The Design of a Palestinian-Israeli Water Commission: A Best Practices Approach

Michele N. Ferenz and Stephan D. Sylvan

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FOREWORD

When most of us think about national security and the Middle East, we think about energy and oil. But historically it is water that has sparked conflict in the region and, in the future, it is water that is likely to be the primary source of tension again. Syria, Jordan, the Palestinian Territories, Iraq and Israel all face serious water supply problems by the year 2020.

To address this important and threatening problem, several prominent scholars have proposed the establishment of supranational organizations to jointly manage water allocation and use. This report looks at the experiences of international water commissions in four different areas of the world and draws from them important lessons for the design and development of a transboundary water commission in the Middle East.

This paper, authored by Michele Ferenz and Stephan Sylvan, was originally written as a Policy Analysis Exercise, the Kennedy School's equivalent of a Masters thesis. With the help of Miriam Avins, it has been edited, but the opinions expressed herein remain solely those of the authors.

Henry Lee
Director
Environment and Natural Resources Program
Center for Science and International Affairs
Kennedy School of Government
Harvard University

June 1, 1995

EXECUTIVE SUMMARY

Lack of cooperation between Palestinians and Israelis is one of the root causes of the acute water scarcity suffered by the region. While there are certain physical limitations to their fresh water resources, supply and delivery cannot be maximized without cooperation and coordination among riparians. A Palestinian-Israeli Water Commission could provide a forum both to resolve disputes over the allocation and use of shared water resources, and to develop new hydrological solutions. To be effective, a Palestinian-Israeli Commission's scope of activity and structure must fit the diplomatic and socio-economic environment of the Middle East. Using a "best practices" approach, we study four water commissions to identify institutional design choices that would be likely to facilitate cooperative water management in Israel and the Occupied Territories.

Obstacles to cooperation between Palestinians and Israelis in water resource development are posed by:

- a history of intense hostility, military occupation, and terrorism;
- disputes over territorial and water rights combined with a situation of strong hydrological interdependence;
- disparities in technical expertise and resources; and
- the fragility of political and administrative institutions in the Occupied Territories.

Hope for sustained cooperation between Palestinians and Israelis in water resource development is inspired by:

- the Agreement in Principle establishing interim self-rule in the Occupied Territories contains an explicit commitment to find common solutions to the region's water problems
- the significant aid ($2.8 billion) that has been pledged to the Palestinian economy by the international community
- concerted efforts to build indigenous Palestinian institutions and technical competence

Recommendations for the Design of a Palestinian-Israeli Institution

Key design choices that would increase the likelihood that a Palestinian-Israeli water commission would be created, and effective, are:

- **data collection as first functional task:** The commission should begin exclusively with the collection and exchange of data and the establishment of a documentation center. This would lay the technical and political groundwork for more involved cooperation. An accurate and agreed-upon picture of the hydrological challenges provides the basis for rational planning. It will help the parties appreciate their interdependence.
- **fast gradualism:** Cooperation should proceed in sequential phases. The commission should begin with limited functional responsibilities (data collection and exchange) to build confidence among the parties and lay the technical groundwork for further joint endeavors. Specific targets and time-tables should be built into an agreement to move the parties toward more involved forms of cooperation as quickly as possible.
- **emphasis on fact-finding:** The commission should rely on scientific boards of inquiry staffed by Palestinian and Israeli technical personnel to produce science-based proposals for revision and ultimate approval by politically appointed commissioners.
- **advisory boards:** Technical work should be done by temporal advisory boards assigned to investigate and propose solutions to a host of water resource questions. Advisory board would typically be temporal, created to resolve a particular hydrological issue. The commission should select individuals from the public and private sectors to serve on a scientific advisory board based on their technical expertise to resolve the specific issue assigned to the advisory board.
- **continuous operation:** The commission should be in session on a continuous basis. The urgency of the hydrological problems in the region and the need for swift progress warrant ongoing, intense activity despite the potential cost. Uninterrupted cooperation could minimize time lags between technical elaboration and political evaluation of policy proposals, and could help solidify working relationships and develop institutional staff loyalty.

