endeavor. http://www.ccrh.org/comm/moses/primary/riveract.html (29 September 2009)

government level.[38] The CRT was signed by Canada and the US on 17 Jan 1961 after 15 years of preliminary investigation by the International Joint Commission (IJC) and one year (1960) of direct international negotiation.[39] Canada undertook to construct 3 dams for water storage projects in the Canadian portion of the basin and to operate them to produce maximum flood control and power downstream. In return, the US would pay Canada US$64.4 million (calculated to be half the worth, in 1961, of the flood protection the US would enjoy over the CRT's 60-year life) and it would give Canada title to half the additional power produced and it would return this power to Canada. The treaty did not become effective until 16 September 1964, much of the delay resulting from a federal-provincial controversy over BC's 1961 decision to sell the power entitlement in the US. The province prevailed in January 1964, when the power benefit for the first 30 years was sold for a lump sum prepayment of US$254.4 million and the treaty was slightly modified by protocol. As the Canadian owner of the resource, British Columbia was heavily involved in the negotiations, and in 1963 and 1964 it assumed Canada's obligations. Its agency, BC Hydro, has constructed all the Canadian treaty projects, and with an American counterpart, coordinates their storage releases to the advantage of both countries.

In the process of looking at the power potential of the Basin in Canada, some consideration was given to the beneficial or detrimental impact which hydroelectric development might have on other uses of the river and its valleys, including irrigation, agriculture, forestry, mining, manufacturing, fish and wildlife, recreation and transportation.[40] Specific to the topic of fish and wildlife, it was recognized that fishing would be affected to some extent by any development of the Columbia River for the purposes of power production.[41] It was also recognized that water diversion plans which gave rise to flooding would likely have an effect on wildlife in the area.[42] The focus on power production and flood control was not imposed by the Treaty, but rather was a considered decision by each country, prior to entering into the Treaty, and subsequently in administering the system. The best way to view the Treaty is as a vehicle that has permitted optimization of the river system as a resource through international cooperation after each Party had determined the trade-offs it was prepared to make.[43]

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[38] See: http://www.thecanadianencyclopedia.com/index.cfm?PgNm=TCE&Params=A1ARTA0001778 (visited 25 September 2009)

[39] See: http://www.thecanadianencyclopedia.com/index.cfm?PgNm=TCE&Params=A1ARTA0001778 (visited 25 September 2009)

[40] *The Columbia River Treaty and Protocol, A Presentation,* issued by the Departments of External Affairs and Northern Affairs and National Resources (Canada), April 1964, Chapter III, at p. 36. ("Blue Book").

[41] Blue Book at p. 44.

[42] Blue Book at p. 44.

[43] Keith A. Muckleston, "International Management in the Columbia River System" prepared for UNESCO's International Hydrological Programme to the World water Assessment Programme, undated, p. 36.

International law provides an important and obvious foundation from which agreements regarding the good governance of international waters (including international water situations involving international groundwater and international Large Marine Ecosystems[44]) can be successfully negotiated. However there is also much to be said for a "mutual gains" approach towards negotiating mutually beneficial agreements for international watercourses that moves beyond merely meeting international legal rights and obligations.

[44] See: Sherman, Kenneth, Marie Christine Aquarone and Sara Adams (eds.), Sustaining the World's Large Marine Ecosystems. International Union for Conservation of Nature and Natural Resources (IUCN), Gland, Switzerland (2009)

3.2 Data and Information Sharing and Exchange[45]

"*If you can't measure it you can't manage it*"[46]

Data and information sharing and exchange are critically important in the good governance of international waters. Among other things, data and Information are required for the planning of projects, operation of facilities and monitoring the performance of interventions. In an international waters context, three broad categories of sources of data and information are:

1. National (private): refers to data and information that are generally available in national agencies of riparian states. While certain rules are to be followed to get access to data and information for 'national' use, special arrangements may be required to get access by 'outsiders'.
2. Shared: refers to data and information that has been compiled through the consent and participation of the riparian states and hence is available to all riparian states. The fact that the data and information is 'shared' by the states signifies that they are mutually agreed upon by the riparian states.
3. Public domain: data and information in the public domain are usually available to practically everyone. Examples of such data and information include satellite imageries and derived products obtainable from the internet, information released for public 'consumption'.

Access to data and information is often governed by, generally written, agreements which usually recognize different classes of users and the sensitivity of the data and information. In the case of international waters, agreements are usually needed on data and information exchange or sharing to define the terms (or modalities) under which access can be granted and to whom. Data and information can usually be reciprocally transferred between parties or can be collected, processed and compiled in a systematic manner and made accessible for all parties involved.

A classification of development phases introduced by Burton et al (2005) is used here to illustrate how in the case of international drainage basins, information and data needs evolve with growing development and, thus, require an increased allocation of resources. According

[45] This section draws in part on materials originally researched and prepared in 2009 by Richard Paisley and Dr. Abdulkarim Seid for the WRPM (Water Resources Planning and Management) division of the Nile Basin Initiative.

[46] This ubiquitous quote is ascribed to various sources, including Peter Drucker, as found at http://blog.marketculture.com/2009/03/20/if-you-cant-measure-it-you-cant-manage-it-peter-drucker/

to this classification, international drainage basins can fall in any of three phases: development, utilization and reallocation.

International drainage basins are said to be in a *development phase* if the amount of naturally occurring water is not a limiting factor for development. In such a situation, growth in demand for water is the prime driving force for the development of infrastructure. In the second phase, the *utilization phase*, a significant proportion of available resources have been committed to use. Governance in such basins shifts more towards effective utilization from available facilities, such as through reuse of drainage water and demand management. With further development of resources as demands grow, a situation can be reached where most of the utilizable water has been committed. This phase is termed '*reallocation*'. The main focus of governance in international drainage basins in this third phase is towards making 'best' use of available water, which may lead to reallocating resources from lower to higher value uses.

The types of data and information needed change as more water and other resources become committed to various uses and the focus of governance moves more towards demand management. Table 1 summarizes the main types of data and information usually thought to be required at different levels of development in an international freshwater drainage basin.

Table 1: Development stages and data and information requirements in an international drainage basin[47]

Data needs	Typical data collected	Developments in information processes
Infancy: Localized use only		
Rudimentary, limited to water levels and extent of flooding	Flood water levels, flooded areas (through experience)	Demarcation (and avoidance) of flooded areas, correlation of flood extend and flood levels
Development: Water allocation is supply focused; Data collected and used by small number of agencies for specific uses and projects		
Availability of water during the year and extent of agricultural land; Main focus is on surface water, though some interest in groundwater for urban and irrigation development; For initial planning for river basin development.	Project-wise collection of river flow and quality data; Climatic data, particularly rain-fall; Land use in riverine plains and extent of agricultural land Topographic surveys; Aerial photography; Land ownership, traditional/existing water rights.	Initial data collection systems established for individual projects; gradually these are linked up and coordinated by the development agency(s); Basin-wide hydrometric stations established to gather base data.
Utilization: Water allocation is supply focused; Data related processes and procedures well established		
Detailed knowledge of the available water resources, both surface and groundwater, particularly over-year to establish storage patterns for reservoirs and recharge pat-terns for groundwater; For river basin master planning.	River flow data throughout the basin; Climatic data throughout the basin; Land ownership and traditional/existing water rights; Groundwater level and quality; Some monitoring of pollution levels.	Data collection procedures standardized and co-coordinated; Procedures established for monitoring pollution levels; Procedures established for monitoring groundwater depth and quality; Publication of water resources and climatic data; Development of simple water re-sources models for river basins.
Re-allocation and restoration: Demand and supply focused; Data related processes and procedures re-fined and more widely disseminated		
To obtain detailed knowledge of the annual and inter-year water resource situation both for supply and demand; To monitor and control water abstraction by users; To make projections of supply and demand; For water resources modelling, using remote sensing and GIS; For scenario analysis; For river basin master planning; To refine and update supply and demand projections, scenario analysis; To formulate rules for allocation of water during droughts / shortages.	River flow and water quality data throughout the basin; Climatic data throughout the basin; Groundwater level and quality; Pollution levels; Water abstraction by all users; Data for prosecution for over-abstraction and/or pollution; Data analysed from perspective of different water users; Water needs for various environmental processes.	Hydrometric network extended and automated for direct transmission to data collection stations; Groundwater monitoring network extended; Pollution monitoring extended; Further computerization of data collection, processing and analysis; Development of sophisticated water resource models for river basins, with refinement to become an operational tool; Remote sensing incorporated into water management and decision making; Publication of water resources supply and demand information; Analysis and presentation of data for a wider range of stakeholders; Scenario analysis to enable participation in decision making.

[47] (adapted from Burton et al 2005)

Every international drainage basin is unique and may not lend itself to be strictly classified into any one of these phases. However, the more water and related resources that are committed to use, the less will purely supply oriented measures be adequate to result in efficient utilization. This usually requires more sophisticated tools and detailed information and data than what would be required in relatively undeveloped situations where resource availability has not yet become a constraint or limiting factor for development.

The *1997 UN Watercourses Convention* recognizes that the exchange of data and information is a necessary pre-requisite for good governance.[48] Article 9 requires basin states to regularly exchange data and information on the condition of the watercourse, in particular that of a hydrological, meteorological, hydro geological and ecological nature or related to water quality and related forecasts. The *1997 UN Watercourses Convention* also allows states to request information that is not currently available while providing compensation to the state procuring the data.

The general obligation of international water states to exchange information has been further affirmed in various ministerial declarations of international water conferences and the resolutions of international organizations. These include: the *Declaration of the United Nations Conference on the Human Environment Recommendation* (encouraging the collection and exchange of information through joint mechanisms);[49] *Dublin Statement of the International Conference on Water and the Environment* (recommending information exchange as a means of minimizing conflict over shared resources);[50] and the *Kyoto Ministerial Declaration of the 3rd World Water Forum* (encouraging information exchange as a mechanism to mitigate natural disasters).[51]

Some resolutions of international organizations reaffirming the general obligation to exchange information include the: *UNECE Decision on International Cooperation on Shared Water Resources,* principle 11 (encouraging members to carry out joint data collection projects);[52] *Draft Principles of Conduct for the Guidance of States in the Conservation and Harmonious Exploitation of Natural*

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[48] United Nations, *Convention on Law of the Non-navigational Uses of International Watercourses 1997,* adopted by the General Assembly of the United Nations 21May 1997 as found at http://untreaty.un.org/ilc/texts/instruments/english/conventions/8_3_1997.pdf

[49] See http://www.unep.org/Documents.Multilingual/Default.asp?documentid=97&articleid=1503

[50] See http://www.inpim.org/files/Documents/DublinStatmt.pdf

[51] See http://docs.google.com/viewer?a=v&q=cache:WuyfrAw2wB4J:www.worldwaterforum4.org.mx/uploads/TBL_DOCS_17_29.pdf+Kyoto+Ministerial+Declaration+of+the+3rd+World+Water+Forum&hl=en&gl=ca&pid=bl&srcid=ADGEESj1R_AXB7ulpB4L04KGUJ5BLIr56JdMudmfQEwZTj407BDUdfNhivwQ8c27DQ3j2DqADg1k8YBQ7N9QR1U3RZl55DQmuDBXtXlyEJoHpJUuP5jHy1brrgb7wsp178h7j6-JCiu8&sig=AHIEtbRhj9eJ-t5ZRMIiAPWg5IaaZXO7Iw&pli=1

[52] See http://www.unece.org/env/water/pdf/watercon.pdf

Resources Shared by Two or More States;[53] and *Co-operation in the Field of the Environment Concerning Natural Resources Shared by Two or More States*.[54]

Numerous resolutions also include a duty to exchange information on transboundary watercourses. See, for example: IDI, Resolution on the Pollution of Rivers and Lakes and International Law, art. VII (encouraging the exchange of data on pollution and the coordination of programs designed to generate data about the basin)[55]; ILA, New York Resolution, art. 3 (recommending that "[c]o-riparian states should make available to the appropriate agencies of the United Nations and to one another hydrological, meteorological and economic information, particularly as to streamflow, quantity and quality of water, rain and snowfall, water tables and underground water movements")[56]; ILA, Helsinki Rules, art. XXIX. [57]

The ILA's Helsinki Rules relate information exchange to the mitigation of water disputes in Article XXIX, which specifies:[58]

> *With a view to preventing disputes from arising between basin states as to their legal rights or other interest, it is recommended that each basin state furnish relevant and reasonably available information to the other basin states concerning the waters of a drainage basin within its territory and its use of, and activities with respect to each waters.*

This statement indicates not only the interconnection between the other key legal principles and the principle of information exchange, but also the legal obligation of riparian states to provide data to co-basin states. By enhancing cooperation and trust, the sharing of information eases the way for discussions on particularly contentious matters such as allocation. Established treaty practice makes clear that there is an obligation to exchange information regarding shared transboundary international waters. Procedural rules on information exchange are diverse, and

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[53] Intergovernmental Working Group of Experts on Natural Resources, U.N. Environment Programme, 6th Sess., Agenda Item 11, U.N. Doc. UNEP/GC.6/17 (1978), adopted by the General Assembly

[54] G.A. Res. 186, at 128, U.N. GAOR, 34th Sess. (1979)

[55] http://www.idi-iil.org/idiE/resolutionsE/1979_ath_02_en.PDF

[56] Development Law Service, FAO Legal Office, *Sources of International Law, Some General Conventions, Declarations, Resolutions and Decisions adopted by International Organizations, International Non-Governmental Institutions, International and Arbitral Tribunals on International Water Resource*s, FAO Legislative Study 65, Rome 1998 at 289 as found at ftp://ftp.fao.org/docrep/fao/005/w9549E/w9549e04.pdf

[57] Development Law Service, FAO Legal Office, *Sources of International Law, Some General Conventions, Declarations, Resolutions and Decisions adopted by International Organizations, International Non-Governmental Institutions, International and Arbitral Tribunals on International Water Resources*, FAO Legislative Study 65, Rome 1998 9 at 299 as found at ftp://ftp.fao.org/docrep/fao/005/w9549E/w9549e04.pdf

[58] Development Law Service, FAO Legal Office, *Sources of International Law, Some General Conventions, Declarations, Resolutions and Decisions adopted by International Organizations, International Non-Governmental Institutions, International and Arbitral Tribunals on International Water Resources*, FAO Legislative Study 65, Rome 1998 at 299 as found at ftp://ftp.fao.org/docrep/fao/005/w9549E/w9549e04.pdf

while a general duty to exchange data exists, no specific requirement can be drawn from documented practice.

The following examples highlight data and information sharing and exchange in an international waters context:[59]

1. Amazon Basin

In the Amazon Basin, Member States of ACTO (Amazon Cooperation Treaty Organization) have a duty to "maintain a permanent exchange of information and cooperation among themselves," as well as with other agencies operating in the Amazon River Basin.[60] This sharing of information is reflected by the multiple memoranda of understanding that ACTO has entered into with other regional or worldwide bodies (such as the Andean Community and the Inter-American Development Bank). The Member States also agreed to exchange information on flora, fauna, and diseases in the Amazonian territory and to make an annual report on the conservation measures adopted.[61] In addition, the ACTO Bi-Annual Action Plan describes the programs and projects that are underway and is distributed to the Member States to keep them informed of the activities of the Permanent Secretariat. The Action Plan describes the duration of the program or project, estimated costs, and projected sources of funding. The coordinators of active projects must report back to the Permanent Secretariat on established indicators designed to assess the progress towards the achievement of project goals. The Permanent Secretariat will also publish an Annual Report on the progress of the Bi-Annual Action Plan.[62] The ACTO Strategic Plan, released in October 2004, describes the plans of the Permanent Secretariat from 2004 to 2012 for various projects that are designed to promote sustainable development and to protect the Amazon Basin. The report describes the strategic axes that will be used to guide the ACTO, the programmatic structure of the plan, and operational tools. The Strategic Plan is meant to be used as a planning document that can be modified based on suggestions from the various stakeholders.[63] Furthermore, in cooperation with the Directorate General for International Cooperation of the Netherlands (DGIS), the German Federal Ministry for Economic Cooperation and Development (BMZ), and the German Organization for Technical Cooperation (GTZ), ACTO established the Amazon Regional Program regarding the sustainable use and conservation of forests and biodiversity in the Amazon Region. The Amazon Regional Program was developed based on the ACTO Strategic Plan and focuses on being a forum for cooperation and communication among the Member States in the areas of forests, biotrade, tourism, indigenous affairs, and institutional strengthening. For example, in terms of forests, the

[59] These materials are extracted with permission from a document researched and written by the international law firm White & Case and entitled "White & Case LLP. International Waters: Review of Legal and Institutional Frameworks. UNDP-GEF International Waters Good Practices Report, February 2011
[60] Amazon Cooperation Treaty, art. XV.
[61] Amazon Cooperation Treaty, art. VII.
[62] ACTO Strategic Plan, at 67.
[63] ACTO Strategic Plan, at 9-11.

Member States have developed 15 indicators, which correspond to eight criteria, to measure and evaluate the effectiveness of forest management in the Amazon. This evaluation system was implemented by each Member State and involved training programs, information gathering, identifying key stakeholders, and holding regional talks. The Member States are also working towards developing a real-time satellite monitoring system of the forest. In addition, in March 2009, ACTO and the United Nations Environment Programme (with support from the University of the Pacific) released a report entitled "Perspectives on the Environment in the Amazon: Amazon GEO." The report, which involved the efforts of 150 scientists and researches, provides a comprehensive review of the economic, ecological, social, political, and geographical status of the Amazon region.[64]

2. Cartagena Convention

In Article 13 of the Cartagena Convention, the Contracting Parties agreed to cooperate, both with each other and with relevant international and regional organizations, in "scientific research, monitoring, and the exchange of data and other scientific information relating to the purposes of th[e] Convention." In addition, Article 17 of the SPAW Protocol calls upon the Contracting Parties to develop "scientific, technical and management-oriented research" on protected areas and threatened or endangered species and their habitats. Contracting Parties are also encouraged to consult with one other and with relevant organizations to identify protected areas and species and to conduct research and monitoring programs to protect them; to assess the effectiveness of measures enacted to implement management and recovery plans; to exchange information and coordinate research and monitoring programs; and to standardize the procedures used for collecting, reporting, archiving, and analyzing scientific and technical information. The CAR/RCU is also intended to serve as a forum for collecting, reviewing, and distributing information on relevant studies, publications, and the results of work conducted under the framework of the Cartagena Convention and its Protocols.[65] The CEP manages and/or contributes to numerous databases related to the marine and coastal environment in the Wider Caribbean Region. The SPAW Species Database, which is hosted and maintained by the CEP, contains both taxonomic information and distribution data on protected species of marine and coastal flora and fauna. Other relevant databases include: the Caribbean Marine Protected Area (MPA) (information on protected coastal areas in 34 countries and territories); the Marine Litter Database; the Global Environment Facility Integrating Watershed and Coastal Areas Management in Caribbean Small Island Developing States Project Databases (GEF-IWCAM); INFOTERRA (the UNEP global environmental information exchange network); and UNEP State of the Environment Reports (SOER) (information on the environmental health of countries and regions).[66] The Contracting Parties also agreed to develop information

[64] *See* Programa Regional Amazônia, *available at* http://www.otca.org.br/programaregional/ (last viewed on 20 Oct. 2010) (website only available in Spanish and Portuguese).
[65] *See* UNEP-Caribbean Regional Coordinating Unit.
[66] *See* CEP–Databases, *available at* http://www.cep.unep.org/publications-and-resources/databases (last viewed on 6 Dec. 2010). Protected species are listed in Annexes I-III to the SPAW Protocol. *See* SPAW Protocol, art. 11(1); Final Act of the Conference of Plenipotentiaries for the Adoption of the Annexes to the Protocol Concerning Specially Protected Areas and

systems and networks to promote the exchange of information and facilitate the implementation of the LBS Protocol.[67]

3. International Commission for the Conservation of Atlantic Tunas (ICCAT)

Every two years, ICCAT submits a report on its work and findings, which is transmitted by the Executive Secretary to all Contracting Parties of the Commission, the FAO and any government or international organization invited to send observers to the meeting. The Council, Panels and other subsidiary bodies of ICCAT also adopt reports at the end of each meeting, which are then submitted to the appropriate parent body.[68] Generally speaking, ICCAT collects two main types of data. Fishery independent data includes research vessel surveys and other studies, such as those conducted with tagging programs.[69] But, ICCAT generally relies on fishery-dependent data sources, such as logbooks, observer programs, port sampling, factory/market sampling and international trade (import/export) statistics.[70] ICCAT also maintains a number of statistical databases, which contain data on fleet characterization (number and type of fishing vessels); nominal catch (by species, region, gear, flag); catch and effort (fishing fleet, time, gear and time and area strata); and fish size (size samples and catch-at-size estimates).[71]

4. Rio Grande/Rio Bravo

Data on water flow and reservoir condition are collected and updated daily on the IBWC website.[72] The collated stream gauging record and records of waters in storage, rainfall and evaporation stations and of the measurements of the quality of waters are published annually in the *Flow of the Rio Grande and Tributaries and Related Data*, an IBWC bulletin.[73] Data on water quality and quantity is also available on IBWC's Geographic Information System.[74]

5. Barcelona Convention for the Protection of the Mediterranean Sea Against Pollution

Under Article 4(3)(d) of the Barcelona Convention, as amended, the Contracting Parties are called upon to promote cooperation among themselves in regards to environmental impact assessment procedures for activities under their jurisdiction that are likely to have a significant adverse effect on the marine environment of other Contracting Parties or other areas beyond their national jurisdiction. This cooperation is to be achieved through notification, exchange of information and

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Wildlife in the Wider Caribbean Region, Annexes I-III, 10-11 June 1991, *available at* http://www.cep.unep.org/cartagena-convention/spaw-protocol/spaw-final-act-resolution-and-appendix/view.