- **address imbalances in administrative and technical capacity:** Any existing imbalances between the parties in administrative or technical capacity must be redressed to ensure the stability of the institution. The establishment of a technical training center should be investigated.
- **core technical staff:** A core of permanent technical staff must be created to serve as the commission's professional backbone.
- **outside personnel:** the commission should rely on scientific boards of inquiry staffed by Palestinian and Israeli technical personnel to produce science-based proposals for revision and ultimate approval by politically appointed commissioners.
- **external involvement:** Third-party involvement would be almost indispensable at early stages of institutional development. Contributions could take the form of facilitating, negotiating, and redressing existing imbalances in financial and technical resources.
- **sustained financial support:** Third parties must provide significant financial assistance in the early phases of development of the commission, and then apply such assistance evenly and consistently until the commission achieves financial self-sufficiency. Donor nations must resist the temptation to withdraw financial assistance during periods of turmoil.

I. INTRODUCTION

"The next war in the Middle East will be fought over water, not politics," Boutros Boutros Ghali, then Egyptian Foreign Minister, predicted in 1985. The warning still stands. While no battles have been fought principally over water, violent conflict over water is a continued real possibility unless ever-growing pressure on dwindling supplies is relieved. According to Hillel Shuval, professor of environmental sciences at Hebrew University, Syria, Jordan, the Palestinian Territories, and Israel all will have inadequate supplies available by the year 2022. That year, the combined resources in Israel, Gaza and the West Bank and the Palestinian Territories will not suffice to meet the essential human survival needs of their respective populations unless management is dramatically improved. [1]

The water shortage in the Middle East is as much political as hydrological in nature. According to one prominent Palestinian, "if the peoples involved...were all under a single, impartial, benevolent, and efficient government, such a government would have little difficulty in reaching and carrying out a fair and reasonable apportionment."[2] But they are not. One solution is a supranational organization through which the riparian states could jointly manage some or all aspects of water allocation and use. In fact, an institutional response is widely promoted in literature on Middle East water problems, but few analysts suggest concrete, substantive recommendations regarding the functions and structure of such a body. This paper attempts to fill this void.

We focus on a potential Israeli-Palestinian water commission. Though ideally riparians should be involved in cooperative endeavors, but the social and economic consequences of lack of water scarcity in the West Bank and Gaza could undermine efforts at reconciliation between Israelis and Palestinians. The peace process that led to the White House Lawn has created the opportunity for collective action. In fact, the interim self-rule accord signed by leaders of the PLO and the State of Israel in September 1993 calls for "cooperation in the field of water ... [including] proposals for studies and plans on water rights of each party, as well as on the equitable utilization of joint water resources for implementation in and beyond the interim period."[3]

II. METHODOLOGY – A BEST PRACTICES APPROACH

Attempts have been made all over the world to apply institutional solutions to conflicts over international fresh water resources. This study taps the wealth of this existing experience to apply lessons learned to the Palestinian-Israeli context. Our methodology is a "best practices approach". We base recommendations regarding the design of a Palestinian-Israeli water commission on an examination of pertinent case studies. A "best" practice seeks to maximize each party's individual interests and the combined interests of all parties. As William Zartmen writes, best practices provide "both the largest pie possible and also the largest shares of it for each party -- a Pareto-optimal outcome."[4]

We examine four international water commissions: The International Joint Commission, whose members are the United States and Canada; the International Commission for the Protection of the Rhine, consisting of the Netherlands, France, Germany, Liechtenstein, Switzerland and the European Community; the Permanent Indus Commission, whose members are Pakistan and India; and the Lake Chad Basin Commission, comprising Chad, Niger, Nigeria, the Central Africa Republic and Cameroon. These sample institutions were chosen to reflect successes and failures in the context of different levels of social and economic development, political stability and regional integration. We identify contextual variables and institutional design variables that are most influential in their establishment and continuing viability. We then compare the operating environments of the four sample commissions to the Palestinian-Israeli environment situation to determine how a water management institution could be designed to successfully perform in the Middle East.

Our recommendations must overcome the skepticism of sovereign (or quasi-sovereign) entities averse to relinquishing any measure of domestic control over politically sensitive issues, such as water management.[5]

A successful design would:

- increase efficiency in resource utilization, and improvements in welfare and equity;
- stabilize or improve overall relations between the parties and avoid negative spillover into non-water issues; and
- increase the speed with which joint resource problems are tackled and resolved.

We gathered qualitative and quantitative data on our four sample commissions. It consists of oral and written accounts from numerous sources, including senior officials from each commission. We consulted over forty individuals including cabinet ministers, diplomats, academics, economists, engineers, non-governmental experts, and legal and technical personnel from international lending institutions. (See Appendix A for a complete list of sources and Appendices I-IV for detailed responses.) This wide variety of professional orientations helped ensure that we considered all the variables that could be important.