[67] LBS Protocol, art. VIII.

[68] ICCAT Rules of Procedure, Rule 15. The reports are available on the ICCAT website. *See e.g.,* ICCAT Biennial Reports, *available at* http://www.iccat.int/en/pubs_biennial.htm (last viewed on 29 Nov. 2010).

[69] ICCAT Field Manual, at Sec. 1.2. Tunas and billfishes are tagged in order to learn more about their movements, migrations, stock structure, growth, population size, mortality, schooling behavior, and physiology. Tagging is also used to study the effects of fishing patterns on the fish and fisheries. Currently, ICCAT has developed a cooperative tagging program in the Atlantic Ocean and adjacent seas, through which various countries are participating. ICCAT: Tagging, *available at* http://www.iccat.int/en/Tag-Desc.htm (last viewed on 29 Nov. 2010).

[70] ICCAT Field Manual, at Sec. 1.2.

[71] ICCAT: Access to ICCAT Statistical Databases, *available at* http://www.iccat.int/en/accesingdb.htm (last viewed on 29 Nov. 2010); ICCAT Field Manual, at Sec. 1.3.

[72] International Boundary & Water Commission – United States Section: Rio Grande Basin Conditions, *available at* http://www.ibwc.gov/Water_Data/Reports/RG_Flow_data.html (last viewed on 19 Jan. 2011).

[73] *See* IBWC Water Resources, *available at* http://www.ibwc.gov/wad/water_resources.htm (last viewed on 19 Jan. 2011).

[74] International Boundary & Water Commission – United States Section: Geographic Information System (GIS) Program, *available at* http://www.ibwc.gov/GIS_Maps/GIS_Program.html (last viewed on 19 Jan. 2011).

consultation. In addition, the Protocols require the Contracting Parties to share specific information relevant to their subject matters.

- The Dumping Protocol requires each Contracting Party to report dumping permits issued and the actual dumping that occurs. The Dumping Protocol also provides that each Contracting Party shall, if it considers it appropriate, report suspicions of illegal dumping to other concerned Parties.[75]
- The Emergency Protocol obliges its Contracting Parties to exchange information, through the RAC in Malta, about domestic regulations, responsible authorities, and best practices regarding the prevention of pollution and emergency response. The Emergency Protocol further requires Contracting Parties to warn the nearest coastal state (and other Parties likely to be affected) of incidents that may result in pollution. Contracting Parties must also inform each other of their planned response to a pollution incident.[76] The Offshore Protocol (which is not yet in force) would require Contracting Parties to ensure that persons on offshore installations follow similar procedures.[77]
- The Hazardous Wastes Protocol requires its Contracting Parties to report to the Secretariat, as soon as possible, information relating to illegal traffic in hazardous waste. Contracting Parties must also share annual statistics on waste generation and transfer.[78]
- The Specially Protected Areas and Biodiversity Protocol calls upon Contracting Parties to regularly exchange information about the characteristics of protected areas and species and to communicate, at the earliest opportunity, information on any situation that might endanger protected ecosystems.[79]
- The Integrated Coastal Zone Management Protocol (which is not yet in force) would require Contracting Parties to assess and report the status of coastal erosion and to share information about major natural disasters.[80]

Under Article 13 of the Barcelona Convention, as amended, the Contracting Parties undertake "as far as possible to cooperate…in the fields of science and technology and to exchange data as well as other scientific information for the purpose of this Convention" and further agree to cooperate in the development and sharing of clean production technology. The Protocols elaborate the required cooperation in their respective domains. For example, according to Article 7(f) of the Emergency Protocol, the Contracting Parties are obligated to share information about "new ways in which pollution of the sea by oil and hazardous and noxious substances may be avoided, new measures for combating pollution, new developments in the technology of conducting monitoring and the development of research programmes." Article 9 of the Land-Based Sources Protocol requires cooperation in "research on inputs, pathways and effects of pollutants and on the development of new methods for their treatment, reduction or elimination, as well as the development of clean production processes to this effect." Under Article 20 of the Specially Protected Areas and Biodiversity Protocol, the Contracting Parties are called upon to coordinate, to the extent possible, their research and monitoring of protected areas and species. Article 8 of the Hazardous Wastes Protocol mandates cooperation in the development and implementation of clean

[75] Dumping Protocol, arts. 12, 14.
[76] Emergency Protocol, arts. 7, 9, 10.
[77] Offshore Protocol, art. 17; *see also* Offshore Protocol, art. 16 (requiring application of the Emergency Protocol).
[78] Hazardous Waste Protocol, arts. 8(2), 9(6).
[79] Specially Protected Areas and Biodiversity Protocol, art. 21(1)-(2).
[80] Integrated Coastal Zone Management, arts. 23(4), 24(2).

production methods. Furthermore, Article 22 of the Offshore Protocol and Article 25(2) of the Integrated Coastal Zone Management Protocol (which are not yet in force) call for the cooperation in the research of new technology and emergency procedures and in the research on integrated coastal zone management, respectively. The MED POL and RACs participate in research coordination, information generation, and information sharing. The Protocols expressly provide that progress and lessons learned in implementation will be shared at regular meetings of their respective Contracting Parties.[81] The Contracting Parties have also begun to coordinate national library resources related to marine science.[82]

In 1996, the Contracting Parties and the EU commissioned the development of a data coordinating structure, which led to the Euro Mediterranean (Water) Information System ("EMWIS").[83] The decision-making and operational structure of EMWIS is independent of the Barcelona Convention structure, but its objectives include developing national water information systems and efforts to transfer know-how in the water sector.[84] Article 4 of the Barcelona Convention, as amended, also establishes principles to harmonize domestic environmental policies, including the precautionary principle,[85] the "polluter pays" principle,[86] and a technology-based approach considerate of sustainable development needs.[87] To facilitate such harmonization, Article 14(2) of the Barcelona Convention, as amended, suggests that the Secretariat may assist Contracting Parties in drafting environmental legislation that is in compliance with the Barcelona Convention and its Protocols. The Protocols generally establish or call for the development of baseline measures to be implemented in national regulations, but do not require absolute harmonization of law.[88] The

[81] *See* Dumping Protocol, art. 14(2); Emergency Protocol, art. 18(2); Land-Based Sources Protocol, arts. 13, 14(2); Specially Protected Areas and Biodiversity Protocol, art. 26(2); Offshore Protocol, art. 25; Hazardous Wastes Protocol, art. 11; *cf.* Integrated Coastal Zone Management Protocol, art. 33 (requiring Parties at regular meetings "to consider the efficiency of the measures adopted").

[82] *See* European Association of Aquatic Science Libraries and Information Centres (EURASLIC); Mediterranean Special Interest Group: Report of the First Workshop/Meeting of the Mediterranean Marine and Aquatic Science Libraries and Information Centres Network, Marine Science Institute of Andalusia (CSIC), Cadiz Spain, 17-18 Nov. 2008, *available at* http://195.97.36.231/dbases/MedLibs/Final_Report_Cadiz.pdf.

[83] The Euro-Mediterranean Conference on water management held in Marseilles (containing decisions adopted by the Ministers and Heads of delegation), 25-26 Nov. 1996, *available at* http://www.ufm-water.net/download/DCL_Marseille1996_en.pdf; Euro Mediterranean (Water) Information System on know-how in the water sector – HANDY GUIDE, 16 May 2000, at 2, *available at* http://www.semide.net/ media_server/files/q/r/handy_guide.pdf.

[84] *See* EMWIS: Decision-Making level, *available at* http://www.semide.net/overview/fol226852/fol720468 (last viewed on 15 Dec. 2010); EMWIS: Operational level, *available at* http://www.semide.net/ overview/fol226852/fol335117 (last viewed on 15 Dec. 2010); EMWIS: Orientations, 22 Aug. 2006, *available at* http://www.semide.net/overview/fol350157/doc064667.

[85] *See, e.g.*, 16th Meeting Report, Annex I, Marrakesh Declaration, at 3; Dumping Protocol, Annex III, para. B(9); Emergency Protocol, Preamble; Hazardous Wastes Protocol, art. 8(3); Specially Protected Areas and Biodiversity Protocol, Preamble. *See also* 16th Meeting Report, Annex III, Five-Year Programme of Work 2010-2014, Appendix 1, at 4.

[86] *See, e.g.*, Offshore Protocol, art. 27; 15th Meeting Report, Annex V, Decision IG 17/4 (and Appendix): Guidelines for the Determination of Liability and Compensation for Damage Resulting from Pollution of the Marine Environment in the Mediterranean Sea Area ("Decision IG 17/4"), at 136, para. 9.

[87] *See, e.g.*, Emergency Protocol, Preamble; Land-Based Sources Protocol, arts. 7(2)-(3), and Annex IV; Offshore Protocol, art. 3.

[88] *See, e.g.*, Dumping Protocol, arts. 11, 13; Land-Based Sources Protocol, arts. 6, 7 and Annex II; Offshore Protocol, arts. 10, 23(2); Specially Protected Areas and Biodiversity Protocol, arts. 16, 27; Emergency Protocol, art. 20; Integrated Coastal Zone Management Protocol, arts. 4(3), 8(2)(a).

Barcelona Convention and certain Protocols promote harmonization by requiring technical assistance to developing countries.[89]

6.Caspian Sea

The Tehran Convention contains a number of articles dealing specifically with the exchange of information among the Member States, cooperation on environmental policies and harmonization of national laws.[90] The Member States are directed to harmonize their national laws and to work together in order to develop specific rules and standards designed to protect the environment of the Caspian Sea, including to jointly develop an action plan to help implement the objectives of the Tehran Convention. The Member States are called upon to: (a) collect and exchange data concerning the sources of pollution in the Caspian Sea; (b) develop programs to monitor water quality and quantity; (c) develop contingency plans for pollution emergencies; (d) implement emission and discharge limits; (e) establish water quality objectives and criteria; and (f) develop harmonized programs to reduce pollution loads from municipal and industrial points, as well as from diffuse sources.[91] The Member States are also to cooperate on research and development concerning techniques for the prevention, control and reduction of pollution in the Caspian Sea. The information gathered, and any resulting reports, are exchanged among the Member States through the Secretariat. The Member States, in conjunction with the Secretariat, are to endeavor provide public access to this information and to the action plans developed by the Member States.[92]

7. Danube River Basin

The Contracting Parties to the DRPC are required to report to the ICPDR on issues necessary for the ICPDR to comply with its tasks. Reports involve a variety of data and information, including on other bilateral or multilateral agreements affecting the Danube, information on Contracting Parties' laws and regulations concerning the protection and water management of the river, communication concerning the domestic implementation of ICPDR decisions, designation of competent institutions for cooperation in the framework, and communication on planned activities likely to cause transboundary impacts.[93] Similarly, as required by the ICPDR, the Contracting Parties are required to share with the other Contracting Parties any "reasonably available data" relating to: (a) the environmental conditions within the catchment area of the Danube River Basin; (b) the experience gained from the application of best techniques and results of research; (c) emission and monitoring data; (d) measures taken and planned to address transboundary impacts; (e) regulations for the discharge of waste water; and (f) accidents that involve substances hazardous to water. Additionally, the Contracting Parties are also required to exchange information on regulations to harmonize emission limits. Moreover, provision is made to enable a Contracting Party to request

[89] *See* Barcelona Convention, as amended, art. 13(3); Land-Based Sources Protocol, art. 10; Specially Protected Areas and Biodiversity Protocol, art. 22; Offshore Protocol, art. 24; Hazardous Waste Protocol, art. 10; *see also* Emergency Protocol, art. 13(4); Integrated Coastal Zone Management Protocol, art. 26.
[90] *See generally* Tehran Convention, arts. 18-21.
[91] Tehran Convention, art. 18.
[92] Tehran Convention, arts. 20, 21.
[93] DRPC, art. 10.

data not available from another Contracting Party, on the condition that the requesting Contracting Party agrees to pay reasonable charges for collecting and processing such data or information. The objectives of the DRPC are also promoted by the facilitating the exchange of "best available techniques" via promotion and commercial exchange, technical assistance, and joint training programs.[94] In addition, the DRPC requires that the Contracting Parties make available all information concerning the state or quality of the river environment "to any natural or legal person, with payment of reasonable charges, in response to any reasonable request."[95] At the same time, the DRPC includes provisions for the protection of certain information and data, including personal data, industrial and commercial secrets and information affecting public or national security.[96] The DRPC also establishes obligations for coordinated or joint communication, warning and alarm systems and obligations to consult on "ways and means of harmonising domestic communication, warning and alarm systems and emergency plans."[97] In this regard, Contracting Parties must supply competent authorities or points of contact for emergency events, including accidental pollution or critical water conditions such as floods and ice-hazards. Competent authorities identifying increases in hazardous substances or floods or forecasts of ice-hazards are obligated to inform downstream states along the Danube River.[98]

Overall, information sharing, exchange, and harmonization have been primary objectives of the ICPDR from its inception. In particular, the establishment of uniform standards for data collection and exchange has been a prime focus of the Contracting Parties since the beginning of the Danube Pollution Reduction Programme in 1992. There are also joint data collection and survey efforts and a technical body—the Information Management and Geographical Information System Expert Group—which is charged with maintaining the overall data information system.[99]

8. Franco-Swiss Genevese Aquifer

The Commission maintains an inventory of all waterworks and equipment, which is available to both Member States.[100] Additionally, the volume of water extracted is to be recorded periodically and provided to the members of the Commission. The Commission also maintains a record of water level variations of the aquifer, which is available to the parties on demand.[101] Each user or group of users of the aquifer also informs the Commission of their estimated volume of extractions from the aquifer at the beginning of each year and their actual usage at the end of the year.[102]

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[94] DRPC, art. 12(1)-(4).
[95] DRPC, art. 14(1).
[96] DRPC, arts. 12(5)-(6), 13, 14(3).
[97] DRPC, art. 16(1).
[98] DRPC, art. 16(2)-(4).
[99] *See* ICPDR - Terms of Reference of the ad hoc Information Management and Geographical Information System Expert Group (ad hoc IM+GIS EG) of the ICPDR, 11 Dec. 2006, at sec. 2, *available at* http://www.icpdr.org/icpdr-files/9237 ("The overall objective of the ad hoc IM+GIS EG is to support ICPDR activities related to the operation and further development of the ICPDR information system. It comprises control over the development, implementation, testing and maintenance of a common Danube River Basin Geographical Information System (DRB GIS).").
[100] Franco-Swiss Genevese Aquifer Convention, art. 4.
[101] Franco-Swiss Genevese Aquifer Convention, arts. 6.2, 7.2.
[102] Franco-Swiss Genevese Aquifer Convention, arts. 9.1, 10.3.

9. The Rhine

Under Article 5(1) of the Convention, the Contracting Parties agreed to cooperate and inform one another of actions taken in their territory to protect the Rhine. In addition, under Article 5(2), the Contracting Parties have also committed to implementing international monitoring programs and studies of the Rhine ecosystem in their territories and to inform the ICPR of the results of those studies and programs. The ICPR relies on the data collection and monitoring efforts of the Contracting Parties. For example, the Warning and Alarm Plan allows the ICPR to gather information on water pollution levels collected by monitoring stations along the river, with more than 100 substances monitored. In addition, the Rhine 2020 program contains numerous targets designed to improve the health and ecological balance of the Rhine, and which call upon the Contracting Parties to work in collaboration in order to meet the stated goals of the program. In addition, as required by the European Water Framework Directive, an Internationally Coordinated Management Plan for the International River Basin District of the Rhine (Part A) was released in December 2009. The report contains a discussion, as it pertains to the Rhine, of: (a) human activities and stresses; (b) a register of protection areas; (c) surveillance networks and results of surveillance programs; (d) environmental objectives and adjustments; (e) economic analysis; (f) summary of the program of measures; (g) a list of the program and management plans; (h) as well as other relevant items. There are also coordinated reports for the areas of operation in the Rhine international river basin district (the Alpenrhein/Bodensee, High Rhine, Upper Rhine, Neckar, Main, Middle Rhine, Mosel/Saar, Niederrhein, and the Delta Rhine), as well as national management plans for Switzerland, Liechtenstein, Austria, France, Germany (broken down by different regions in the country), Luxembourg, Belgium, and the Netherlands.[103]

10. Abidjan Convention

Under Article 22 of the Abidjan Convention, the Contracting Parties should transmit to the UNEP reports on the measures they adopted in implementing the Convention and its Protocol(s). In addition, each Contracting Party should also provide the UNEP, according to Articles 12 and 3 respectively, with information concerning pollution emergencies and any additional agreements entered into concerning the protection of the marine and coastal environment in the Convention area. The UNEP, as the Secretariat, will send these reports to the other Contracting Parties, as required by Article 16 of the Abidjan Convention. And according to Article 13, the Contracting Parties should develop procedures to share information regarding their environmental assessments of potentially harmful activity. Furthermore, as the Contracting Parties are meant to cooperate, according to Article 14 of the Abidjan Convention, in the fields of scientific research and development, monitoring, and assessments of pollution in the Convention area, the Contracting Parties should exchange with each other relevant data and other scientific information related to the Abidjan Convention and its Protocol(s). In addition, under Article 5 of the Protocol, each Contracting Party is also obligated to provide the Secretariat and the other Contracting Parties with

[103] ICPR – Management Plan, *available at* http://www.iksr.org/index.php?id=171&L=3 (last visited 21 Oct. 2010). The Internationally Coordinated Management Plan for the Rhine is available at: http://www.iksr.org/fileadmin/user_upload/Dokumente_en/Inventory_Parts/bwp_endversion-en_komplett.pdf.

information on its National Focal Point; its relevant laws, regulations, and other legal instruments; and its national marine emergency contingency plans. And as part of the revitalization program, the stakeholders requested that each National Focal Point provide the Secretariat with reports on its national coastal and marine environment and on the status of its implementation of the relevant Abidjan Convention work programs.[104] As part of the effort to revitalize the Abidjan Convention, one of the strategies is focused on enhancing the sharing among the Contracting Parties of reliable and up-to-date information, especially if the information could lead to a better understanding among the Contracting Parties of the benefits of the Abidjan Convention. The Abidjan Convention stakeholders recommended that the Contracting Parties adopt a specific information and data sharing policy to cover issues related to the sustainable development of the coastal and marine environment in the Convention area.[105] In addition, under the revitalization plan, the Contracting Parties asked the Secretariat to create a database and web-based information sharing system that would allow the Contracting Parties, as well as other stakeholders, to access information on the value and benefits of the Abidjan Convention.[106]

11. Lake Tanganyika

Article 19 directs the Contracting States to provide the public with "adequate information . . . concerning the state of the Lake Basin, planned development activities, measures taken or planned to be taken to prevent, control and reduce adverse impacts, and the effectiveness of those measures." For that purpose, the Contracting States are obligated to make information available concerning: water and environmental quality objectives; compliance with permits; notifications concerning proposed activities likely to have trans-boundary adverse impacts; and environmental impact assessment reports concerning such activities. Article 20 addresses information exchange between the Contracting States, directing them to exchange data and information concerning sustainable management of the Lake Basin and the implementation of the Convention. Contracting States are also directed to employ "best efforts" to provide data or information that is requested, but not readily available.[107] The Convention additionally obligates the Contracting States to report periodically to the Authority on certain measures relevant to the environmental management of the Lake Basin and the implementation of the Convention.[108] Article 21 specifies that the Convention shall not affect the established rights or obligations of Contracting States to protect personal information, intellectual property, and confidential information. It also directs the Contracting States to respect the confidentiality of confidential information they receive.

[104] 2008 Stakeholder Report, at 13.
[105] 2008 Stakeholders Report, at 14-15.
[106] 2008 Extraordinary Meeting Report, at 21.
[107] Convention, art. 20(2).
[108] Convention, art. 22.

12. Lake Victoria Basin Commission and Lake Victoria Fisheries Organization

Lake Victoria Basin Commission ("LVBC")

Article 24 of the LVBC Protocol discusses the exchange of data and information, mandating that the Member States, on a regular basis, "exchange readily available and relevant data and information on existing measures on the condition of the natural resources of the Basin." If one Member State receives a request from another Member State for information that is not readily available, that Member State is obligated to use its best efforts to fulfill the request, but may condition its compliance upon receiving payment from the requesting Member State to cover the reasonable costs of collecting and processing the relevant data. The Member States are also charged with facilitating collaboration in research and on the exchange of data, reports and information among stakeholders within the Member States. However, the exchange of information or data does not extend to information that is protected under the laws of the Member States or any international treaty to which a Member State is a party.[109] Additionally, one of the functions of the LVFC Secretariat is to establish a regional database and to promote the sharing of information and the development of information systems and data exchange.[110]

In terms of harmonization, Article 6(2) of the LVBC Protocol requires the Member States to take steps to harmonize their laws and policies through the institutional framework established under the LVBC Protocol. Accordingly, one of the functions of the LVBC listed under Article 33(3) is to harmonize the policies, laws, regulations and standards of all of the Member States. More specifically, Article 14 requires the Member States to harmonize their laws and regulations in order to conform to the guidelines formulated by the LVBC regarding environmental audits for operators of facilities within the Member States that are likely to have a significant impact on the environment; Article 16(2) requires the Member States to "adopt standardized equipment and methods of monitoring natural phenomena;" Article 25(1) requires the Member States to harmonize their water quality standards; and Article 29 calls for the harmonization of infrastructure and services within the Member States.

Lake Victoria Fisheries Organization ("LVFO")

Article II(2) of the LVFO Convention calls for the harmonization of national measures in order to promote the sustainable utilization of the living resources of Lake Victoria. However, the LVFO Convention specifies that it does not infringe upon each Member State's sovereign powers regarding any of the areas covered by the LVFO Convention, and that each Member State remains free to adopt national laws that are more stringent or extensive than those required to fulfill its

[109] LVFC Protocol, art. 24.
[110] LVFC Protocol, art. 42(c).

obligations to the LVFO.[111] Under Article XIII of the LVFO Convention, the Member State agreed to implement the decisions of the LVFO's governing bodies, in accordance with their respective constitution and national legal framework. The Member States also agreed to adopt laws and regulations prohibiting the introduction of non-indigenous species into Lake Victoria, other than in accordance with a decision by the Council of Ministers.

In terms of data sharing, each Member State is to provide the LVFO with access to "laws, regulations and all documents, data and reports pertaining to fish landings, stock assessments, living resources of Lake Victoria or any other matter which is the subject of resource management and utilization, and research" in furtherance of the objectives of the LVFO Convention.[112] Additionally, each Member State must transmit to the LVFO an annual statement of the measures it has taken to implement the decisions of the Council of Ministers.[113] Article XIV of the LVFO Convention requires the Member States, when a research program has been authorized by the LVFO, to grant access to the research teams to their national territories and territorial waters.

13. Niger Basin

The Convention charges the NBA with harmonizing and coordinating national policies to develop the resources of the Niger Basin, and requires it to maintain permanent contact with the Member States to inform them of development plans in the Basin. In turn, the Member States undertake to inform the Executive Secretary of proposed projects in the Basin and agree not to undertake projects on portions of the Niger River in their jurisdiction that are likely to pollute the waters or adversely affect the biological characteristics of the flora or fauna.[114] Outside the Convention framework, the NBA has established "national focal structures," or teams in each country, including a point of contact and various experts, to liaise and ensure proper communication between the Executive Secretariat and national governments.[115] The Water Charter provides for the exchange of information and obligates parties to consult and negotiate (if necessary) on the possible effects of planned measures. Member States are obligated to notify other Basin States (through the Executive Secretariat) prior to implementing measures that may have "significant adverse effects" on such states. The Executive Secretariat then refers the notification to the Permanent Technical Committee for an opinion. Notifying States must allow the Executive Secretariat a three month period to review and evaluate the planned measures (such period may be extended), and during this period must provide requested data and information and refrain from implementing the planned measures. In the event a Notified State or the Executive Secretariat considers that the proposed measures are likely to have a significant harmful impact, the parties are to enter into consultations and negotiations.[116]

[111] LVFO Convention, art. XIII(4).
[112] LVFO Convention, art. XIII(5).
[113] LVFO Convention, art. XIII(8).
[114] Convention, art. 4.
[115] Pieck, *West Africa Sets an Example*.
[116] Water Charter, arts. 19-20, 22.

14. Nubian Sandstone Aquifer System

Data is consolidated in the Nubian Aquifer Regional Information System ("NARIS")—which has the following functions: (a) stores and documents different data relating to the NSAS; (b) processes, analyzes and displays the data; (c) prepares input parameters for different models of the Aquifer and provides comparisons of the results; and (d) provides a link among the Member States to exchange information.[117] Additionally, the Member States have agreed to share information on yearly extractions, representative electrical conductivity measures, and water level measurements.[118]

15. North Western Sahara Aquifer System

The original UNEP project called for the establishment of a "consultation mechanism" for the NWSAS in order to ensure that, at the conclusion of GEF project funding, there would be continued management of the shared water resources. This led to the creation of an Observatory for the Aquifer-Basin, which is shared by the three Member States. The Observatory for the Aquifer-Basin is responsible for technical and scientific issues related to the management of the shared waters, information exchange and consultation, and joint elaboration of simulation models. The Observatory of the Aquifer-Basin is also charged with a number of additional tasks, including data collection and the publication of relevant documents that synthesize data analysis on the exploitation of water resources and its implications.[119]

16. Okavango River System

OKACOM is authorized to appoint consultants to assist in gathering and processing information concerning any matter on which it is tasked with advising the Member States. A Member State may request that OKACOM provide such advice in the form of a written report signed by the leaders of each Member State's delegation. Each Member State's delegation is then responsible for submitting such reports to its respective government.[120] During OKACOM's 16th Meeting, held in Gaborone, Botswana from 24-27 May 2010, OKACOM adopted a protocol to share information related to the Okavango River Basin.[121] This new protocol, the OKACOM Protocol on Hydrological Data Sharing for the Okavango River Basin ("Protocol"), is intended to help the three Member States better prepare themselves for extreme climatic events, such as floods and droughts.[122] The Protocol provides that the OBSC is the entity responsible for the implementation of the Protocol. But, under the Protocol, each Member State shall be responsible for the installation and the operation and maintenance of hydrometeorological stations in its territory.[123] The specific types of data required to be monitored pursuant to the Protocol include water levels, water discharge,

[117] Agreement #1.
[118] Agreement #2.
[119] GEF Project Brief, at 22.
[120] OKACOM Agreement, art. 5.
[121] *See* OKACOM Protocol on Hydrological Data Sharing for the Okavango River Basin ("Protocol"), 26 May 2010, *available at* http://www.icp-confluence-sadc.org/sites/default/files/OKACOM_Hydrological_Data_Sharing_ Protocol_English_C.pdf.
[122] OKACOM – News: 16th OKACOM Meeting, *available at* http://www.okacom.org/events.htm (last viewed 9 Nov. 2010).
[123] Protocol, arts. II, III, IV.

water quality, sediment transport and meteorological data.[124] More specifically, the Protocol also provides that the Member States shall share, on a daily basis, water level data collected from key hydrometric stations at the following sites: (a) in Angola, Menongue on the Cuebe, Mucundi on the Cubango and Cuito Cuanavale on the Cuito; (b) in Namibia, Rundu and Andara on the Kavango; and (c) in Botswana, Mohembo on the Okavango.[125] The Member States are also required to share, on a quarterly basis, discharge data from all stations, calculated using rating curves from the previous hydrological year. Water quality data is also to be shared on a quarterly basis, and on an *ad hoc* basis as requested by the Member States.[126] The Protocol specifies that the following parameters should be considered during an analysis of water quality: electrical conductivity, total dissolved solids, dissolved oxygen, pH, phosphates; nitrates, fecal coliforms (in inhabited zones), total hardness, temperature, turbidity, total suspended solids, and chlorophyll a. The Protocol requires that the sampling and analytical methods used to measure water quality be standardized among the Member States.[127] With respect to sediment transport data, the Protocol mandates that such data be shared on an annual basis among the Member States. The Protocol also requires that meteorological data, including rainfall, evaporation and temperature data, be shared on an *ad hoc* basis.[128] At the end of each hydrological year (defined in the Protocol as the period commencing each October 1 and ending each September 30), the Member States are given three months to prepare an annual hydrological report for such year, and the report is then distributed by OKASEC.[129] The Protocol also requires that early warning information with respect to important environmental indicators is shared among the Member States. OKACOM's Hydrological Task Force is required to provide OKASEC with "the best available information on floods, droughts and pollution magnitudes at different time and space scales." OKASEC is then required to channel such information to "decision making bodies and other public actors" in the Member States.[130]

17. Southern African Development Community

To achieve the objectives of the SADC Treaty, the SADC Treaty encourages, *inter alia*, the harmonization of political and socioeconomic policies of the Member States and the promotion of the coordination and harmonization of the international relations of the Member States.[131] Furthermore, the Member States have agreed to cooperate in numerous areas, including in regards to natural resources and the environment.[132] The objectives of the Watercourses Protocol include promoting the harmonization and monitoring of relevant legislation and policies concerning shared watercourses, as well as encouraging information exchange regarding shared watercourses management.[133] The Watercourses Protocol also obligates the Member States to undertake to

[124] Protocol, art. V.
[125] Protocol, art. VI.
[126] Protocol, arts. VII, VIII.
[127] Protocol, arts. IX, XII.
[128] Protocol, arts. X, XIII
[129] Protocol, arts. I, XV.
[130] Protocol, art. XIV.
[131] SADC Treaty, art. 5(2).
[132] SADC Treaty, art. 21.
[133] Watercourses Protocol, arts. 2, 4(2)(b)(ii).

harmonize their water uses in the shared watercourses and to observe the objectives of regional integration and harmonization of their socioeconomic policies. In addition, the Member States agreed to verify that all necessary interventions in the shared watercourses are consistent with the sustainable development of all of the Watercourse States. For planned measures that may have a significant adverse impact upon other Watercourse States, the relevant Member States must engage in consultations (and, if necessary, negotiations on the possible effects of the planned measures on the shared watercourse) and exchange certain technical data and information, including the results of any environmental impact assessment. In terms of data exchange, the Member States committed to exchanging available information and data concerning the hydrological, hydro-geological, water quality, meteorological and environmental condition of the shared watercourses in the SADC region.[134] Furthermore, the Shared Watercourse Institutions are obligated to provide, on a regular basis or as required by the Water Sector Co-ordinating Unit, all of the information needed to assess the progress on implementing the Watercourses Protocol.[135] Under the Protocol of Fisheries, the Member States agreed to exchange information needed to achieve the Protocol's objective of responsible and sustainable use of the aquatic resources and the aquatic ecosystems in the SADC region, as well as to cooperate in the exchange of information on the state of shared resources, levels of fishing effort, measures undertaken to monitor and control the exploitation of shared resources, any plans for new or expanded exploitation, and relevant research activities. Two or more Member States may collaborate to create mechanisms for cooperation and information sharing regarding shared resources. The Member States are also called upon to promote effective communication strategies with stakeholders in order to encourage the participative management of the aquatic resources and to publicize certain information, including the rationale and criteria behind decisions regarding total allowable catches, allocation of quotas, permits, licensing, and other rights to use the living aquatic resources.[136] In addition, Member States are called upon to harmonize their legislation concerning the management of shared resources. The Member States have also agreed to make illegal fishing and related activities by nationals an offense under their national laws and to establish region-wide comparable levels of penalties for illegal fishing by both non-SADC flag vessels and SADC flag vessels.[137] In 2005, the Governing Council decided to create a database of scientific organizations and individual scientists who work on fisheries, aquaculture, and other related activities in the region. The database is intended to promote the sharing of information between relevant organizations and scientists and individuals in the region. Currently, the database is limited to the Member States and their populations, but the goal is to eventually expand the database to a wider audience.[138] In addition, the Governing Council has approved

[134] Watercourses Protocol, arts. 3(1), 3(6), 4(1).
[135] Watercourses Protocol, art. 5(3)(c).
[136] Protocol on Fisheries, arts. 3, 7(3)-(4), 18.
[137] Protocol on Fisheries, arts. 8(1), 8(2), 8(4)(b).
[138] BOBP-IGO: Database, *available at* http://www.bobpigo.org/database.htm (last viewed on 5 Jan. 2011).

activities regarding capacity building related to fisheries data collection methodologies and stock assessment.[139]

18. Bay of Bengal

In 1995, the FAO developed a global Code of Conduct for Responsible Fisheries. Under the old FAO Bay of Bengal Program and continuing under the BOBP-IGO, the Code of Conduct was translated into the languages of Bay of Bengal basin countries (Bengali, Dhivehi, Sinhalese, Thai, Oriva, Tamil, Telugu, Gujarati, Hindi and Marathi) in order to better engage the fishing community in the region. The BOBP-IGO is continuing this effort to translate the Code of Conduct and its Technical Guidelines into additional regional languages. The BOBP-IGO also intends to promote the Code of Conduct and its Technical Guidelines though workshops, seminars, and regional training courses in Member States, as well as distributing booklets directly to local fisherman.[140] The regional training courses consist of theoretical sessions, field visits and interactions regarding the Code of Conduct and are targeted at mid-level and junior level fisheries officials in the Member States.[141] In addition, documents from the FAO's erstwhile Bay of Bengal Program are available online.[142]

19. Partnerships in Environmental Management for the Seas of East Asia ("PEMSEA")

One of the objectives of the Sustainable Development Strategy for the Seas of East Asia ("SDS-SEA") is to mobilize governments, civil society and the private sector to use innovative communication methods. To achieve this aim and to enhance the dissemination of data related to coastal and marine environmental and resource management, the SDS-SEA encourages the use of local, national and regional networks to distribute information, the creation of online resource centers, the establishment of a news monitoring and quick response systems, and the establishment of partnerships with international agencies in order to strengthen technical skills related to information sharing.[143] In addition, the Partnership Operating Arrangements call upon the Partners to "[s]trengthen communication and dialogue with each other regarding activities affecting the implementation of the SDS-SEA," and indicate that the Partners have the right "[t]o participate in PEMSEA's knowledge sharing network."[144] Additionally, the International Conference of the EAS Congress serves as a forum to "[f]acilitat[e] knowledge exchange, advocacy and multi-stakeholder participation, through sessions, workshops, side events and exhibitions, etc."[145]

[139] 2010 Governing Council Report, at 13.
[140] BOBP-IGO: Programs, *available at* http://www.bobpigo.org/programs.htm (last viewed on 5 Jan. 2011).
[141] BOBP-IGO: News & Events, *available at* http://www.bobpigo.org/news_events.htm (last viewed on 5 Jan. 2011).
[142] FAO Fisheries and Agriculture Department: BOBP – Bay of Bengal Programme, *available at* http://www.fao.org/fi/oldsite/eims_search/advanced_s_result.asp?progname=3&sortorder=3&form_c=AND&lang=en (last viewed on 5 Jan. 2011).
[143] SDS-SEA, at 91.
[144] Partnership Operating Arrangements, par. 9(c), 10(e).
[145] Partnership Operating Arrangements, par. 22(b).