We analyzed each case in light of the contextual and institutional design variables listed in Table 1.

In composing the list of variables, our goal was to distinguish between potentially influential factors without overburdening survey respondents with an excess of hairsplitting questions. An initial set of 80 variables was therefore limited to 43.

More than one hundred treaties address transboundary water resources[6] and include some institutional provisions. Hundreds of variables are potentially influential in the establishment and the sustainability of such institutions. Our four case studies are hardly an exhaustive set. Further examination of other examples and variables might redirect analytic attention and reveal additional insights.

Diplomatic Relations/Intern'l Legal Context
1. formal diplomatic relations
2. transnational contact
3. participation in multilateral bodies
4. territorial disputes
5. strategic importance of water
6. international water law principles

Domestic Political Context
7. high-level political support
8. changes in government leadership
9. public participation

Events/Timing
10. political/hydrological/economic event
11. cooperative sequencing

Social/Cultural Context
12. social/cultural factors

Hydrological Context
13. urgency of hydrological problems
14. hydrological (inter)dependence

Commission Membership
15. commitment of member states

Economic Development
16. economic development/homogeneity

External Involvement/Support
17. brokering/political function
18. technical/funding support

Institutional Mandate/Function
19. number of functions
20. complexity of functions

Decision-Makers/Process
21. authority/autonomy
22. informal contact
23. type/level of expertise
24. political status/clout
25. voting requirements
26. de(centralization)
27. charismatic leadership

Organizational Culture/Negotiating Behavior
28. issue linkage
29. voting block behavior
30. political sensitivity/pragmatism.
31. creativity/flexibility
32. bureaucratic/scientific independence

Compliance
33. transparency
34. targets/time tables
35. reporting/monitoring
36. penalties/incentives
37. role of subnational agencies

Institutional Funding
38. magnitude/regularity
39. distribution of financial burden

Institutional Capacity
40. technical/administrative resources
41. disparities in resources

Dispute Resolution Mechanism
42. dispute resolution mechanism
43. 3rd party involvement

Table 1: Institutional variables examined

III. THE INTERNATIONAL JOINT COMMISSION PROFILE

A. Hydrological Profile

The United States and Canada share more than 150 bodies of water along their 8,000 km-long border. These include the Columbia River and the Great Lakes, the world's largest body of freshwater that supplies an intensely industrialized region. The Columbia River is 1950 km long (1,225 miles), of which 1,200 km flow through US territory and the remaining 750 km through Canada. The river basin drains over 650,000 square km (259,000 square miles), an area encompassing vast stretches of border.[7] The total yearly run-off is 180 million acre-feet, more than twice the flow of the Nile and eleven times that of the Colorado River.

The shared waters are economically significant for both the US and Canada. The bulk of Canada's population and industrial base resides in close proximity to the boundary. Americans nevertheless outnumber Canadians in the basin by a ratio of 3:1.[8] On the Canadian side, the population is substantially more rural and dispersed. Roughly one third of the hydroelectric potential of North America lies within the Columbia River basin.

Extensive industrialization in Great Lakes region (one-sixth of the US GNP and one-third of Canada's national income is generated in the basin) has led to serious pollution of the US-Canadian waters.[9] The two countries primarily face quality and quantity problems associated with the following uses: navigation, hydro-electric power generation, industry and agriculture.[10] In recent years, pollution issues, such as the chemical pollution of the Great Lakes, have gained considerable attention.

B. Historical Background

The idea of appointing an international commission to adjudicate conflicts over international waters took hold slowly. It was accepted unanimously at the International Irrigation Congresses (1894 and 1895) attended by delegations from both Canadian and the US.[11] Limits to the autonomy of such a body was one of the issues rigorously debated at that time.

In 1902 a six-member United States-Canada International Waterways Commission was established to investigate and report on the conditions of the waters adjacent to the border between the United States and Canada. The Boundary Waters Treaty, which established the International Joint Commission (IJC), was signed in 1909 by Great Britain (on behalf of the Dominion of Canada) and the United States following the Commission's inquiry and several years of bilateral negotiation. The Treaty's primary purpose was to prevent and settle disputes arising over the boundary waters and the common frontier.[12] In addition to creating the IJC, the Treaty resolved a dispute over the apportionment of the St. Mary and Milk Rivers and the diversion of water for hydro-electric power at Niagara Falls.[13]