20. South China Seas

UNCLOS obligates Member States to cooperate directly and through competent international organizations to exchange information and data acquired about pollution of the marine environment.[146] In addition, under the Declaration on the Conduct of the Parties in the South China Sea, the Parties agreed to share data on a voluntary basis. However, such data sharing is to begin "pending the peaceful settlement of territorial and jurisdictional disputes."[147] The ASEAN Declaration on the South China Sea simply states that the Parties shall resolve to explore the possibilities of cooperation in the South China Sea. It does, however, urge the Parties to apply the principles contained in the Treaty of Amity and Cooperation in Southeast Asia as the basis for establishing a code of international conduct over the South China Sea.[148] The Treaty of Amity and Cooperation in Southeast Asia states that the Contracting Parties shall "strive to achieve the closest cooperation on the widest scale and shall seek to provide assistance to one another in the form of training and research facilities in the social, cultural, technical, scientific and administrative fields."[149] The Treaty further states that the Contracting Parties shall "maintain regular contacts and consultations with one another on international and regional matters with a view to coordinating their views actions and policies."[150]

21. Western and Central Pacific Fisheries Commission (WCPFC)

Each CCM must submit an annual report containing certain statistical, biological and other data as required. Part 1 of the Annual Report, which is submitted to the SC, includes information for each CCM on: (a) fisheries information; (b) background (e.g., historical description of national fisheries) (c) flag state reporting that details the activities of national fleets, listed by gear types, in the Convention Area (including trends in each fishery related to changes in fishing patterns, fleet operations, target species, and size composition); (d) coastal state reporting that details activities by foreign and domestic fleets in waters under national jurisdiction (including trends in each fishery related to changes in fishing patterns, fleet operations, target species, and size composition); (e) socioeconomic factors; (f) disposal of catch (such as fresh or frozen) and market destination (export of import); (g) onshore developments (such as processing plants or support facilities); (h) prospects of the fishery (such as long-term viability and if the fisheries are expanding or contracting); (i) the status of tuna fishery data collection systems (including information on log sheet data collection and verification, the observer program, the port sampling program, and unloading and transshipment); and (j) research activities focused on both target and non-target species. For the fisheries information, each CCM is required to provide data for its national fleet in the Convention Area, including information on, among other requirements: annual catch and effort estimates, number of vessels, annual distribution of target species catch and effort, and estimated annual coverage of operational catch/effort, port sampling and observer data. This information must be

[146] UNCLOS, art. 200.
[147] 2002 ASEAN Declaration, Declaration 5.
[148] 1992 ASEAN Declaration, Declaration 4.
[149] Treaty of Amity, art. 8.
[150] Treaty of Amity, art. 9.

broken down by gear type (such as longline, purse seine, pole-and-line, troll, handline, ringnet, and driftnet).[151] In Part 2 of the Annual Report, which is submitted to the TCC, the CCMs report on their implementation of the CMMs, as well as monitoring and inspection activities, surveillance activities, investigations and prosecution activity, and other relevant information. Monitoring and inspection activities includes the vessel monitoring system, transshipments inspections, at-sea inspections, port inspections, observer monitoring, monitoring of trade and domestic distribution of highly migratory fish species, inspections of domestic-only vessels, and high seas boarding and inspection of flag vessels.[152] Part 1 Reports are posted on the WCPFC website, but Part 2 Reports are classified as confidential and only available to other CCMs.[153] Under Article 24, each CCM must produce a Record of Fishing Vessels that are entitled to fly its flag and are authorized to fish, beyond the areas of national jurisdiction, in the Convention Area and submit it to the Commission.[154] The Commission has established a Vessel Monitoring System ("VMS") that requires each vessel that fishes in certain parts of the high seas in the Convention Area (south of 20°N and above 20°N, east of 175°E) to use near real-time satellite position-fixing transmitters (i.e., a mobile transceiver unit/automatic location communicator ("MTU/ALC")) in order to track the positions and movements of fishing vessels. If a vessel is initially fishing in the covered area but then moves north of 20°N and west of 175°E, it still needs to keep its MTU/ALC activated. Generally, vessels report their position to the Commission automatically. Automated alerts have also been established to alert the Commission when vessels enter or exit the high seas of the Convention Area. If a vessel is fishing in waters under the national jurisdiction of another member of the Commission (besides it flag state), it must comply with the requirements of that coastal state in regards to the use of near real-time satellite position-fixing transmitters. The Commission enacted security measures to protect access to the data. The flag states are obligated to ensure that their fishing vessels comply with the VMS requirements. The FFA also has a VMS program, and fishing vessels on the high seas have the option of reporting data to the Commission through the FFA's VMS. In addition, any CCM can request that the waters under its national jurisdiction be included in the Commission's VMS (with New Zealand being the first county to sign up for this option).[155] The WCPFC has entered into a Data Exchange Agreements with the SPC in regards to aggregated catch and effort data and with the IATTC in regarding to operational-level tuna fisheries data (such as catch and effort, observer, unloading, transshipment and port inspection data), aggregated catch and effort data, and other relevant monitoring, control, surveillance, inspection

[151] Annual Report to the Commission – Part 1: Information on Fisheries, Research and Statistics, Aug. 2008, *available at* http://www.wcpfc.int/node/604; Convention, art. 23.
[152] Western and Central Pacific Fisheries Commission - Revised Template for the Annual Report (Part 2), Dec. 2009, *available at* http://www.wcpfc.int/doc/commission-08/revised-template-annual-report-part-2; Convention, art. 23.
[153] Summary of Annual Reports (Part 1 and 2) to the Commission, 16 Nov. 2009, *available at* http://www.wcpfc.int/doc/wcpfc6-2009ip03/summary-annual-reports-part-1-and-2-commission.
[154] WCPFC Intranet: RFV Vessels, *available at* http://intra.wcpfc.int/Lists/Vessels/Stats.aspx (last viewed on 3 Nov. 2010).
[155] Commission Vessel Monitoring System, CMM 2007-02, Dec. 2007, *available at* http://www.wcpfc.int/doc/cmm-2007-02/commission-vessel-monitoring-system; Commission VMS Standard Operating Procedures (SOPs), 19 Feb. 2010, *available at* http://www.wcpfc.int/doc/commission-vms-standard-operating-procedures; Convention, art. 24 (8)-(10); WCPFC Quarterly Reports – First Quarter 2010, 9 Apr. 2010, *available at* http://www.wcpfc.int/doc/ wcpfc-2010-qtr-01/1st-quarter-2010.

and enforcement data.[156] The Commission has also adopted rules governing the protection and dissemination of data that is compiled by the WCPFC.[157]

22. The Mekong

The Mekong River originates high on the Tibetan Plateau, and makes it way through six countries: China (Tibet), Myanmar (Burma), Laos, Thailand, Cambodia, and Vietnam, before reaching the South China Sea. At 4,800 kilometres (2,976 miles), the Mekong River usually ranks twelfth in the world in terms of length, and eighth in terms of average annual runoff. The flow in the Mekong varies with the tropical monsoon climate. The flows begin to increase at the onset of the wet season in May, peaking in August or September, and decreasing rapidly until December. The flows recede slowly during the annual dry period from December to their lowest levels in April. An enormous volume of water flows through the Mekong Basin in the wet season resulting in extensive flooding. The floodwaters support a productive and diverse freshwater ecosystem, but also result in loss of human life and damage to crops and structures. During the dry season, a dramatic reduction of flow leads to water shortages for domestic and agricultural use, and limiting navigation. The coastal plain of the delta constantly suffers from an intrusion of seawater.

The Mekong Basin's water resources have the ability to support economic growth through irrigation, hydropower, navigation, water supply and tourism. Equitable sharing of the water resources and sustainable development of the natural resources in the Basin becomes most critical during the dry season. Laos relies heavily on river transport, and the reduction of dry season flows could adversely affect navigation. Cambodia has the long-term potential for increasing its irrigated agriculture. Over the decades, Vietnam and Thailand have developed extensive irrigation systems that currently face dry season water constraints. Vietnam makes use of dry season flows for seawater repulsion and for irrigation. Thailand has recently been studying options for diverting water from the Mekong, and for inter-basin diversion from Thai tributaries to the Mekong. Hydropower development in the Mekong Basin has also been gaining momentum in China and Laos. Currently, there are only 500 MW of installed capacity in the Lower Mekong and 1500 MW along the Chinese portion of the River. China is constructing several hydropower projects on the Mekong River. Laos has plans to construct a number of medium sized hydropower projects on Lao tributaries to the Mekong. Both China and Laos would like to export power to Thailand. Options for creating a regional power grid are under study.

[156] Data Exchange Agreement Between the Western and Central Pacific Fisheries Commission and The Secretariat of the Pacific Community, 27 Aug. 2009, *available at* http://www.wcpfc.int/doc/wcpfc-spc-ofp-data-exchange-agreement; Memorandum of Cooperation on the Exchange and Release of Data between the Commission for the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean and the Inter-American Tropical Tuna Commission, 11 Dec. 2009, *available at* http://www.wcpfc.int/node/2684.

[157] Rules and Procedures for the Protection, Access to, and Dissemination of Data Compiled by the Commission, Dec. 2007, *available at* http://www.wcpfc.int/doc/data-02/rules-and-procedures-protection-access-and-dissemination-data-compiled-commission-revise.

Key to reaching an overall framework agreement in 1995 was the need to find acceptable language that provided both a sense of good faith and cooperation, and the assurances that no party would be disadvantaged under its provisions in light of the doctrine of sovereign equality. Efforts to promote sustainable water management in the Mekong River Basin and protection for the environment, aquatic life and the ecological balance of the basin subsequently received a major boost in the form of an $11 million influx of funding from the Global Environment Facility. The Water Utilization Project (WUP) funded by the grant supported the MRC in developing an integrated and comprehensive Basin hydrologic modelling package, and a functional and integrated knowledge base on water and related resources, and using these tools to establish "Rules," one of five major goals. The first Rule developed using an "interest based" negotiation approach were the "Procedures for Data and Information Exchange and Sharing" dated 01 November 2001. The approach taken was essentially to establish a framework agreement and a committee and then leave implementation to the committee.

23. The Columbia

The Columbia River is one of a number of key international watercourses shared by Canada and the United States where Canada is generally the upstream watercourse state and the US is generally the downstream watercourse state. Stretching 1952 kilometres, the Columbia River is the fourth largest river in North America and the Columbia River basin covers 640 000 square kilometres of territory in Canada and the US. In recognition of the importance of cooperating with regard to their many shared water resources, Canada and the US concluded an agreement in 1909, known as the *Boundary Waters Treaty*, which, among other things, established an entity called the International Joint Commission ('IJC') to govern their relations. The subsequent *Columbia River Treaty* between Canada and the US explicitly recognized that the construction and operation of three treaty projects in Canada would increase both the useable energy and dependable capacity of power plants in the US, as well as provide irrigation and flood control benefits in the US, all of which would not be possible at the same cost without the three treaty projects in Canada. In return for building the three *Columbia River Treaty* projects in Canada, the Treaty specifically entitled Canada to a lump sum payment for various downstream (flood control) benefits, as well as one half of the additional power generated by power plants in the US that resulted from storage across the border in Canada.

Much of the data sharing under the Columbia River Treaty is performed by the Permanent Engineering Board.[158] The Columbia River Treaty established the Permanent Engineering Board, consisting of four members—two appointed by the United States and two appointed by Canada. The Permanent Engineering Board is tasked with the following duties:

- Assemble records of the flows of the Columbia River and the Kootenay River at the Canada-United States boundary;

[158] Columbia River Treaty, art. XV.

- Report to the United States and Canada whenever there is substantial deviation from the hydroelectric and flood control operating plans and, if appropriate, include in the report recommendations for remedial action and compensatory adjustments;
- Assist in reconciling differences concerning technical or operational matters that may arise between the U.S. and Canadian Entities;
- Make periodic inspections and require reports from the U.S. and Canadian Entities in order to ensure that the objectives of the Columbia River Treaty are being met;
- Make reports, at least once a year, to the United States and Canada of the results being achieved under the Columbia River Treaty and make special reports concerning any matter which it considers should be brought to the countries' attention; and
- Investigate and report with respect to any other matter that comes within the scope of the Columbia River Treaty, at the request of either the United States or Canada.[159]

The Permanent Engineering Board must comply with directions relating to its administration and procedures that are agreed upon by the United States and Canada.

The key subsidiary agreement to the Treaty governing data and information and exchange is entitled: "Terms of Reference for the Columbia River Treaty Hydrometeorological Committee" is dated 20 May 1968.[160] The approach taken was essentially to establish a framework agreement and a committee and then leave implementation to the committee.

24. Africa

Africa in particular is a region of international drainage basins. With the exception of island states, every African country has territory in at least one transboundary river basin, and transboundary river basins cover 62% of Africa's total land area. [161] A number of possible lessons learned from recent African experience in the realm of data and information sharing and exchange include:

1. Responsibilities for data collection and analysis for transboundary water resources management in Africa are typically divided up among different levels of government. As a result of this, a division of labour between the member countries responsible for collecting and analyzing data in their own territories and an international commission responsible for setting standards and responsible for coordinated basin wide analysis probably offers the best prospects of success.
2. The methods used to collect data in different African countries do not always appear to be in line with international standards and this often means that the information derived from these data cannot be directly compared with data from neighbouring countries.
3. In supporting transboundary water resources management in Africa, the transaction costs involved in information transmission should be carefully considered. The widespread "what we

[159] See U.S. Army Corps of Engineers Columbia Basin Water Management, *Permanent Engineering Board, Columbia River Treaty* as found at http://www.nwd-wc.usace.army.mil/PB/PEB_08/peb.htm
[160] See Appendix B Terms of Reference for the CRTHMC as found at http://www.nwd-wc.usace.army.mil/PB/PEB_08/docs/Entity/01HydroMetAnnRep.pdf

[161] Cooperation on Africa's International Water Bodies: Information Needs and the Role of Information-sharing by Malte Grossmann (part of a study by the German Development Institute) and Transboundary Water Law in Africa: Development, Nature and Geography by Jonathon Lautze and Mark Giordano in 45 Nat. Resources J. 1053, 2005. The former article explores the instruments that basin organizations in Africa have assumed to facilitate the transmission of information. The former article concludes with lessons to be drawn for development cooperation. The latter article focuses more on documenting and analyzing a large body of transboundary water agreements relating to Africa with a view towards providing guidance for future institutional development.

need is more data" paradigm must give way to efforts to specify the information required to make management decisions.

4. Synergies with other information-generating initiatives should be sought. Close coordination with other national or international initiatives is a good way to make optimal use of synergies. Targeted co-financing of relevant programs is a good way to harness synergy potentials.
5. There is an important lesson to be learned regarding the play of tensions between various requirements concerning the level of public accessibility of information for IWRM. The principles of best IWRM practices are grounded on transparent mechanisms for the allocation, protection, and basic supply of scarce water resources and these mechanisms are best ensured by clear-cut institutional arrangements designed to set the stage for planning and management at the lowest possible level and with the participation of all stakeholders. Participation requires public accessibility of information. Publication of information may prove beneficial to the political and civil society discourse on possible riparian cooperation. On the other hand transboundary water resources management is for the most part a governmental task with political accountability. If riparian states withhold information for strategic reasons, creation of a shared information base (i.e. one that is not public but accessible only to the parties) may constitute an important trust-building measure for initiating transboundary negotiations.
6. Any successful information and decision support system should probably be perceived as "owned" by the riparian countries concerned.
7. It is essential to ensure that both the database and the methods used for calculation of data and information for IWRM are transparent and inspire confidence. This requires that all riparian states concerned are involved "at eye level" in the specification and development of the models. There should also be consensus on assumptions, methods, and technical descriptions, and these must be accessible to all users and decision-makers.
8. It is essential to ensure that the set of instruments used to collect data and information will be maintained and developed over the long term. This means that due consideration must be given to the institutional, financial, and technical aspects.

Table 2 below summarizes examples of international agreements and/or arrangements on data and/or information sharing in selected international waters situations.

Table 2: Summary of transboundary international waters agreements on data/information sharing

Region/River Basin and/or Countries	Procedure/agreement for data/information sharing	Remarks
Orange-Senqu River Commission; Countries: Botswana, Lesotho, Namibia, and South Africa	An Orange-Senqu agreement that provides for the development of a database and a provisional integrated water resources management plan has been signed by the countries.	Data-sharing and joint hydrological analyses are conducted regularly among the countries; the data collected by South Africa are regularly shared with its neighbours. Namibia provides runoff data and information on present and anticipated water demand. Lesotho also provides runoff and precipitation data. South Africa has funded measuring weirs in Lesotho to calibrate the data. *This information-sharing has led to a high level of conformity in assessments of the region's water yield*
Nubian Sandstone Aquifer System Countries: Chad, Egypt, Libya, and Sudan	Agreement on Monitoring and Exchange of Groundwater Information of the Nubian Sandstone Aquifer System Signed 3 – 4 October 2000	According to the agreement, member states share information through the Nubian Aquifer Regional Information System (NARIS). The agreements includes the information to be shared: Annual extractions, specifying the geographical location and number of wells and springs Annual electrical conductivity measurements, followed by chemical analysis if drastic changes in salinity are observed Water level measurements taken twice a year The information compiled in the NARIS is used to run aquifer development scenarios using the aquifer model developed for the NSAS. The data are stored on a server operated by the Centre for Environment and Development for the Arab Region and Europe (CEDARE) in Egypt.
Senegal River (Organization for the Development of the Senegal River, OMVS)	Agreements have been concluded between relevant (national) organizations and the OMVS with a view to defining the role and the responsibilities of the individual organizations involved (collection, processing, and storage of data) and the OMVS (preparation, dissemination, and exchange of information).	The OMVS is an example for cooperation with a strong international competence center in charge of organizing cooperation with national authorities.

Region/River Basin and/or Countries	Procedure/agreement for data/information sharing	Remarks
Countries: Mali, Senegal, Guinea, Mauritania		The OMVS is responsible for the operational regulation of jointly run infrastructure, and as such it also operates hydrological measuring networks.
The Mekong Countries: Lao PDR, Thailand, Vietnam, Cambodia; China PR and Myanmar (Burma) are not members	Sharing and exchange of data/information subject to the provisions of the 'Procedures for Data and Information exchange and sharing"	Agreement defines types of data/information The Mekong River Commission (MRC) secretariat is designated as the custodian of the data/information (creates and maintains the MRC-Information System MRC Joint Committee oversees the effective implementation of the agreement.
Columbia River Countries: Canada and USA	A subsidiary agreement to the Columbia River Treaty governs data/information exchange. The agreement is entitled: "Terms of Reference for the Columbia River Treaty Hydrometeorological Committee"; dated 20 May 1968.	Scope covers, among others, exchange of available hydrometeorological data/information; recommend establishment of additional gauging stations.
Orange-Senqu River Commission; Botswana, Lesotho, Namibia, and South Africa	An Orange-Senqu agreement that provides for the development of a database and a provisional integrated water resources management plan.	Data-sharing and joint hydrological analyses are conducted regularly among the countries; the data collected by South Africa are regularly shared with its neighbours. Namibia provides runoff data and information on present and anticipated water demand. Lesotho also provides runoff and precipitation data. South Africa has funded measuring weirs in Lesotho to calibrate the data. This information-sharing has led to a high level of conformity in assessments of the region's water yield.

Ideal Scope of a Model Data and Information Sharing and Exchange Agreement for International Waters

1. Types of data and information: Transboundary water resources management, which is based on principles of IWRM, usually requires interventions to integrate socio-economic, environmental and technical/engineering issues and, hence, requires broader types of data and information requirements spanning a potentially wide spectrum of thematic categories.
2. Custodianship of Data/Information: the data/information that are being compiled from various sources for the planning/implementation of various current and possible future projects/programs can be systematically archived and made available for use by countries in their cooperative management. This may require a central database of 'mutually agreed' data/information, which is maintained and managed by an appropriately mandated institution, which becomes the custodian of the database.
3. Access to 'third parties': an important question to be addressed by any agreement regarding data and information sharing and exchange refers to provision of access to potential users other than governments of the riparian states entering into the agreement. Should the agreement limit its scope to governing exchange/sharing of data/information among the riparian states only? Or should it also deal with the question under what circumstances and modalities access to data/information be granted to 'third parties', which may include academic/research institutions, NGOs, UN agencies, private institutions?
4. Finance and costs: What are the circumstances under which data and information should be paid for and by whom? A good starting point could be the cooperative framework agreement that is being negotiated, whereby exchange of readily available data would apparently proceed at no cost to the requesting riparian state. The challenge here is that it may be difficult to reach consensus on what is meant by the term "readily available." Depending upon whether 'third' party access is provided for, the agreement should probably also have provisions on how access is granted to such 'outside' users.
5. Data standards and compliance: this refers to the various standards that are potentially relevant in handling data/information sets included in the agreement. While the agreement may not deal with specific details of what standards are to be used, it should probably clarify how these Standards are to be set and who shall be responsible for quality assurance of the data/information, for standardizing data formats and similar issues.
6. Implementation arrangements: while the issue of managing and maintaining the 'mutually agreed' data/information is largely addressed under 'custodianship' discussed above, the agreement needs to address the issue of how the agreement is to be implemented. Important relevant issues probably include, monitoring, verification, compliance and dispute resolution.
7. Adaptivity: How can the agreement be "adaptive" with regard to emerging technologies? There are many examples of how flexibility and adaptability has been built into agreements.
8. Sustainability: How can "sustainability" including financial sustainability of the agreement be ensured? What is the fuel that will keep it running and maintain the parties' interests in continuing to implement it, and indeed modify and enhance it? This needs to be achieved by ensuring that the agreement adequately addresses the fundamental incentives of the parties.

3.3 Dispute Resolution[162]

The term "good governance" is being increasingly used in development literature. This section critically reviews one key element of good governance (dispute resolution) in an international waters context where governance is defined as the process of decision-making and the process by which decisions are implemented (or not implemented).[163]

Some of the oldest civilizations have been sharing international waters for thousands of years. The oldest treaty governing shared water resources dates back to 2500 BC between the city states of Lagash and Umma on the Tigris River.[164] In modern times, cooperative governance arrangements are usually governed by treaties governed by international law.[165] Hundreds of such treaties have entered into force since 1948. Notwithstanding the premium value placed on international waters and the potential for conflicting demands within and between sovereign States, particularly in water scarce regions, a recent study concluded that cooperative interactions outnumber conflict by at least 2 to 1.[166]

Regrettably, sovereign states do not always have the confidence that commitments will be maintained and joint or coordinated investments will be safe.[167] As a result, many transboundary international water agreements do not deliver on the enormous potential gains

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[162] This section is based on materials researched and prepared by Alex Grzybowski and by Lauren Mandell and Andrea Menaker of the international law firm White & Case for a colloquium in Almaty, Kazakhstan, in December 2010, organized by the United Nations Regional Centre for Preventive Diplomacy for Central Asia. Please see also: Malintoppi, Loretta (2006), "Methods Of Dispute Resolution In Inter-State Litigation: When States Go To Arbitration Rather Than Adjudication" in *The Law and Practice of International Courts and Tribunals* 5:133-162, Koninklijke Brill NV, The Netherlands, and please see Paisley, Richard Kyle (2008), *International Watercourses/River Basins Including Law, Negotiation, Conflict Resolution and Simulation Training Exercises*, FAOWATER, United Nations Food and Agriculture Organization (FAO), Rome. The authors also gratefully acknowledge the support and encouragement of a wide range of individuals and institutions who have helped sustain this research through a GEF (Global Environment Facility) project entitled "Good Practices and Portfolio Learning in GEF Transboundary Freshwater and Marine Legal and Institutional Frameworks." This three-year multi donor project is dedicated to facilitating good governance and more effective decision making in international waters through the identification, collection, adaptation and replication of beneficial practices and lessons learned from international experiences.

[163] According to UNESCAP good governance has at least 8 major characteristics. Those characteristics include: participatory, consensus oriented, accountable, transparent, responsive, effective and efficient, equitable and inclusive and follow the rule of law. See: http://www.unescap.org/pdd/prs/ProjectActivities/Ongoing/gg/governance.asp

[164] Wolf, Aaron ed. (2001). *Conflict Prevention and Resolution in Water Systems,* Edward Elgar, Cheltenham, UK, and see also: Paisley, Richard Kyle (2002). *Adversaries into Partners: International Water Law and Down Stream Benefits*, Melbourne Journal of International Law, 3 (2) 280.

[165] See Paisley, Richard Kyle (2008), *International Watercourses/River Basins Including Law, Negotiation, Conflict Resolution and Simulation Training Exercises*, FAOWATER, United Nations Food and Agriculture Organization (FAO), Rome.

[166] Malintoppi, Loretta (2006), "Methods Of Dispute Resolution In Inter-State Litigation: When States Go To Arbitration Rather Than Adjudication" in *The Law and Practice of International Courts and Tribunals* 5:133-162, Koninklijke Brill NV, The Netherlands.

[167] Malintoppi, Loretta (2006), "Methods Of Dispute Resolution In Inter-State Litigation: When States Go To Arbitration Rather Than Adjudication" in *The Law and Practice of International Courts and Tribunals* 5:133-162, Koninklijke Brill NV, The Netherlands.

that can be achieved through cooperation - they simply restate principles of customary international law in a regional context or articulate commitments that are not fully fulfilled.[168] One key element that is needed appears to be an effective dispute resolution mechanism. Such mechanisms not only increase the confidence that commitments will be fulfilled but also provide a more secure foundation for consideration and development of more substantial commitments.

Designing an Effective Dispute Resolution Mechanism[169]

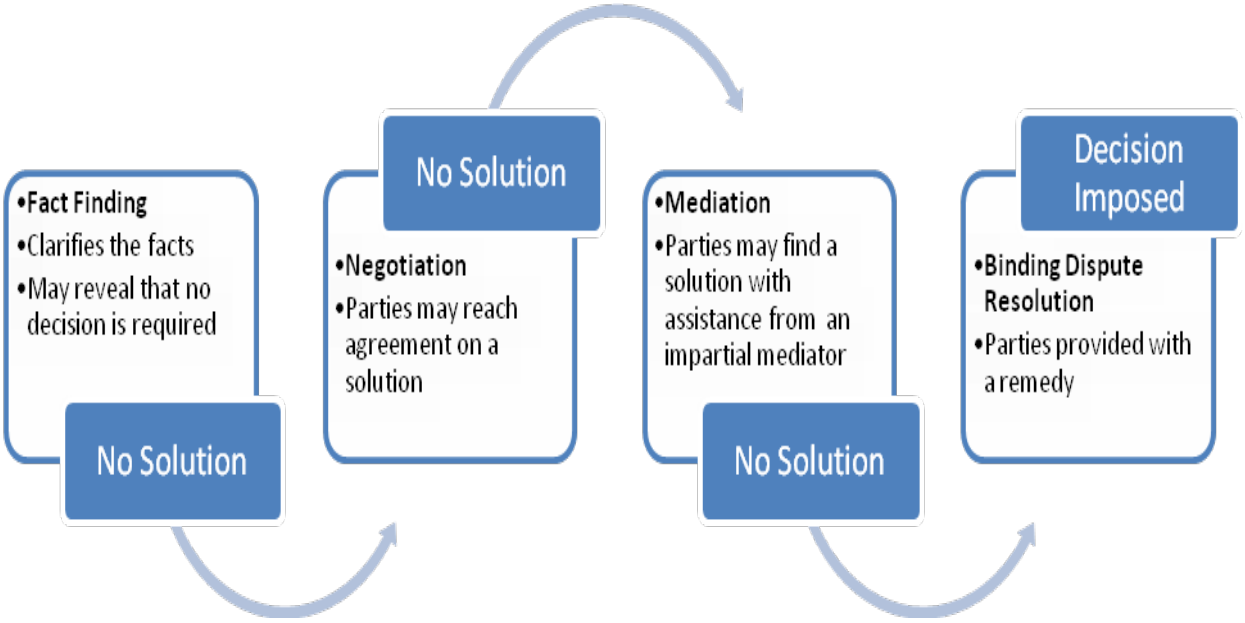
Systematic and effective dispute resolution mechanisms in international waters agreements fulfil a number of key objectives including the fact that they can:

- Reinforce proactive problem solving and dispute prevention;
- Deliver a remedy based on the facts;
- Resolve disputes and utilize the human and financial resources of basin states as efficiently as possible;
- Reduce the risks associated with cooperative management and investment and expand the potential for mutual gain.

Dispute resolution mechanisms in international waters agreements are best structured as a sequence of progressively more intensive steps or elements, each of which contributes to achieving these underlying objectives: procedures to clarify the facts; negotiation; mediation; and binding dispute resolution (including binding arbitration and adjudication). These elements are mutually reinforcing. Clarification of the facts is needed to determine the scope of the actual dispute, which is essential to negotiation, mediation, and binding dispute resolution, and separates misunderstanding and rumour from the realities of the situation. The prospect of binding dispute resolution and mediation reinforces the incentive to negotiate a solution. Both negotiation and mediation provide the disputing parties with the opportunity to design a solution that optimizes their interests rather than having a solution imposed through binding dispute resolution. Binding dispute resolution provides a guarantee to all parties that there will be a resolution to a dispute.

[168] Grzybowski, Alex, Stephen C. McCaffrey, & Richard K. Paisley (2010). *Beyond International Water Law: Successfully Negotiating Mutual Gains Agreements For International Watercourses*, Pac. McGeorge Global Bus. & Dev. L.J. 139.
[169] I Grzybowski, Alex, Stephen C. McCaffrey, & Richard K. Paisley (2010). *Beyond International Water Law: Successfully Negotiating Mutual Gains Agreements For International Watercourses*, Pac. McGeorge Global Bus. & Dev. L.J. 139.

Figure 1. Dispute Resolution Sequence[170]



Each of the elements outlined above contributes to resolving disputes in a different manner.[171] When they are combined in a systematic manner, the weaknesses of the individual elements are addressed and the strengths are combined to create an effective dispute resolution mechanism.

Fact Finding

Fact finding procedures are a well-known step in dispute resolution mechanisms for international waters agreements. For example, the 1997 UN Watercourses Convention includes a binding commitment to establish a Fact Finding Commission to investigate a dispute between parties to the Convention.[172] In the event that the parties to the dispute disagree on the composition of a Fact Commission, the Secretary General of the United Nations is empowered to decide on the composition of the Commission. Prior to agreeing on the Columbia River Treaty, Canada and the US were in conflict over the construction of infrastructure on the Columbia River.[173] The International Joint Commission (established to resolve boundary water disputes) undertook a fact finding initiative which was instrumental to the negotiation of the Columbia River Treaty.

[170] Adapted from materials presented by Alex Grzybowski at a colloquium in Almaty, Kazakhstan, in December 2010, organized by the United Nations Regional Centre for Preventative Diplomacy in Central Asia.

[171] See Grzybowski, *supra* note 169.

[172] United Nations (2005). *Convention on the Law of the Non-navigational Uses of International Watercourses 1997* as found at http://untreaty.un.org/ilc/texts/instruments/english/conventions/8_3_1997.pdf

[173] Paisley, Richard Kyle, Cuauhtémoc León, Boris Graizbord and Eugene Bricklemyer, Jr. (2004). *Transboundary Water Management: An Institutional Comparison among Canada, the United States and Mexico*, 9 (2) Ocean and Coastal Law Journal (University of Maine School of Law) 177.

Negotiation[174]

Negotiation is the most common provision in a dispute resolution mechanism in an international waters context. It commits the parties to attempt to resolve disputes by agreement. Alone a commitment to negotiation does not provide any certainty to the parties that disputes will be resolved because in the absence of agreement there is no resolution imposed and the dispute will persist. When this occurs it undermines the confidence of the parties and may cause them to withdraw their commitments, undermining the agreement as a whole. Negotiation is the primary vehicle that is used to develop international water agreements at the outset and to make decisions regarding implementation of these agreements. The agreements for the Aral Sea basin and the Syr Darya and Amu Darya have all been developed through negotiation, as was the Columbia River Treaty. A key difference among these agreements is the nature of the dispute resolution provisions in the agreements. The Central Asia Agreements include a commitment to negotiate resolutions to disputes with voluntary reference to arbitration in at least one agreement. The Columbia River Treaty includes a dispute resolution provision that culminates in binding arbitration that can be triggered by either party.

Mediation[175]

Mediation is negotiation that is assisted by an impartial individual or organization that assists the parties in reaching an agreement. Mediators are not empowered to resolve the dispute. By working with the parties independently and together, mediators are able to help the parties identify and evaluate potential solutions. Where parties have difficulty working together, or they need to be able to develop and explore potential solutions, mediators may propose ideas for consideration. These proposals may be presented to the parties collectively or mediators may shuttle proposals and counter proposals between parties. Mediation is often included as an optional step in dispute resolution provisions in international water agreements, and it has been instrumental in the development of a number of challenging agreements such as the Indus Treaty between Pakistan and India,[176] and the 1995 Mekong Agreement between the lower four Mekong States.[177] As with negotiation, the mere fact of mediation does not guarantee an outcome for the parties as the parties must agree on the solution for mediation to deliver.

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[174] See Paisley, Richard Kyle (2008), *International Watercourses/River Basins Including Law, Negotiation, Conflict Resolution and Simulation Training Exercises*, FAOWATER, United Nations Food and Agriculture Organization (FAO), Rome.

[175] See Paisley, Richard Kyle (2008), *International Watercourses/River Basins Including Law, Negotiation, Conflict Resolution and Simulation Training Exercises*, FAOWATER, United Nations Food and Agriculture Organization (FAO), Rome.

[176] The Indus Water Treaty as found at http://siteresources.worldbank.org/INTSOUTHASIA/Resources/223497-1105737253588/IndusWatersTreaty1960.pdf

[177] The Mekong River Commission, *1995 Mekong River Agreement and Procedural Rules as found at http://www.mrcmekong.org/download/agreement95/agreement_procedure.pdf*

Binding dispute resolution[178]

Binding dispute resolution is the final stage in the process of dispute resolution. By agreement of the parties, a single decision-maker or a panel of decision-makers hears the parties' arguments, reviews evidence, and issues a binding decision which may not be appealed. There are three primary types of binding dispute resolution mechanisms for resolving State-to-State disputes: (1) international courts, such as the International Court of Justice ("IJC"); (2) standing regional courts and tribunals, such as the Southern African Development Community Tribunal ("SADCT"); and (3) ad hoc arbitration, such as arbitrations administered by the Permanent Court of Arbitration ("PCA").[179] Each of these mechanisms has advantages and disadvantages depending on the nature of the dispute and the parties' interests. For example, one mechanism may promise a speedy resolution of the dispute, but may be costly to administer; another mechanism may allow the parties to choose the decision-makers, but may be less predictable and consistent. But all three mechanisms have been used to resolve territorial and water disputes. In 2010, for instance, the IJC rendered a decision in a high-profile dispute between Argentina and Uruguay over Uruguay's construction of industrial facilities on the banks of a river shared by the two States.[180] The Court's decision, holding that the construction did not violate an 1858 Treaty between the States, has been well-received by the States and the international community.

Enforcement[181]

The outcomes of negotiation, mediation and binding dispute resolution need to be implemented if the parties are to have any confidence in the dispute resolution mechanism. What assures implementation? This varies depending on the means used to resolve the dispute. The underlying guarantees of implementation are the prospect of binding dispute resolution and withdrawal of the benefits associated with the cooperation.

Where states are committed to binding dispute resolution, they are obligated under customary international law to comply with the decision. States, nonetheless, may wish to choose a binding dispute resolution mechanism that offers additional incentives for compliance and/or penalties for non-compliance. At the ICJ, parties have a right to bring an

[178] See Paisley, Richard Kyle (2008), *International Watercourses/River Basins Including Law, Negotiation, Conflict Resolution and Simulation Training Exercises*, FAOWATER, United Nations Food and Agriculture Organization (FAO), Rome.

[179] See Malintoppi, Loretta (2006), "Methods Of Dispute Resolution In Inter-State Litigation: When States Go To Arbitration Rather Than Adjudication" in *The Law and Practice of International Courts and Tribunals* 5:133-162, Koninklijke Brill NV, The Netherlands.

[180] See International Court of Justice, *Pulp Mills on the River Uruguay (Argentina v. Uruguay)* as found at http://www.icj-cij.org/docket/index.php?p1=3&p2=3&case=135

[181] ECE/UNEP Network of Expert on Public Participation and Compliance (2000). *Water management: Convention on Protection and Use of Transboundary Watercourses and International Lakes: Guidance on public participation and compliance with Agreements*, Geneva, Switzerland.

enforcement issue to the UN Security Council.[182] At the regional and ad hoc level, some states have agreed to give the United Nations ("UN") or other neutral third parties a role in enforcement, and others have created more novel tools. For example, some states have required the parties in an arbitration to contribute funds to a security account that will be used to pay a judgment rendered by the tribunal. The Iran-US Claims Tribunal is one such example.[183] Some states also have tied the benefits of regional associations to which the states belong, to compliance with decisions. In the Southern African Development Community ("SADC"), for example, a failure to comply with a tribunal decision will be referred to the policy-making arm of the Community, which may choose to suspend or withdraw the benefits of the delinquent state, including benefits related to regional trade and investment.[184] The 1992 Agreement between Central Asian States included article 12 which made reference to developing economic measures for violations against the agreed water regime and limits of use.[185]

Fact finding, negotiation, mediation and binding dispute resolution can also be combined to create powerful dispute resolution mechanisms that will strengthen international waters governance agreements.[186] In addition, the prospect of such mechanisms provides the confidence that parties need in order to seriously consider more substantial commitments and cooperative development initiatives that can yield the potential benefits of cooperation on international waters governance.

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[182] See Paisley, Richard Kyle, Cuauhtémoc León, Boris Graizbord and Eugene Bricklemyer, Jr. (2004). *Transboundary Water Management: An Institutional Comparison among Canada, the United States and Mexico*, 9 (2) Ocean and Coastal Law Journal (University of Maine School of Law) 177.

[183] See Iran-US Claims Tribunal as found at http://*www.iusct.org/*

[184] See The Treaty Of The Southern African Development Community as found at http://www.sadc.int/index/browse/page/120

[185] See *Agreement between the Republic of Kazakhstan, the Republic of Kirgyzstan, the Republic of Uzbekistan, and the Republic of Tajikistan and Turkmenistan on the Cooperation in the Field of Joint Water Resources Management and Conservation of Interstate Resources,* as found at http://www.ce.utexas.edu/prof/mckinney/papers/aral/agreements/ICWC-Feb18-1992.pdf

[186] See aisley, Richard Kyle (2008), *International Watercourses/River Basins Including Law, Negotiation, Conflict Resolution and Simulation Training Exercises*, FAOWATER, United Nations Food and Agriculture Organization (FAO), Rome.

Survey of Binding Dispute Resolution Mechanisms

The essential feature of binding dispute resolution in an international waters context is that a third party issues a decision that the parties agree in advance to respect and comply with. To reach a decision, the third party decision-maker typically hears arguments from the parties and reviews evidence.

Benefits

There are several benefits to having a binding dispute resolution mechanism in a treaty.[187] The provision provides a means for resolving disputes that may arise in the future. It also may provide benefits even if a dispute never arises, or if the parties choose not use the mechanism when a dispute does arise.[188]

Having a binding dispute resolution mechanism in place may assist the parties in reaching agreement at the treaty negotiation stage. In treaty negotiations, parties on all sides must make commitments. Parties will be inclined to make commitments only if they believe that the other parties' commitments are meaningful and that there will be negative consequences for a failure to comply. Having a binding dispute resolution provision is useful because negotiating parties will take into consideration that a decision-maker with the power to issue binding decisions will enforce commitments.

After the treaty is negotiated, the existence of a binding dispute resolution option encourages the implementation of treaty commitments. Parties may be less likely to defy a treaty if they face the prospect of a binding decision issued against them.

In many cases, once a dispute arises and before binding dispute resolution is invoked, the parties engage other dispute resolution methods, including fact-finding, negotiation, and/or mediation. The existence of a binding dispute resolution provision in the treaty enhances the effectiveness of these other dispute resolution mechanisms. Without it, a party could refuse to participate in good faith in the other mechanisms without facing consequences. If a binding dispute resolution procedure looms, parties may take these other dispute resolution methods more seriously. This may produce faster settlements and a less acrimonious dispute resolution process.