C. Diplomatic Relations and the Economic Context

In 1977, Prime Minister Trudeau declared: "The friendship between our two countries is so basic, so non-negotiable, that it has long since been regarded by others as the standard for enlightened relations."[14] North America's geographical, sociological, and political environment facilitates such harmony.[15] First, Canada and the United States share cultural traditions and have complementary political systems. Second, the relationship between Canada and the United States is most appropriately characterized "not as a relationship between a strong and a weak power but between a strong and a less strong power."[16] Canada can influence the policy process in the US because of the openness of the U.S. political system. Third, the two highly developed countries are enormously interdependent economically. The level of trade between Canada and the United States is greater than between any other two countries in the world. Canada is more vulnerable, however, to barriers against exchange;[17] over 70 percent of Canada's foreign trade is with the United States, while only 25 percent of U.S. foreign trade is with Canada.

D. Institutional Mandate and Functions

The IJC, conceived as a neutral technical advisory body that was to address the issue of water supply, has since moved beyond the realm of pure scientific advice.[18] The Commission now facilitates and coordinates cooperation between the United States and Canada on international water issues.

The two governments originally intended the activity of the IJC to focus on the regulation of water supply on either side of the border.[19] Today, it addresses water pollution in boundary waters and transboundary rivers, apportionment and control of water flows and levels (to ensure navigation), air pollution, and even the examination of a local transboundary socio-economic problem.[20]

Reaching well beyond its initial quasi-judicial role, the IJC expends much effort on scientific investigations, most of which involve environmental concerns.[21] In 1972, the IJC was charged with monitoring and assisting the implementation of the Great Lakes Water Quality Agreement, whose purpose is to "restore and maintain the chemical, physical and biological integrity of the waters of the Great Lakes Basin Ecosystem."[22] This environmental enterprise treaty was an outgrowth of a prior reference to the IJC. The IJC recently issued a report on the Great Lakes' toxic waste problems that called for the cessation of chlorine use in manufacturing.[23]

The IJC serves the following three primary procedural functions:

- **Water level permitting.** The IJC approves applications to raise or lower water levels of boundary or transboundary waters. The IJC can impose conditions to protect interests on one side of the boundary when works or structures are built on the other side.[24] The construction and operation of approved projects is monitored by an independent board.[25]
- **Dispute investigation.** The IJC investigates any question or disagreement related to water resource management that is referred to it by either government. This investigative function, called the reference function, is generally not invoked without the consent of both parties. The IJC acts as a joint fact-finding body; its product is a set of findings and technical solutions. The IJC does not conduct the research itself; instead, it convenes a group of experts, mostly drawn from government agencies in both countries. Based on the experts' report and contributions made through a formal public hearing process, the IJC prepares recommendations. It can accept, in part or in whole, the recommendations of the advisory board, or discard them. Significant bilateral negotiations occur between the two sides before the recommendations are issued. The IJC tends to receive references

on issues the governments want to avoid, either because they are politically charged or technically complex.[26] The IJC thus provides a mechanism for "neutralizing" the problem by removing it from the political arena and redefining it in "objective" scientific terms.

- **Notification.** The IJC is responsible for alerting the U.S. and Canadian governments to potential problems along the boundary.

E. The Decision-Making Structure

The IJC operates under the principle of majority rule. It is composed of six non-tenured commissioners, three appointed by the Governor-in-Council of Canada and three appointed by the President of the United States with the advice and consent of the Senate. For administrative convenience, the IJC is divided into two sub-units, one in Washington D.C. and the other in Ottawa.[27] Despite this geographic split, the commissioners act as a single body seeking common solutions and are expected to formulate their positions with the welfare of the whole, rather than national interest, in mind. The chairperson of each unit serves as a full-time senior executive, and presides over all meetings held in his or her country. The two other members of each national team serve part-time.

The IJC currently has a full-time staff of approximately sixty. About half are assigned to the Great Lakes Water Quality Reference.[28] The IJC also depends heavily on an extensive network of advisory boards, task forces, and working groups whose members are borrowed from federal, state, and provincial government agencies. Other advisors come from academia, industry, and environmental organizations. While each office has a small core of technical advisors to assist the commissioners, the IJC's regulatory, investigative, and surveillance activities are performed by boards that are convened on a case-by-case basis. These advisory councils do not receive any instructions from national government agencies, and their members are not to act or be regarded in any way as representatives of their home institutions.