Binding dispute resolution provides the parties with the means to resolve their dispute definitively. If the dispute reaches binding dispute resolution, the decision of the third party decision-maker will be recognized as binding by the international community. Perhaps for

[187] See Malintoppi, Loretta (2006), "Methods Of Dispute Resolution In Inter-State Litigation: When States Go To Arbitration Rather Than Adjudication" in *The Law and Practice of International Courts and Tribunals* 5:133-162, Koninklijke Brill NV, The Netherlands.

[188] Kraska**,** James (2003). *Sustainable Development is Security: the Role of Transboundary River Agreements as Confidence Building Measure (CBM) in South Asia*, 28 Yale Journal of International Law 465.

this reason, a high percentage of decisions of international binding dispute resolutions mechanisms have been complied by states.[189]

Types

There are several different types of binding dispute resolution mechanisms: (1) global mechanisms; (2) regional mechanisms; and (3) dispute-specific mechanisms.

Global mechanisms are theoretically available for all states to use to resolve disputes concerning specified subject matters. The most prominent example is the ICJ, seated at the Peace Palace in The Hague. It was created in 1945 as the judicial organ of the UN to resolve disputes of a general nature between states that have consented to its jurisdiction.[190] Other examples are the International Criminal Court[191] and the International Tribunal for the Law of the Sea.[192]

The ICJ has a long and distinguished history of resolving disputes between states involving transboundary water bodies. The ICJ is composed of 15 judges who are elected by the UN General Assembly and the UN Security Council to nine-year terms. The ICJ's rules of procedure are codified in the Statute of the International Court of Justice, an annex to the UN Charter. Its official languages are english and french.

Regional mechanisms resolve specific types of disputes involving parties in the same region, as well as situations where more than one dispute arises out a particular event. Should sovereign states choose to have their disputes resolved by a regional mechanism, they would need to create one either by drafting a regional water treaty containing a binding dispute resolution provision, or by grafting a binding dispute resolution provision onto an existing regional treaty. SADC features an example of the latter.[193] The SADC, a 15-State regional bloc focused on trade, development, and security, established a tribunal in 1992 to issue binding decisions to resolve disputes involving the interpretation of the SADC treaty and its protocols. In 1998, SADC members enacted a protocol on shared water bodies and referred all disputes involving the protocol to the SADC tribunal.

Another prominent example of a regional mechanism outside an international waters context is the Iran-US Claims Tribunal.[194] The Iran-US Claims Tribunal is composed of nine judges – three Iranian, three US, and three non-nationals – seated at The Hague who render binding decisions in disputes between Iran, the US, and their nationals arising from the Iranian Revolution.

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[189] Llamzon, Aloysius, (2007). *Jurisdiction and Compliance in Recent Decisions of the International Court of Justice* in *Eur J Int Law 18*(*5*): *815-852*.

[190] See International Court of Justice as found at http://www.icj-cij.org/homepage/index.php

[191] See International Criminal Court as found at http://www.icc-cpi.int/Menus/ICC?lan=en-GB

[192] See International Tribunal for the Law of the Sea as found at http://www.itlos.org/start2_en.html

[193] See Southern African Development Community Tribunal as found at http://www.sadc-tribunal.org/

[194] See Iran-US Claims Tribunal as found at http://*www.iusct.org*/.

Dispute-specific mechanisms are another option for binding dispute resolution. By creating a dispute-specific mechanism in a treaty, states agree in advance on a procedure to choose decision-makers (typically three to five decision-makers) when a dispute arises, as well as the procedural rules and law that will guide the proceedings. There is no standing body of decision-makers that hears all disputes arising out of the treaty, as is typical for global and regional mechanisms. Dispute-specific dispute resolution often takes the form of arbitration. For each dispute that arises under the treaty, a distinct arbitral panel would be constituted to hear and decide that particular dispute. Arbitration may be "administered" meaning that an arbitral institution provides certain assistance to the arbitrators and the parties, or it may be ad hoc, in which case it is not administered under the auspices of any arbitral institution.

Arbitrations involving state parties often are administered by the PCA.[195] The PCA provides facilities for use in arbitrations, model rules of procedure, and numerous secretarial and substantive services. Established in 1899, the PCA is experienced in administering arbitrations involving both state and non-state parties, including disputes involving territorial boundaries. Even in ad hoc arbitrations, the parties may make use of the PCA's model procedural rules, such as the PCA Optional Rules for Arbitrating Disputes Between States.[196]

ICJ Decisions

In *Pulp Mills on the River Uruguay* (2010), Argentina challenged Uruguay's construction of two pulp mills on the banks of the River Uruguay, which forms the boundary between the two states.[197] Argentina alleged that the construction of the pulp mills violated numerous provisions of a 1975 treaty between the states, including the obligation to contribute to the optimum and rational utilization of the river, the obligation to coordinate measures to preserve the ecological balance, and the obligation to prevent pollution. Argentina also argued that Uruguay failed to give advanced notice of its construction plans in violation of the procedural provisions of the treaty. Argentina requested that the Court declare Uruguay to be in breach and order Uruguay to stop construction of one mill, dismantle the second mill, pay damages, and provide guarantees that it would comply with the treaty in the future. The Court denied the requested relief, reasoning that notwithstanding Uruguay's failure to inform, notify, and negotiate with Argentina as required by the treaty, Argentina failed to show a substantive violation of the treaty. To reach that conclusion, the Court closely examined expert submissions from both sides regarding the environmental impact of the pulp mills.

The *Case Concerning the Dispute Regarding Navigational and Related Rights* (2009) concerned the interpretation of an 1858 treaty which granted Nicaragua sovereignty over the San Juan

[195] See Permanent Court of Arbitration as found at http://www.pca-cpa.org/showpage.asp?pag_id=363

[196] See Permanent Court of Arbitration, *Optional Rules for Arbitrating Disputes between Two States* as found at http://www.pca-cpa.org/upload/files/2STATENG.pdf

[197] See International Court of Justice, *Pulp Mills on the River Uruguay (Argentina v. Uruguay)* as found at http://www.icj-cij.org/docket/index.php?p1=3&p2=3&case=135.

River, a natural border between Nicaragua and Costa Rica, but granted Costa Rica the right of free navigation for purposes of commerce.[198] Costa Rica alleged that Nicaragua violated the treaty by denying it free navigation in at least nine ways, including, for example, by requiring passengers on Costa Rican vessels to carry Nicaraguan visas. Costa Rica sought declaratory, injunctive, and monetary relief. The Court reaffirmed Nicaragua's sovereignty over the river, but held that Nicaragua's practice of requiring Costa Rican passengers to carry Nicaraguan visas, charging Costa Rican vessels special taxes, and interfering with Costa Ricans' subsistence fishing along the banks of the river violated the treaty. The Court denied all other requests for relief.

Case Relating to the Gabčíkovo-Nagymaros Project (1997) concerned the interpretation of a 1977 treaty between Hungary and Czechoslovakia to construct a system of locks on the Danube River.[199] After Hungary unilaterally suspended, and then abandoned, work on the project and Czechoslovakia proceeded to dam a portion of the river on its own, Hungary and Slovakia (which succeeded to Czechoslovakia's rights and obligations under the treaty) executed a special agreement to refer the dispute to the Court. The Court declared that Hungary violated the treaty, and that while Slovakia was within its rights to prepare an alternative means to dam the river, it breached the agreement by putting its solution into operation unilaterally. As to future conduct, the Court ordered the parties to negotiate in good faith to achieve the objectives of the treaty. The Court added that the parties should take evolving international environmental norms into account, as it recognized that the project might cause environmental harm and that the treaty required the States to consider these norms.

Decisions of Other Global and Regional Mechanisms

In *Southern Bluefin Tuna Cases* (1999), Australia and New Zealand requested that the International Tribunal for the Law of the Sea find that Japan's experimental fishing program violated its international legal obligation to preserve southern bluefin tuna.[200] Pending the Tribunal's final decision, Australia and New Zealand moved for the temporary suspension of Japan's fishing program as a provisional measure. The Tribunal ordered the provisional measure on the basis of the precautionary principle. The provisional measure remained effective for 11 months until the Tribunal issued a final decision denying Australia's and New Zealand's claim for lack of jurisdiction.

In *The Matter between Campbell et al. v. The Republic of Zimbabwe* (2008), Mike Campbell, a white farmer in Zimbabwe, requested that the SADC Tribunal find Zimbabwe's seizure of his

[198] See International Court of Justice, *Dispute Regarding Navigational and Related Rights (Costa Rica v. Nicaragua)* as found at http://www.icj-cij.org/docket/index.php?p1=3&p2=3&k=37&case=133&code=coni&p3=5

[199] See International Court of Justice, *Gabčíkovo-Nagymaros Project (Hungary/Slovakia)* as found at http://www.icj-cij.org/docket/index.php?p1=3&p2=3&k=8d&case=92&code=hs&p3=5

[200] See International Tribunal for the Law of the Sea, *Southern Bluefin Tuna Cases,* as found at http://www.itlos.org/start2_en.html

land pursuant to Amendment 17 of the Zimbabwean Constitution violated the SADC treaty.[201] The Tribunal ruled that Amendment 17 violated the SADC treaty because it made the acquisition of white farmers' land immune from judicial review and discriminated against white farmers, and ordered Zimbabwe to stop interfering with white farmers' land under Amendment 17, and to pay compensation to farmers who had lost their land on that basis.

Decisions of Dispute-Specific Mechanisms

In *Abyei*, a five-member tribunal in an arbitration administered by the PCA, heard a boundary dispute between the Government of Sudan ("Government") and the Sudan People's Liberation Army ("SPLA").[202] The arbitration was the culmination of 20 years of civil war between the north and south. In 2005, the Government and the SPLA, a powerful southern faction, signed a peace agreement which created a commission to fix the boundaries of the oil-rich Abyei province. After the Government rejected the commission's findings, the parties agreed in July 2008 to arbitrate under the PCA Optional Rules for Arbitrating Disputes Between States. In July 2009, the tribunal issued its decision, finding that the commission exceeded its mandate in drawing Abyei's northern, eastern, and southern boundaries. The tribunal re-drew those boundaries.

The *Ethiopia v. Eritrea* arbitrations, administered by the PCA, also took place against the backdrop of civil war.[203] In 2000, the States created a five-member boundary commission to resolve the status of the disputed Badme territory and the boundaries between the two States, and a five-member claims commission to determine damages from the armed conflict. In 2002, the boundary commission held that Badme territory was a part of Eritrea, and in 2007, it demarcated boundaries. In 2009, the claims commission awarded damages.

[201] See Southern African Development Community Tribunal, *The Matter between Campbell et al. v. The Republic of Zimbabwe,* as found at http://www.sadc-tribunal.org/docs/case032009.pdf

[202] See Permanent Court of Arbitration, The Government of Sudan / The Sudan People's Liberation Movement/Army (Abyei Arbitration) as found at http://www.pca-cpa.org/showpage.asp?pag_id=1306

[203] Permanent Court of Arbitration, Eritrea-Ethiopia Claims Commission, as found at http://www.pca-cpa.org/showpage.asp?pag_id=1151

Choosing a Binding Dispute Resolution Mechanism

While no one type of binding dispute resolution mechanism is suitable for all states in all situations, objectives that are commonly sought with respect to a binding dispute resolution mechanism are: (1) obtaining an effective remedy; (2) obtaining a correct decision; and (3) maximizing the efficiency, in terms of cost and time, of the decision-making process.[204] To determine which mechanism is appropriate to resolve water disputes in international waters situations, states are advised to scrutinize the ICJ, regional mechanisms, and dispute-specific mechanisms in terms of these objectives and any other objectives that they identify.

Obtaining an Effective Remedy

To provide an effective remedy, a binding dispute resolution mechanism must provide (1) meaningful relief; (2) incentives for voluntary compliance with decisions; and (3) means to enforce decisions where voluntary compliance is not forthcoming.[205]

Meaningful Relief

In international practice, an award in favour of a state may consist of an order to pay monetary compensation, an injunction (an order to perform certain action), or a declaratory judgment (a statement of the rights and obligations of the parties), or some combination thereof. A provisional order, which is an order for a party or parties to take certain action pending further consideration by the decision-makers at the conclusion of the proceedings, may also be an element of meaningful relief.

The ICJ typically issues declaratory judgments.[206] Injunctions are infrequently issued and an award of monetary compensation is extremely rare. By contrast, regional and dispute-specific bodies may order monetary compensation or injunctive relief depending on the unique features of each mechanism and their rules of procedure. All three types of dispute resolution bodies may issue provisional orders.

Incentives for Voluntary Compliance[207]

Compliance with a decision of a binding dispute resolution mechanism is an international legal obligation. Global, regional, and dispute-specific mechanisms have a variety of methods to compel states to comply. However, states are sovereign actors, the means to compel states to comply with international decisions are limited. Therefore, it is important for a dispute

[204] See Malintoppi, Loretta (2006), "Methods Of Dispute Resolution In Inter-State Litigation: When States Go To Arbitration Rather Than Adjudication" in *The Law and Practice of International Courts and Tribunals* 5:133-162, Koninklijke Brill NV, The Netherlands.

[205] See Malintoppi, Loretta (2006), "Methods Of Dispute Resolution In Inter-State Litigation: When States Go To Arbitration Rather Than Adjudication" in *The Law and Practice of International Courts and Tribunals* 5:133-162, Koninklijke Brill NV, The Netherlands.

[206] See International Court of Justice as found at http://www.icj-cij.org/homepage/index.php.

[207] See ECE/UNEP Network of Expert on Public Participation and Compliance (2000). *Water management: Convention on Protection and Use of Transboundary Watercourses and International Lakes: Guidance on public participation and compliance with Agreements*, Geneva, Switzerland.

resolution mechanism to create incentives for voluntary compliance to provide an effective remedy.

The ICJ has several aspects that may promote voluntary compliance. First, the obligation to comply with ICJ decisions is written into the UN Charter. Second, the Court has a unique international public profile because it is composed of leading judges and has issued frequently-cited decisions in dozens of significant cases. Third, the parties' pleadings and the Court's decisions are made publicly available after a case ends, increasing the likelihood that a state's non-compliance will receive international attention, which many states may wish to avoid.

For regional mechanisms, the role that states play in establishing and maintaining the body may promote compliance with that body's decisions. For example, where the regional mechanism plays an ongoing role in the state parties' relationships, as is the case with the SADC, for instance, this may promote compliance with the regional mechanism's decisions. Similarly, because the same regional body will be called upon to decide future disputes, where any non-complying state may need to seek the assistance of that regional body, states may have an added incentive to comply with the decisions of regional mechanisms. As for dispute-specific mechanisms, the role states play in choosing decision-makers for a particular dispute may increase the likelihood of voluntary compliance with a decision. In the case of both regional and dispute-specific mechanisms, the visibility of a particular dispute may affect voluntary compliance.

For regional and dispute-specific mechanisms, the pleadings and decisions may very well remain confidential, unless there is agreement by the states in the treaty or at a later time to make them public. In the Abyei arbitration, the parties chose to make the pleadings and decisions public, and then went further and posted hours of video from the proceedings on the internet.

Enforceability[208]

In situations where a state delays or refuses to comply with a binding decision, a dispute resolution mechanism's ability to enforce the decision may become critical.

With respect to decisions issued by the ICJ, a state has a right to request that the UN Security Council make recommendations or enact measures to aid the enforcement of an ICJ decision.[209]

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[208] See ECE/UNEP Network of Expert on Public Participation and Compliance, *supra* note 182.
[209] International Court of Justice, *How the Court Works*, as found at http://www.icj-cij.org/court/index.php?p1=1&p2=6

See also Llamzon, *supra* note 190 at 822:

> This clearly manifests the strong link between the ICJ and the Security Council as institutions with related but decidedly different competencies in the settlement of international disputes – the ICJ is tasked with allocating rights and responsibilities and assessing competing legal claims among states party, and the Security Council is tasked, upon judgment, to give effect to that decision, should the debtor state refuse to comply.

Existing regional and dispute-specific mechanisms offer several models of enforcement. At the SADC, the Tribunal shall report any failure to comply with a decision to the Summit, the SADC's supreme body, which has the authority to issue sanctions, including the withdrawal of benefits enjoyed by the state as a result of its SADC membership.[210] In the Iran-U.S. Claims Tribunal, Iran is required to place funds in a security account, and maintain a minimum balance, to be used to pay awards issued against it.[211] As for dispute-specific mechanisms, in the *Ethiopia v. Eritrea* arbitration, the boundary commission requested that the UN assist in enforcement of the new boundaries.[212]

Obtaining a Correct Decision

To increase the likelihood that the binding dispute resolution mechanism provides a correct decision, several factors should be considered, including (1) the expertise of the decision-makers; (2) the impartiality of the decision-makers; and (3) the predictability or consistency of decisions.[213]

Expertise of Decision-Makers

In state-to-state disputes concerning the interpretation of treaty rights and obligations, the decision-makers' expertise in international law, including the rules concerning treaty interpretation, may affect the correctness of the decision. In the context of disputes over international waters, states may also consider whether it is important to them to have decision-makers who have expertise in hydrology or in regional issues.

The judges at the ICJ are prominent experts in international law who are selected to reflect the diversity of the world's legal systems.[214] The judges are experienced in resolving disputes involving transboundary water bodies, though they are not necessarily experts in hydrology or engineering. Very often, parties will engage experts when arguing a case before the ICJ or before another dispute resolution body. In terms of regional expertise, if no sitting judge is a national of a state that is party to a case, the state may appoint a national as judge ad hoc to take part in the consideration of the matter and the rendering of a decision.

A number of subtle points are discernible from the text: first, only 'judgments' of the ICJ are subject to Article 94 enforcement. Secondly, only the judgment creditor state has the right to seek recourse from the Security Council; this was not the case with the League of Nations and Permanent Court. Thirdly, the Security Council appears to retain discretion both as to whether it shall act to enforce at all and, if so, what concrete measures it decides to take. Clearly, therefore, the enforcement of ICJ judgments involves quintessentially political acts by both parties and the Security Council, in which the Court itself has little involvement and over which it has no power.

[210] See The Treaty Of The Southern African Development Community as found at http://www.sadc.int/index/browse/page/120.

[211] See Iran-US Claims Tribunal as found at http://*www.iusct.org/*.

[212] See Permanent Court of Arbitration, Eritrea-Ethiopia Claims Commission, as found at http://www.pca-cpa.org/showpage.asp?pag_id=1151.

[213] The International Bureau of the Permanent Court of Arbitration (ed.) (2002). *Resolution of International Water Disputes*, Papers emanating from the Sixth PCA International Law Seminar November 8, 2002, Kluwer Law International, The Hague.

[214] See International Court of Justice as found at http://www.icj-cij.org/homepage/index.php.

With respect to both regional and dispute-specific mechanisms, states may determine the desired qualifications of the decision-makers. For example, the SADC requires that judges be accomplished jurists or highest-level civil servants.[215] While the governing documents of the Iran-U.S. Claims Tribunal and the *Abyei* and *Ethiopia v. Eritrea* arbitrations do not state minimum qualifications for decision-makers, in practice, the decision-makers have included former ICJ judges as well as prominent academics and practitioners.[216] Because decision-makers in a regional mechanism will decide all disputes arising under the treaty, they tend to be more expert with regard to that treaty than ICJ judges, who may infrequently examine that treaty, or any arbitrator in a dispute-specific mechanism, who is likely to be called upon to decide only one specific dispute arising out of that treaty.