F. Funding Mechanism

The Boundary Waters Treaty requires each government to pay the salaries and expenses of the IJC members and their secretaries. Canada and the United States share all joint expenses including providing the financial, scientific, and engineering resources required by the reference groups. The IJC once requested funds to conduct its own research but this idea was rejected by the U.S. State Department, on the grounds that such independence would restrict the United States' ability to perform technical reviews.[29]

G. Compliance and Implementation

The IJC's recommendations are implemented at the discretion of Canada and the United States, generally only after additional bilateral consultations. Most of the IJC's recommendations are referred by the U.S. Department of State and the Department of External Affairs of Canada for implementation by the U.S. Environmental Protection Agency and Environment Canada.[30] (Most IJC initiatives also originate with either the EPA or Environment Canada.[31])

For a commission without decision-making authority, the IJC's track record is impressive.[32] A U.S. General Accounting Office report of 1989 found that 29 out of 56 IJC recommendations, or 56 percent, had been implemented; 36 percent had been ignored or rejected; and 4 percent had been partially implemented.[33] From 1909 to 1979, the IJC handled 59 applications, 46 references, and supervised 26 boards and dozens of committees and working groups.[34] Only four times during this period did the IJC fail to reach agreement and divide along national lines. Some of the major issues the IJC has resolved include the St. Lawrence Seaway and Power Project, the Great Lakes water levels problem, a dispute over the development of the Columbia River, and pollution in the boundary waters.

H. Dispute Resolution Process

The mandate of the IJC includes a formal dispute resolution function. It will attempt to settle any question or matter of difference involving the rights, obligations, or interests of the parties referred to it with the consent of the two parties. If both the U.S. Senate and the

Canadian Governor-in-Council consent, the IJC's decisions are binding. The dispute resolution power has never been invoked.[35]

EVALUATION

A. Record of Success

The IJC is widely seen as a successful experiment in transboundary water resource management. It has been shown that it is a fair, independent body, and was seldom divided along national lines even early in its existence.[36] In fact, nearly all of the cases referred to the IJC since 1909 were resolved unanimously.

The IJC is a science-based institution, while the predominant focus in international affairs is law and diplomacy.[37] The commission's members know that the IJC's credibility depends on the strict application of technical standards. Yet in addition to its reputation for impartiality, political sensitivity has also contributed to the IJC's continued effectiveness as an advisor to two governments. In its role as watchdog over the implementation of the Great Lakes Water Quality Agreement, the IJC has sternly criticized the American and the Canadian governments for their lack of progress. However, it has been very careful not to cross the line into environmental advocacy, which could erode its influence. The success of the IJC reflects its understanding that its work is political.

Nonetheless, on some politically charged issues, national interest has nevertheless prevailed; in those cases the IJC was excluded from critical negotiations. In the case of acid rain, for example, the governments chose to go the diplomatic route. [38]Only after the member countries reached an agreement to jointly monitor and conduct research into the acid rain problem did they involve the IJC by creating the Great Lakes Air Quality Board.

B. Findings

We identified 12 variables as the most influential in the creation and continuing viability of the International Joint Commission. (See Figure 1 for the influence of the most salient variables.)

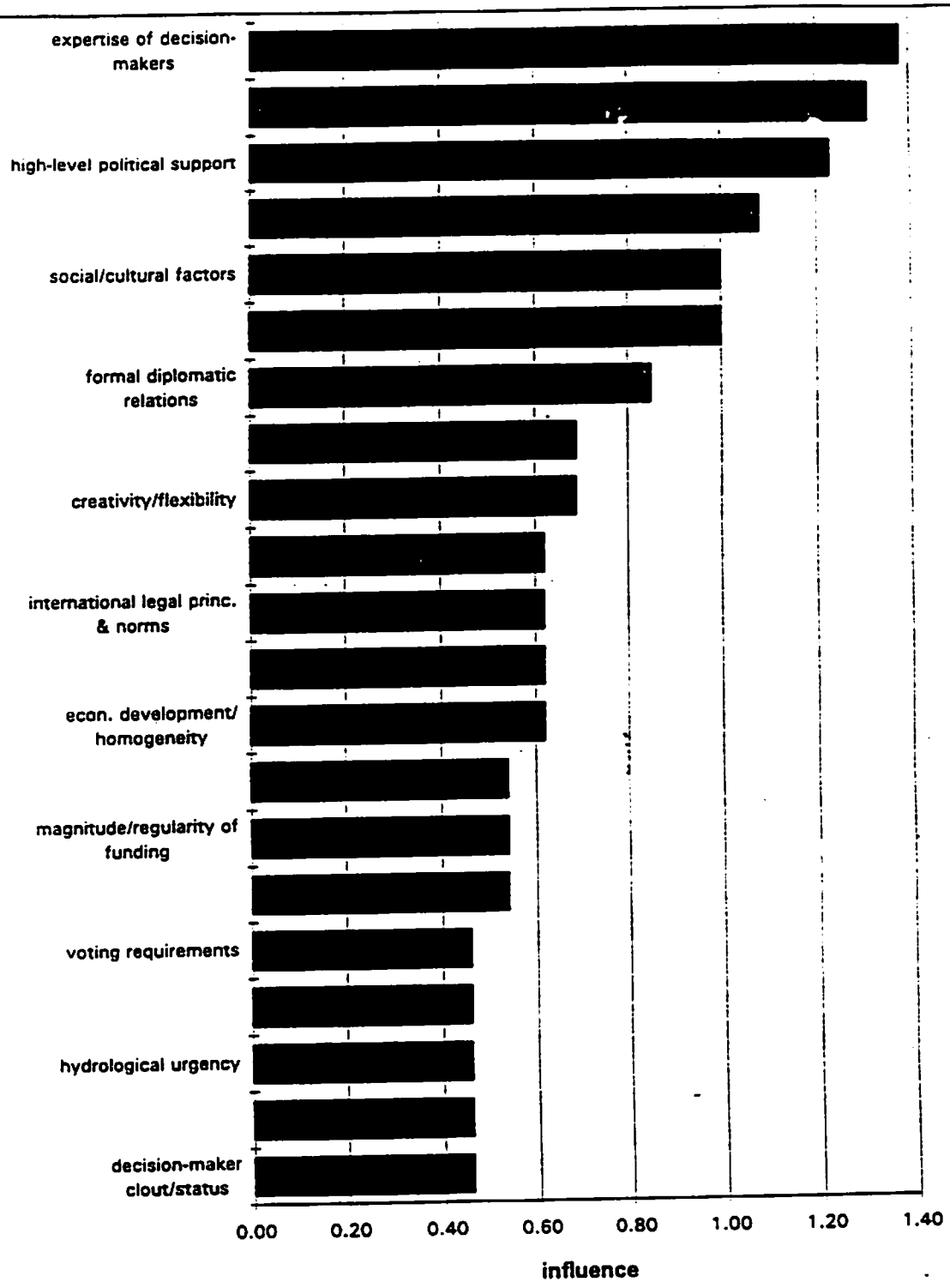

Figure 1: The most salient institutional variables for the International Joint Commission and their influence

- **The type and level of expertise of the decision making players and process (Variable No. 23)**

  By convening advisory boards, the IJC can draw from a substantial pool of hydrological, economic, ecological expertise within Canada and the U.S..

- **The authority and autonomy of the decision making players and process (Variable No. 21)**

  The success of the IJC has been attributed to the commission's commitment to serve as a forum for the elaboration of mutually advantageous solutions rather than a battleground between national interests.

- **High-level political support within the domestic political context (Variable No. 7)**

  The creation of the IJC was promoted by high-ranking government officials such as the Chairman of the International Waterways Commission, George Gibbons.

- **The bureaucratic and scientific independence of the organizational culture (Variable No. 32)**

  The advisory board's detached scientific recommendations contribute to the IJC's favorable reputation.

- **The shared social and cultural values and norms (Variable No. 12)**

  The shared social and cultural histories of the United States and Canada are positive influences in the workings of the IJC.

- **Public participation within the domestic political context (Variable No. 9)**

  The IJC's efforts to increase public participation is cited both as a positive and negative feature of the IJC. According to Carol Reardon, "the demand for greater public participation has made it more difficult to define issues in purely scientific terms, and to shelter scientists from the public debate until they have come to some consensus on the relevant science."[39]

- **The formal diplomatic relations among member states (Variable No. 1)**

  The strong diplomatic relations between the United States and Canada are instrumental in the workings of the IJC.

- **The practice of issue linkage in organizational culture and negotiating behavior (Variable No. 28)**

  Treatment of water issues in isolation, without linkage to cooperation in other realms, constitutes an obstacle to cooperation.

- **Creativity and flexibility in the organizational culture (Variable No. 31)**

  The creativity and flexibility of the advisory boards' technical personnel enhance the IJC's effectiveness.

- **Regional economic development and homogeneity (Variable No. 16)**

  Industrial activity is largely responsible for the degradation of transboundary waters.