Impartiality of Decision-Makers

It is important to ensure that decision-makers with the power to issue a binding decision are impartial. Having decision-makers who are nationals of the states that are party to the dispute or of other interested states may present at least the appearance of partiality. On the other hand, States may deem such risks to be outweighed by the need to ensure that the decision-makers have sufficient knowledge of regional issues. One of the most important decisions states must consider in deciding upon a dispute resolution mechanism is what role they wish to play in appointing decision-makers and whether the appointment of party nationals would make a correct decision less likely because of concerns regarding the decision-makers' partiality or the increased likelihood that the decision-making process will become politicized.

At the ICJ, cases typically are heard by all 15 judges in general session.[217] No two judges may be from the same state. If a state party wishes to have a national serve as a judge in the proceedings, and none of the sitting judges is a national of that state, the state may appoint a national as judge ad hoc for the duration of the case. Outside of general session, the ICJ rules provide for cases to be heard by ad hoc chambers if the parties so desire. The identity and number of judges of an ad hoc chamber is subject to consultation between the parties and the Court; potentially, multiple party nationals may serve as judges. To date, ad hoc chambers have been used only in a handful of cases.

For regional and dispute-specific mechanisms, states may determine the desired rules concerning the nationality of decision-makers. In the SADC Tribunal rules and in the agreements establishing the *Abyei* and *Ethiopia v. Eritrea* arbitrations, there are no

[215] See The Treaty Of The Southern African Development Community as found at http://www.sadc.int/index/browse/page/120.

[216] See Iran-US Claims Tribunal as found at http://*www.iusct.org/ and* The International Bureau of the Permanent Court of Arbitration as found at http://www.pca-cpa.org/showpage.asp?pag_id=1043.

[217] See International Court of Justice as found at http://www.icj-cij.org/homepage/index.php.

nationality provisions.[218] Nonetheless, in the Abyei and *Ethiopia v. Eritrea* arbitrations, the parties did not select party nationals as arbitrators. The Iran-U.S. Claims Tribunal requires that the nine-member full tribunal consist of three U.S. nationals, three Iranian nationals, and three non-nationals, and that smaller three-member chambers consist of one U.S. national, one Iranian national, and one non-national.[219]

Predictability or Consistency of Decisions

States may find it desirable for the dispute resolution mechanism to issue predictable and consistent decisions, which may assist states in understanding their obligations under the treaty and may even lessen the possibility of resort to the dispute resolution mechanism. A decision-maker may be more likely to reach a correct decision if the decision is informed by previous decisions. On the other hand, a decision-maker that approaches each case anew may be less likely to be repeat previous errors.

The ICJ is not bound by prior decisions, but in practice the judges follow precedents stretching back to the ICJ's predecessor, the Permanent Court of International Justice.[220] This yields consistency. Regional mechanisms also tend to produce consistent results as the same body hears multiple disputes arising out of the same treaty. However, if the caseload of a regional dispute mechanism becomes great, the regional mechanism may need to develop a system whereby the full body only hears a portion of the cases and the remaining cases are heard by smaller panels. In bodies that employ this system, such as the Iran-U.S. Claims Tribunal, the decision of the smaller panels or chambers do not bind the full tribunal or future panels, and inconsistencies between the decisions of different panels or chambers may arise. For dispute-specific mechanisms, there is potentially no consistency because a new tribunal is constituted for each dispute and prior decisions rendered by other tribunals are not binding. As a matter of practice, however, a tribunal may choose to rely on earlier decisions rendered by other ad hoc tribunals that have interpreted the same treaty.

Efficiency

There are three aspects of efficiency in binding dispute resolution: (1) the cost of establishing the dispute resolution mechanism; (2) the cost of resolving a dispute through the dispute resolution mechanism; and (3) resolving the dispute in a timely manner.[221]

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[218] See The Treaty Of The Southern African Development Community as found at http://www.sadc.int/index/browse/page/120; see Iran-US Claims Tribunal as found at http://*www.iusct.org/*; see Permanent Court of Arbitration, Eritrea-Ethiopia Claims Commission, as found at http://www.pca-cpa.org/showpage.asp?pag_id=1151.

[219] See Iran-US Claims Tribunal as found at http://*www.iusct.org/*.

[220] See International Court of Justice as found at http://www.icj-cij.org/homepage/index.php.

[221] See Malintoppi, Loretta (2006), "Methods Of Dispute Resolution In Inter-State Litigation: When States Go To Arbitration Rather Than Adjudication" in *The Law and Practice of International Courts and Tribunals* 5:133-162, Koninklijke Brill NV, The Netherlands.

Cost of Establishing the Dispute Resolution Mechanism

There is no cost involved in deciding to submit a dispute to the ICJ, as the ICJ is a standing body.[222] States would need to indicate that they are consenting to ICJ jurisdiction in their treaty. Choosing to submit disputes to a regional dispute resolution mechanism typically entails significant up-front costs, as it is likely to require considerable time, money, and effort to establish a regional body to resolve disputes under the treaty. These costs are lessened if states choose to submit their disputes under the treaty to a pre-existing regional body. Dispute-specific mechanisms have almost no establishment costs, as the only cost involved is that connected with drafting the arbitration clause in the treaty.

Cost of Resolving a Dispute through the Dispute Resolution Mechanism

At the ICJ, the expenses of the proceedings are paid for by UN member-states' dues.[223] Parties do not pay a filing fee, the judges' salaries, or administration fees. The parties, however, must bear the expense of holding hearings at The Hague, translating pleadings and evidence into english or french, and making a substantial number of copies of pleadings, as required by the Court's rules. To offset these costs, states may seek assistance from the Secretary General's Trust Fund, which awards funds to states based on their financial needs and the availability of funds.

For regional mechanisms, there are potentially fewer translations and travel costs if the body is located in the region. The parties, however, must pay the decision-makers a salary or stipend and pay for dedicated hearing space and administrative support.

For dispute-specific mechanisms, like regional mechanisms, translation costs and travel costs may vary. Unlike a regional body, the states may choose to site an arbitration outside of the region out of concern for neutrality, as was done, in both the Abyei and Ethiopia v. Eritrea arbitrations. The parties to an arbitration must pay for arbitrators and administration per case, generally at an hourly fee. For arbitrations that are administered by the PCA, states that meet certain objective eligibility requirements may seek financial assistance from the PCA Financial Assistance Fund.[224]

[222] See International Court of Justice as found at http://www.icj-cij.org/homepage/index.php.

[223] See International Court of Justice as found at http://www.icj-cij.org/homepage/index.php.

[224] Permanent Court of Arbitration, *Financial Assistance Fund* as found at http://www.pca-cpa.org/showpage.asp?pag_id=1179

Resolving the Dispute in a Timely Manner

ICJ proceedings generally take three-to-five years.[225] The length of proceedings may be due, in part, to the great number of judges who preside over each case and the ICJ's significant caseload. The Court's ad hoc chamber or chamber of summary procedure, which would have fewer judges, may be faster, but the former has been used infrequently and the latter has never been used.

Regional and dispute-specific mechanisms generally have fewer decision-makers and a lesser caseload, and the parties can prescribe in the treaty timing requirements for the proceedings and the issuance of judgments. In the *Abyei* and *Eritrea v. Ethiopia* arbitrations administered by the PCA, the parties and the tribunals abided by strict schedules which the parties had developed.[226] As a result, the *Abyei* tribunal rendered a decision within one year and the *Ethiopia v. Eritrea* boundary commission rendered a decision within 16 months.

[225] See International Court of Justice as found at http://www.icj-cij.org/homepage/index.php.

[226] See Permanent Court of Arbitration, Eritrea-Ethiopia Claims Commission, as found at http://www.pca-cpa.org/showpage.asp?pag_id=1151.

Enforcement

Having the means to enforce binding decisions ensures that a state can obtain an effective remedy even when the opposing state fails to voluntarily comply with a decision in a timely manner.[227] More importantly, providing for enforcement may itself encourage voluntary compliance, as it may move states to consider the costs of non-compliance. The ICJ, as well as some regional and dispute-specific mechanisms, has successfully attained high levels of compliance through a combination of incentives for voluntary compliance and methods to compel compliance. States are advised to consider these examples and case studies.

ICJ

Statistical data indicates that States ordinarily comply with ICJ decisions.[228] From 1946 to 1987, for example, 80% of ICJ decisions were fully complied with. From 1987-2004, 60% of decisions gained full compliance, and the remainder were partially complied with. Compliance since 2004 has been viewed as consistent with historical trends. States may comply with ICJ judgments, in large part, because they want to be seen as responsible actors in the international community.

In *Pulp Mills on the River Uruguay* (2010), both Argentina and Uruguay accepted the Court's decision that Uruguay's action did not violate the applicable treaty.[229] In its decision, the Court noted that Uruguay was obligated to monitor the effects of the mill. Accordingly, in November 2010, the states signed an accord setting up a scientific committee composed of experts from both states to monitor the pollution levels on the river. This appears to be the end of a conflict that threatened relations between the States and which at times nearly turned violent, as thousands of protestors from Argentina blocked a bridge serving the pulp mills intermittently for three years.

In the *Case Relating to the Gabčíkovo-Nagymaros Project* (1997), Hungary and Slovakia complied with the Court's order to negotiate to achieve the objectives of a treaty between the States calling for the joint construction of a dam on the Danube River.[230]

In *Certain Activities Carried out by Nicaragua in the Border Area* (2009), since the Court recognized Costa Rica's right to navigate the San Juan River for ordinary commercial activities, including tourism, Costa Rican officials have periodically complained that Nicaragua has disregarded the decision by demanding tolls and seizing commercial goods

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[227] See Malintoppi, Loretta (2006), "Methods Of Dispute Resolution In Inter-State Litigation: When States Go To Arbitration Rather Than Adjudication" in *The Law and Practice of International Courts and Tribunals* 5:133-162, Koninklijke Brill NV, The Netherlands.

[228] See Llamzon, Aloysius, (2007). *Jurisdiction and Compliance in Recent Decisions of the International Court of Justice* in *Eur J Int Law 18*(*5*): *815-852*.

[229] See International Court of Justice, *Pulp Mills on the River Uruguay (Argentina v. Uruguay)* as found at http://www.icj-cij.org/docket/index.php?p1=3&p2=3&case=135.

[230] See International Court of Justice, *Gabčíkovo-Nagymaros Project (Hungary/Slovakia)* as found at http://www.icj-cij.org/docket/index.php?p1=3&p2=3&k=8d&case=92&code=hs&p3=5.

transported on the river.[231] In November 2010, Costa Rica filed a new, separate claim against Nicaragua before the ICJ, arguing that Nicaragua has made illegal incursions into Costa Rican territory in connection with its construction of a canal off the San Juan River. Nicaragua has responded that the disputed territory is part of Nicaragua.

Regional Mechanisms

The SADC and the Iran-U.S. Claims Tribunal are examples of two regional mechanisms that have adopted novel means to enforce decisions.

In 2000, the SADC ratified a protocol to promote the sustainable and equitable utilization of shared water resources, and empowered the Tribunal to rule on disputes under the protocol as well. If a state fails to comply with a Tribunal decision regarding the treaty or the water protocol, the Tribunal shall report the non-compliance to the Summit, SADC's supreme body, which has the power to issue sanctions. *In the Matter between Campbell et al. v. The Republic of Zimbabwe* (2008), the Tribunal reported Zimbabwe's non-compliance to the Summit, which has yet to take action.[232]

At the Iran-U.S. Claims Tribunal, the treaty establishing the body provided for a US $1 billion security account, to be created from Iran's assets frozen by the US, to pay awards issued against Iran.[233] Iran is required to maintain a minimum balance of US $500 million and promptly make deposits if the amount falls below that figure. To date, the Tribunal has ordered Iran at least twice, in 2000 and 2004, to replenish the security account after extended periods of delinquency. Numerous awards, amounting to more than two billion dollars, have been paid out from this account.

Dispute-Specific Mechanisms

The *Ethiopia v. Eritrea* boundary commission ruled in 2002 that the disputed Badme territory is part of Ethiopia, and in 2007 it demarcated boundaries.[234] Despite these rulings, Ethiopia has refused to relinquish the Badme territory. In the arbitration agreement, the UN was tasked with assisting implementation of the commission's decision by facilitating the resolutions of issues related to the transfer of territorial control, but the UN has not been in a position to act because the territory has not changed hands. As for the claims commission, it awarded Ethiopia approximately US $12.5 million (US $174 million minus US $161.5 million that it was held to owe Eritrea). Afterward, Eritrea stated publicly that it accepted the decision without equivocation.[235]

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[231] See International Court of Justice, *Certain Activities Carried out by Nicaragua in the Border Area (Costa Rica v. Nicaragua)* as found at http://www.icj-cij.org/docket/index.php?p1=3&p2=3&code=crn&case=150&k=ec&PHPSESSID=8131530fabafdebbd60b6a2ddf9612d9

[232] See Southern African Development Community Tribunal as found at http://www.sadc.int/tribunal.

[233] See Iran-US Claims Tribunal as found at http://*www.iusct.org/*.

[234] See Permanent Court of Arbitration, Eritrea-Ethiopia Claims Commission, as found at http://www.pca-cpa.org/showpage.asp?pag_id=1151.

[235] See President Isaias Afwerki's declaration at http://www.eritrea.be/old/eritrea-ethiopia-boundary.htm

After the Abeyi decision, which re-drew the boundaries of the disputed province, the Government of Sudan and the SPLA issued a joint communiqué stating that they would enforce the decision. The demarcation of the boundaries, however, has been delayed. Further, in July 2010, a senior advisor to the Government stated that the decision was inadequate and did not resolve the dispute. The size of the province is a key issue, as Abyei residents will vote in a referendum on whether to join southern Sudan, which held a separate referendum in January 2011 on whether to secede, and which was overwhelmingly passed.[236]

The situation in the Aral Sea Basin is also illustrative.[237] There is an extensive history of transboundary water cooperation in the Aral Sea Basin however, critical review of past Central Asia (CA) water agreements reveals that the dispute resolution provisions could be much stronger. While these agreements have fostered significant cooperation, commitments have not always been fulfilled and agreements have expired, which are principle reasons that basin organizations are working to strengthen the management system. Regardless of how CA states decide to improve their management of shared water resources, a systematic and effective dispute resolution mechanism will significantly strengthen these arrangements and potentially help open the door to the opportunities that have yet to be realized.

[236] According to the Southern Sudan Referendum Commission, 98.8% of voters voted to secede. Voter turnout was 97.58%. See http://www.ssrc.sd/SSRC2/

[237] See: Paisley, Richard Kyle. *The Challenge of International Watercourse Negotiations in the Aral Sea Basin*, A *NEGOTIATE* case study, IUCN, Switzerland.

3.4 Funding

Good governance of international waters requires funds. Not only are funds necessary for large scale infrastructure projects and development works, but they are also required for the transactional costs of governance, which are the foundations of cooperation. Transactional costs may be viewed as having two elements. The first relates to understanding the resource in question and reducing uncertainty around the possible risks, benefits and costs associated with cooperation. It involves research, inventory, fact finding and information gathering. This is part of 'data and information exchange,' as previously discussed, and is essential for optimising sustainable resource use and developing trust between parties. The second aspect of transactional costs associated with cooperation relate to decision making and management and usually centre around meetings, conferences, costs of operating a secretariat and maintaining open and transparent communication between the contracting parties.

The importance of supporting transactional costs and ensuring institutional sustainability for managing international waters should not be underestimated.[238] As principal obstacles hindering cooperation of international waters are political not technical, developing and ensuring political support becomes a fundamental aspect of cooperation and the sustainable use of resources.[239] Moreover, adequate funding for effective institutional management will help to establish more cohesion between parties and develop better resource management strategies which in turn will help secure investment for large scale infrastructure or development projects.[240]

For certain activities, such as resource exploitation (e.g. water withdrawals, hydro generation, or fishing), there may be possibilities to develop 'funding' mechanisms through resource sale and licensing. In maintenance issues such as flood control, pollution control and environmental protection, it is less clear how funds can be generated from the resource itself to sustain administration activities. In such cases it is recommended that another

[238] Marty, F. (2001). *International River Management: Problems Politics and Institutions*, (Bern:Peter Lang)

[239] Bernauer, T. (2002). Explaining success and failure in international river management. *Aquatic Sciences.* 64:1-19; Caponera , Dante A., *Patterns of Cooperation in International Water Law: Principles and Institutions*, 25 Nat. Resources J. 563 (1985); Elhance, A. (2000). Hydropolitics: Grounds for Despair, Reasons for Hope. *International Negotiation.* 5:201-222

[240] Le Marquand, D. (1977). *International Rivers: the Politics of Cooperation*, (Vancouver: Westwater Research Centre, University of British Columbia)

activity, ancillary or adjunct to the main program, be developed which has income-earning potential.[241]

In general, sustainable financing is taken to mean that the operations and activities of institutions set up to administer or implement international arrangements are able to do so without the continued assistance of foreign donors.[242] From the perspective of the institution, we understand this to mean that reliance on foreign donors for implementation and continued existence is not desirable from the principle standpoint that donor funds are often unpredictable and are intentionally designed to be withdrawn at a certain point in time. Nevertheless, donor funds should be part of a portfolio of mechanisms used to ensure sustainable financing of institutional arrangements. As with national governments and private sector investment, donors must see clear benefits for their funding to continue contributions. The role of the transboundary institution is therefore to create a viable portfolio of funding sources to ensure its ability to administer the transboundary resources in question.

Examples of funding mechanisms

Nile Basin Initiative:

The Nile Basin Initiative (NBI) institutional framework[243] is financed by the Nile Basin Member States through annual dues. Nevertheless, the bulk of activities remain largely donor driven to date. The Nile Basin Member States also provide counterpart funds for all NBI projects and contribute additional funds to the Secretariat. The financing of the local costs of the Shared Vision Program ("SVP") project management units is also borne by the host NBI Member States.[244] Coordination of international donors is conducted by the World Bank in partnership with the UNDP and the Canadian International Development Agency ("CIDA").

The International Consortium for Cooperation on the Nile ("ICCON") was established in 2001 and donor agencies committed to approximately US $130 million to the NBI.[245] In 2003, a multi-donor Nile Basin Trust Fund (NBTF) was established to support NBI programs and projects. The NBTF is overseen by a Committee comprised of contributors to the fund, the

[241] Brown, D. (1998) Evaluating Institutional Sustainability in Development Programs: Beyond Dollars and Cents, *Journal of International Development,* 10 (1) 55-69.

[242] See OECD (1989) Sustainability in Development Programmes: A Compendium of Evaluation Experience. Paris. Organization of Economic Cooperation and Development.

[243] Nile – Council of Ministers, Technical Advisory Committee, and the Nile Basin Secretariat.

[244] *See* Nile Basin Initiative—How We Are Funded, *available at* http://www.nilebasin.org/index.php?option=com_content&task=view&id=43&Itemid=97 (last viewed on 12 Jan. 2011).

[245] The World Bank – The World Bank and NBI, *available at* http://go.worldbank.org/C25RHXSYG0 (last viewed on 9 Dec. 2010).

NBI, and the World Bank (which manages the fund).[246] Donors that contribute through the NBTF include: Canada, Denmark, Netherlands, Norway, Sweden and the United Kingdom. Ten partners (CIDA, Denmark, European Commission, Finland, France, the Netherlands, Norway, Sweden , the UK Department of International Aid ("DFID") and the World Bank) have provided a total amount of US$191.54 M (100% deposited) with a net investment income of US$9.87 M. The fund is set to close in 2013 and the Nile Basin countries are reviewing options for what will follow.