- **Informal contact among decision making players and process (Variable No. 22)**

  Frequent informal exchanges among low level officials "provides a valuable supplement to information exchanged through normal channels."[40]

- **The political sensitivity and pragmatism of the organizational culture (Variable No. 30)**

  These are positive features of the advisory boards.

IV. THE INTERNATIONAL COMMISSION FOR THE PROTECTION OF THE RHINE PROFILE

A. Hydrological Profile

The Rhine River originates in Switzerland, forms part of the Franco-German border, and then winds through German and Dutch territory before flowing into the North Sea. The river's catchment area is 185,000 square km; it encompasses ten countries and a population of 55 million people.[41] Rhine waters are used for drinking, industry, transportation, irrigation, fishing, recreation and municipal waste disposal. Twenty percent of its yearly flow is used as cooling water by power stations,[42] predominantly located in Germany, resulting in severe thermal pollution. In the early 1970s, a 100-km stretch of the river was virtually devoid of oxygen, and a Dutch government report predicted that Rhine water flowing across its boundary would reach the boiling point by the year 2000[43] with deleterious effects on the natural habitat and meteorological conditions in surrounding areas. Measurements taken from 1973 to 1975 showed that water at this border crossing contained an average yearly load of 47 tons of mercury, 400 tons of arsenic, 130 tons of cadmium, 1600 tons of lead, 1500 tons of copper, 1200 tons of zinc, 2600 tons of chromium, and 12 million tons of chloride.[44]

For decades, the most dramatic and intractable form of inorganic pollution afflicting the Rhine was chloride, primarily from salt discharges released by Alsacian and German potash and coal industries. As the downstream estuary state, the Netherlands incurred much of the resulting damage. The country's low altitude -- partly below sea-level -- and its dependence on Rhine water renders it particularly sensitive to a decline in quality. Not surprisingly, the Dutch initiated the diplomatic process that led to the creation of the International Commission for the Protection of the Rhine (ICPR), and most aggressively pushes for an expansion of the institution's powers and jurisdiction.

B. Historical Background

Ten percent of the world's chemical and pharmaceutical plants operate along the Rhine's shores, discharging massive loads of toxic chemicals to a river already subjected to a barrage

of human and agricultural waste. The need for concerted action among bordering states to control river pollution inspired the establishment of the ICPR, which obtained official status as an intergovernmental body in Bern on April 29, 1963. The ICPR was originally composed of Germany, France, the Netherlands, Luxembourg, which is connected to the Rhine through the Moselle, and Switzerland. The European Community joined in 1976. The secretariat is headquartered in Koblenz, Germany.

The Rhine has been a central transportation artery in Europe since Roman times, and the ICPR was formed in the context of a history of cooperation among riparian states. The Rhine Basin has over time come to be governed by a number of single-purpose multi-national bodies:

As far back as 1815, the countries bordering the Rhine established the world's first international organization, the *Central Commission for the Navigation of the Rhine.* This body governed shipping, an activity that had been hampered by a myriad fiscal and commercial restrictions, such as unilaterally imposed tolls and customs barriers.[45] The principle of freedom of navigation for all nations was adopted and the Commission was endowed with an unprecedented degree of power for an international body. At its inception, the body exercised executive authority through an international inspectorate, but national administrations soon laid claim to these oversight and enforcement functions. The Central Commission remained operational during World War II ("...even in these tragic and abnormal times, old loyalties and working agreements were honored *de facto* if not *de jure*"[46]), and now acts as a policy-making and coordinating body, as well as a court of appeals hearing cases from lower national tribunals. One analyst has remarked that "over the years the quantitative Rhine water management policy has reached a very high level, both technically and administratively." [47]

A much less effective endeavor was the *International Salmon Commission,*[48] which was established to protect a dwindling fish stock and promote the equitable distribution of catches. But the battle for the survival of salmon lost ground to increasing pollution and the proliferation of water and hydroelectric works, and the Commission became defunct in 1950.[49] A third body, the *International Commission for the Hydrology of the Rhine Basin,* deals with other hydrological issues of common interest.