To date, the majority of the costs of implementing NBI program activities have funding from the NBTF. According to the World Bank, the NBTF transfers funds to the NBI, which then carries out the implementation of project activities since almost all (95%) of the project activities are recipient-executed. The NBTF supports the implementation of the SVP, as well as sub-basin investment programs in the Eastern Nile Subsidiary Action Program and the Nile Equatorial Lakes Subsidiary Action Program. As progress is made in program implementation and establishing a permanent institutional framework for the NBI, the goal is to transfer the NBTF to a NBI institution.[247]

Columbia River Treaty

The Columbia River Treaty (CRT) does not provide explanation as to cost sharing for operational costs. However, it does explain the terms of the loan from the United States to Canada for constructing the necessary dams in Canada.[248] In 1964, the United States paid Canada US $64.4 million for flood control benefits[249] and a further US $254 million for the first 30 years of Canada's share of increased power benefits.[250] Despite explicit explanation of the cost sharing, it was implicit that cost sharing would occur between the "entities."[251] The entities are BC Hydro for Canada (a provincial agency for British Columbia), and Bonneville Power Authority and Army Corps of Engineers for the United States (both federal agencies).

Under the CRT, the entities are responsible for implementing the Columbia River Treaty, including management costs such as monitoring, modelling, research, infrastructure

[246] Nile Basin Initiative—How We Are Funded; The World Bank - Nile Basin Trust Fund, *available at* http://go.worldbank.org/V0QNBV7WP0 (last viewed on 12 Jan. 2011).

[247] The World Bank – Nile Basin Trust Fund; Nile Basin Initiative—How We Are Funded. *available at* http://www.nilebasin.org/index.php?option= com_content&task=view&id=43&Itemid=97 (last viewed on 12 Jan. 2011).

[248] Columbia River Treaty, art. XVI (5). Treaty between Canada and the United States of America relating to cooperative development of the water resources of the Columbia River Basin (with Annexes) ("Columbia River Treaty"), 17 Jan. 1961, and exchanges of notes at Washington, 22 Jan. 1964 and at Ottawa, 16 Sept. 1964, 542 U.N.T.S. 244, *available at* http://www.ccrh.org/comm/river/docs/cotreaty.htm.

[249] See Art 6 (1) of CRT

[250] See the section on 'Benefit Sharing' in this report.

[251] See Art 14 of CRT.

upgrades, meetings and operational issues. As these are essentially the responsibilities of the entities within their national jurisdiction in any case, the transactional costs of implementing the CRT can be seen as incremental to their regular roles and responsibilities. The benefits in implementing the CRT include both flood control and enhanced power generation. The enhanced power generation amounts to some 8000 GWh per annum (CRT-Entities, 2008).[252] This has an estimated at a value of US$600 million per year, which may be either in actual power or in sales to other utilities. Consequently, the entities' incremental costs for implementing the CRT are more than covered by the enhanced power generation. To date there has not been any financial issue arising with respect to one of the entities not conducting its share of treaty implementation, as the entities have the full support of their respective governments.

Abidjan Convention

The Abidjan Convention is dependent on donor funds and United Nations support to fully operate. At the start of the Abidjan Convention (in 1981), the UNEP contributed US$1.4 million (contingent upon matching funds from the Trust Fund) for the implementation costs of the Action Plan from 1981-1983. An Abidjan Convention Trust Fund was established and was to be financed by proportional contributions from the Contracting Parties. Contributions were based on a United Nations scale whereby the majority of countries in the Convention area (Angola, Benin, Cape Verde, Republic of Congo, Equatorial Guinea, Gambia, Guinea, Guinea-Bissau, Liberia, Mauritania, Sao Tome and Principe, Senegal, Sierra Leone, Togo, and Cameroon) were scheduled to contribute 3.72% (US $37,200 in 1982 and US $55,800 in 1983) towards the final budget of the Action Plan. The other levels of contribution were 4.94% (Gabon, Zaire (present-day Democratic Republic of Congo) – US $49,400 in 1982 and US $74,100 in 1983), 6.16% (Ghana, Côte d'Ivoire – US $61,600 in 1982 and US $92,400 in 1983), and 22.01% (Nigeria – US $220,100 in 1982 and US $330,150 in 1983).[253]

Unfortunately, contributions to the Abidjan Convention Trust Fund have been limited and unpredictable. The total amount contributed between 2004 and 2007 was only US $112,500 instead of the assessed contributions of $3 million over 3 years. In the report for the Eighth Conference of Parties in November 2007, UNEP reported that the Abidjan Convention Trust Fund was in a precarious financial situation as a result.[254] The continued low contributions

[252] CRT-Entities (2008). *Columbia River Treaty: Assured Operating Plan and Downstream Benefits for Operating Year 2012-2013*. Canada and United States Entities, January 2008

[253] *See* Final Act of the Conference of Plenipotentiaries on Co-operation in the Protection and Development of the Marine and Coastal Environment of the West and Central African Region - Resolutions Adopted by the Conference, 23 Mar. 1981, at 11-12, *available at* http://www.unep.org/AbidjanConvention/docs/Final%20Act %20March%201981.pdf

[254] Report of the eighth meeting of the Contracting Parties to the Convention for Cooperation in the Protection and Development of the Marine and Coastal Environment of the West and Central African Region, at 47, 14 Feb. 2008, *available at* http://www.unep.org/AbidjanConvention/docs/K0820275%20COP8%20Report-DEPI-WAF-CP-8.pdf ("2007 Eighth Conference of Parties Meeting Report").

have been a continual concern. In 1994, the Contracting Parties agreed to waive all accumulated payment arrears in hopes that this would improve future contribution levels.[255] However, payment levels remained extremely low. Some contracting Parties have remarked that their low levels of contributions to the Trust Fund are a result of a lack of any identifiable benefits from their contributions to the Abidjan Convention.[256]

As a result of the low contributions, the Secretariat of the Abidjan Convention conducts most of its work through partnerships. For example, UNEP and UNDP are funding Guinea Current LME projects (US $21.49 million); UNDP is funding Benguela Current LME projects (US $15 million); and FAO and UNEP are funding Canary Current LME projects (US $12 million), all of which were established as part of the Abidjan Convention.[257]

At an extraordinary Conference of Parties meeting in 2008, the Contracting Parties agreed to make prompt payments to the Trust Fund and to continue using the assessed proportional scale to determine the level of contributions each Contracting Party is required to make. The Contracting Parties also agreed to waive the payment arrears that had accumulated as of November 2007, with the exception of 10% of the total accumulated arrears that the Contracting Parties are still required to pay.[258] These assessed contributions would add up to an annual budget of $500,000 and are based on the original assessment percentages agreed to in 1982, taking into the accounting the accession of South Africa and the countries that have not yet ratified the Abidjan Convention.[259] The Secretariat also agreed to undertake additional actions, such as efforts to encourage in-kind contributions for national level projects, to strengthen the financial resources base of the Abidjan Convention.[260]

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[255] Report of the First Meeting of the Bureau to the Abidjan Convention for Cooperation in the Protection and Development of the Marine and Coastal Environment of the West and Central Africa Region, at 3, Apr. 2008, *available at* http://www.unep.org/AbidjanConvention/docs/Report%20of%20the%20First%20Meeting%20of%20the%20Bureau%20to%20the%20Abidjan%20Convention%20Dakar,10%20May%202008.pdf ("2008 Bureau Meeting Report").

[256] 2008 Stakeholder Report at 5.

[257] (UNEP Report on the Joint Conference of Parties at 2008)

[258] This 10% of unpaid pledges amounts to a total of $201,690. The Contracting Parties established biennial contributions for the Trust Fund at $56,571 (for Republic of Congo, Gambia, Liberia, Sierra Leone, Togo, Benin, Guinea – the original 3.72% countries), $80,000 (for Cameroon – originally 3.72%, Côte d'Ivoire – originally 6.16%, Gabon – originally 4.94%), $90,000 (for Ghana – originally 6.16%, Senegal – originally 3.72%), and $92,000 (for Nigeria – originally 22.01%, South Africa – who was not a Contracting Party in 1982).

[259] The majority of the assessed contributions were for $18,600 (for Benin, Cameroon, Congo, Gambia, Guinea, Liberia, Senegal, Sierra Leone, Togo). Other levels of pledged contributions were $24,700 (Gabon), $30,800 (Côte d'Ivoire, Ghana), $37,500 (South Africa), and $110,050 (Nigeria). 2008 Extraordinary Meeting Report at 35.

[260] 2008 Extraordinary Meeting Report at 21-22, 26-28. For other ideas from stakeholders on how to increase the financial strength of the Abidjan Convention, *see* 2008 Stakeholder Report at 11-13.

UNEP has also indicated that the Abidjan Convention should determine ways to solicit funds from the private sector, civil society, and other bilateral and multilateral entities that operate in the Convention area.[261]

Mekong River

The administrative and operating costs of the Mekong River Commission are ostensibly funded from "contributions from member countries on an equal basis unless otherwise decided by the Council, from the international community (donor countries) and from other sources."[262] The senior legal advisor to the drafters explained that the 'equal basis' pertains to administrative costs not covered by other sources, but do not necessarily address extraordinary meetings of councils and committees which may depend upon the nature of the meeting.[263]

In 2004, the Member States contributed approximately US $1 million combined, while grants from donors totalled approximately US $13 million.[264] In the Hua Hin Declaration (April 2010), the Member States committed to having the MRC being financially self-sustained by 2030.[265] While there is no financial management strategy currently available to assess a strategic plan for financial self-sustainability, the Hua Hin Declaration indicates a clear advance to reducing the reliance on foreign donors over time.

Illumenden Aquifer

The Memorandum of Understanding between Niger, Nigeria and Mali relating to the management of the Illumenden Aquifer system is still in draft form; however it is anticipated that a formal agreement will be realized in 2011.[266] To date, the countries have been funded with support of the international donor community, principally GEF, though UNECSO and FAO, as well as national aid agencies, have also contributed to research and development of collaboration over the shared aquifer. The draft Memorandum is forward looking in dealing with financial concerns for implementing the agreement. It adopts the "user pays" principle such that each nation is to provide a user fee to those using the aquifer in its jurisdiction. As such, it is devising a income generating mechanism for implementing management activities under the agreement.[267] It also is set to adopt the "polluter pays" principle as a means of

[261] 2008 Extraordinary Meeting Report at 21-22, 26-28. For other ideas from stakeholders on how to increase the financial strength of the Abidjan Convention, *see* 2008 Stakeholder Report at 11-13.

[262] 1995 Agreement, art. 14. Agreement on the Cooperation for the Sustainable Development of the Mekong River Basin ("1995 Agreement"), 5 Apr. 1995, *available at* http://www.mrcmekong.org/agreement_95/agreement_95.htm

[263] George Radosevich, personal communication.

[264] Backer, *Paper Tiger*, at 37.

[265] Hua Hin Declaration, at 4.

[266] The Memorandum of Understanding relating to the setting up of a Consultative Mechanism for the management of the Iullemeden Aquifer System (IAS), 20 June 2009

[267] Art 18 of the Draft MOU.

compensation for injured parties.[268] The exact details of these mechanisms have yet to be determined, and it is not yet clear when and how user fees will be established, and for whom. This will require appropriate national legislation to implement, and likely be implemented by national agencies. Nevertheless, it demonstrates recognition of the need to separate the operational costs of the international program from general national expenses and activities. This is critical in countries where departments are often strapped for funding and dependent on central financing for their programs.

The financing of the 'Consultative Mechanism', which involves the Secretariat, Technical Committee and the Council of Ministers, will be determined by the Council of Ministers through contributions from the parties.[269] Furthermore, those involved in the creation of the Consultative Mechanism are mindful of the need for sustainable financing, and are seeking to devise a "light" bureaucracy that will be efficient and effective. As a legal entity, the Consultative Mechanism will be able to negotiate financing and loans, and has sought to receive funding from international organizations such as the African Development Bank, Africa Water Facility, UNEP, and GEF.

Lake Tanganyika

The Convention on the Sustainable Management of Lake Tanganyika (the "LT Convention")[270] provides for cost-sharing between the member countries. The Authority, which implements the LT Convention, is funded by equal contributions from the Contracting States,[271] as well as external funding[272] such as UNDP, GEF, and ADB. This is an interesting funding allocation as the four countries do not share the littoral waters equally, with the Democratic Republic of the Congo and Tanzania having the majority of the west and east shores respectively, and Burundi and Zambia having much smaller areas of the north and south respectively. It can be assumed that the benefits of maintaining an institutional arrangement are equal in the sense that all benefit from pollution control, sustainable fisheries and environmental protection.

The Convention also specifies that the Contracting States are responsible for funding activities related to implementation of the Convention that are undertaken within their

[268] Art 17 of the Draft MOU.

[269] Art 33 of the Draft MOU.

[270] Convention on the Sustainable Management of Lake Tanganyika ("Convention"), 12 June 2003, *available at* http://www.lta-alt.org/publications/projectdocuments/the-convention-on-the-sustainable-management-of-lake-tanganyika-eng/view.

[271] Convention, art. 28(1) (specifying that the Contracting States "shall contribute in equal proportions to the budget of the Authority unless otherwise agreed").

[272] Convention, art. 28(2) (directing the Authority to seek funding from donors and other sources); *see also* Lucas Liganga, *Fund Set Up to Save Lake Tanganyika*, THE CITIZEN (Tanzania), 19 May 2010, *available at* http://www.thecitizen.co.tz/news/4-national-news/2015-fund-set-up-to-save-lake-tanganyika.html (reporting on the granting to the Authority of approximately Tanzanian Shilling 20 billion in funds by the AfDB, the GEF, and the Nordic Development Fund for environmental protection and conservation purposes).

territory or for their exclusive benefit.[273] The Authority also funds the incremental costs to each Contracting State of managing the Lake Basin, as well as activities undertaken to implement the strategic action program that benefit more than one of the Contracting States.[274]

The Convention also directs the Conference of Ministers to adopt financial rules "to determine, in particular, the financial obligations under the present Convention and protocols to which they are parties."[275]

Discussion

There is no recipe for developing sustainable financing. A mix of possible alternatives needs to be assessed with respect to the potential for using the resources in question as a means of income generation, as well as developing creative approaches to developing sources of financing. Following the lead from Agenda 21, a variety of funding mechanisms should be explored including: multilateral development banks (ex. GEF, ADB), specialized institutional organisations (ex. UNDP), multilateral institutions, bilateral assistance programmes, debt relief, foreign direct investment, innovative financing, amongst others.[276]

Encouraging national support for transactional costs of the secretariat

The importance of having national level governments support the administrative secretariat stems primarily from the need to develop collective ownership of the management and development of the resources in question. How costs are shared is often different in different circumstances. In the Western Sahara Aquifer, after GEF funding terminated each country continues to support the Secretariat through national water sales. This is a similar formula that is being developed in the Iullemenden aquifer (see above example). In the case of the Benguela Current, the secretariat is funded by each country contributing US $100,000/annum plus contributions in-kind. This is in contrast to the overall Abidjan Convention secretariat, which is to be funded in relation to UN criteria that include size and GDP. Likewise, the Niger Basin Authority secretariat is supported through a percentage based on GDP and land coverage. The Council of Ministers determines the costs of certain projects and approves the annual budget of the secretariat. Financing comes as part of Ministry budgets to participate. Similarly, in the Black Sea, the contribution of the parties to the Secretariat is by GDP only. The Lake Tanganyika Authority receives contributions in equal amounts from all four countries, though they do not share equal amounts of the water body.

[273] Convention, art. 28(4).

[274] Convention, art. 28(3).

[275] Convention, art. 24(4).

[276] See Agenda 21, Chapter 33, Para 14-33. UN Doc. A/CONF.151/26/Rev.1) 1992.

Reducing the reliance on donor support

The above case studies emphasise the current reliance on foreign assistance for ensuring institutional stability to administer agreements. Some models are looking at income generation opportunities, such as the CRT and draft MOU for the Illumenden. In general, in the developing world context, there has been a tendency to evolve a financing system reliant on a mix of donor support with additional public funding from national sources. Increasingly, the importance of being creative in developing finance mechanisms has been advanced by a number of agencies with a development portfolio. One of the principle sources of potential financing is the attraction of direct foreign investment.[277] In 2004, the World Bank estimated that as much as US$166 billion was invested in developing States in the form of direct foreign investment. A large portion of this in resource goods and extraction; the remaining bulk in manufacturing. Clearly, there is a potential to generate income through the licensing of power generation, water supply, fish extraction etc.. However, if the private sector could also be harnessed for environmental protection, pollution control, and biodiversity conservation, it could constitute an important component of developing sustainable finance mechanisms for programs such as the Caspian Sea Environmental Program.

Encouraging private sector investment

Encouraging private sector investment has already been initiated by groups such as GEF, UNDP, UNEP and others to explore innovative possibilities to encourage the private sector to become involved in funding programs. One example is the 'UNEP Finance Initiative: Innovating Financing for Sustainability' which works to establish linkages between the private sector and the international development agenda. They have created specific publications related to the water sector to enhance the interest of the private sector in funding initiatives.[278] GEF has also initiated modes of concessional lending and contingent loans.[279] The Organization for Economic Cooperation and Development has also explored different ways to encourage private sector involvement.[280]

[277] Miles, K. (2005) Innovative Financing: Filling in the Gaps on the Road to Sustainable Environmental Funding.

[278] See 'Challenges to Water Scarcity: A business case for financial institutions; Financing Water: Risks and Opportunities; Half full or half empty: opportunities in the water sector; Power Sector,' amongst others. http://www.unepfi.org/publications/water/index.html

[279] F. Pinto, UNDP/GEF Experience with Innovative Financing Mecha- nisms for Environmental Projects, Technical Workshop on Con- cessional Lending, UNEP Division of Technology, Industry and Economics (July 2002), at 1, available at <http://www.uneptie.org/ ozonaction/events/lending/papers.html>.

[280] H. Reisen, Innovative Approaches to Fund- ing the Millennium Development Goals (Organization for Economic Cooperation and Development, 2004), at 7–17, available at <http:// www.oecd.org/dataoecd/61/2/30880682.pdf>

GEF remains the single largest donor for international water initiatives, having invested some US$500 million between 2006 and 2010.[281] While this funding is essential for the development of new institutional arrangements to help manage international waters (both marine and fresh water), there must be additional sources of financing to sustain these arrangements. To this end, the clear benefits of cooperation must be seen and experienced by the contracting parties to ensure political support, and thus public funds and effort where needed. Clear benefits will help ensure support at international, national and local levels. Politicians are politically driven and consequently what are not obvious benefits to their constituents will not necessarily be clear to the politicians and decision makers. The work of GEF to address parliamentary dialogue in Southern Africa (whereby parliamentarians are briefed on the benefits of cooperation over transboundary waters) is a means to help develop political support at the national level.

Finally, one of the most important elements for developing sustainable financial mechanisms will be developing income generating activities. Consequently, creative and thoughtful means of engaging the private sector will assist in developing activities that are economically viable. To this end, it is highly important the institutional arrangements set up 'entities' (either joint or independent) which have legal personalities to be able to enter into negotiations with the private sector, receive loans, and administer investments.[282]

[281] In August 2006 32 donor countries pledged to contribute US$3.13 billion over 4 years. http://207.190.239.143/Replenishment/Reple_Documents/reple_documents.html

[282] See section in this report on 'Institutional Design'.

3.5 Resilience

This section describes the need for resilience in developing institutional arrangements for shared fresh and marine water resources. It focuses on the structure of arrangements to deal with or accommodate changes such as those associated with climate change.

WORK IN PROGRESS

3.6 Institutional Architecture

This section discusses the role of institutional architecture when developing a coherent and effective means to govern international waters. It describes the founding principles, provides examples of existing transboundary institutions and closes with a discussion related to different possible structures.

WORK IN PROGRESS