C. Diplomatic Relations and Domestic Political Considerations

The Netherlands first expressed concern over the level of pollution of the Rhine in 1946, but the process of establishing the ICPR was slowed by the political difficulties of war-ravaged Europe. Progress in abating pollution levels halted during the 1960s and 1970s, partly because wounds from the conflict had not completely healed. Today, despite persistent differences in national character and in ideological outlook regarding the desirable role of market forces and social considerations[50] the countries of the ICPR are comparatively a culturally homogeneous group, though there differences in negotiating styles among the national delegations. The nations' commonality of values, methods, and goals is considered crucial to harmonious teamwork on both the technical and the diplomatic level; one analyst writes that such homogeneity "seems to have been the main influence making the negotiations more cooperative than distributive."[51]

The Rhine riparians are close allies embedded in an elaborate web of bilateral and multilateral institutions--EEC, EFTA, Council of Europe, WEU, as well as extraregional organizations such as NATO and the OECD. Of these, the European Economic Community, which is an ICPR member, plays an especially large role in setting the tone and pace of the ICPR's proceedings. At times, this influence facilitates the decision-making process, at others it has a dampening effect. Dupont writes that "because of the growing feeling of continental unity European negotiators tend to interact in a more confident and casual way."[52]

The work of the ICPR rests on concrete building blocks of a European legal framework governing water resource management. A European Water Charter issued in 1968 by the Council of Europe proclaimed that water is not an inexhaustible resource, and that its protection requires international cooperation. The EEC has promulgated legislation on water pollution, to which all ICPR members except Switzerland are bound. One example is the Council Directive on Pollution Caused by Certain Dangerous Substances Discharged into the Aquatic Environment (1976). Some EEC rules aim to limit effluents and thus complement the work of the ICPR. Progress in Brussels can be excruciatingly slow, so that the linkage has sometimes hampered the commissioners.

Sustained interaction of the kind practiced within the ICPR is generally believed to

enhance relations between nations. But when highly sensitive domestic issues are on the agenda of international bodies, the converse can be true. Who holds political power in the members' respective capitals is significant, not only in terms of the composition and policy orientation of the national delegations,[53] but also in terms of determining whether a government is willing to withstand domestic opposition to the ICPR's decisions. For example, in 1979, France failed to ratify a convention that called for reductions in salt discharges from Alsacian potassium mines, the single largest source of chloride in the Rhine, by dumping the waste refuse into the subsoil. Fearing that the local outcry against the plan would be so strong as to defeat the measure, the ruling party refused to put the agreement to a parliamentary vote. In protest, the Netherlands recalled its ambassador. A modified Chloride Convention was approved only after a change in France's government in 1981, and the issue was finally laid to rest in 1991 with another revision of the agreement.

D. Economic and Social Development

The ICPR's member nations are among the wealthiest and most developed in the world. Advanced industrialization created many of the Rhine's ills and the standard of living that allows citizens to demand and pay for a cleaner environment. Especially in Germany and in the Netherlands, the environmentalist ethos has penetrated public consciousness and political discourse. Dietrich Ruchay, the current president of the ICPR, cites the pressure of public opinion as a critical factor in the institution's growth.

E. Institutional Mandate and Functions

The reduction of pollution is the goal that created the ICPR and keeps it viable: "The general principle of a pollution-free Rhine has led -- and continues to lead -- the actors to agree on a common recognition of the nature of the problem and the need to cooperate toward a betterment of the situation."[54] However, precise objectives and substantive obligations were not spelled out in the treaty establishing the Commission because France and Germany were not prepared to commit themselves to such provisions.

The ICPR has no independent legislative, executive, or judicial power; rather, it is a forum for consultation and coordination. Its tasks include research of the nature and sources

of pollution, the elaboration of abatement measures and financing schemes, and the drafting of legal protocols. Given the significant economic interests that are involved in the last task, the ICPR sometimes steps on politically sensitive ground. For example, the Association of German Chemical Industry claimed that a Franco-Dutch proposal to set stringent chemical pollution abatement targets in the 1970s would threaten 70 percent of its total business activity.[55] More than anything, the ICPR performs an important consolidating function: linking a wide array of government agencies and interest groups at the national and sub-national level involved in policy determinations regarding the waters of the Rhine.

F. Decision-Making Structure

The ICPR has a dynamic, multi-tiered decision-making structure. At the outset, each country conducts internal consultations which help crystallize a national perspective. Several of the member countries are strongly committed to federalism; they collect input from local and regional authorities at both the policy formulation and the enforcement stages. Private interests and other third parties are also heard. The positions elaborated through domestic consultation are conveyed to the other countries through bilateral and multilateral channels before they are formally presented to the ICPR. Thus, few surprises jolt ICPR proceedings; their principal objective is to iron out differences between member countries.

Technical and scientific evaluations are crucial to the way problems come to be defined and solutions elaborated by the ICPR. They are prepared by numerous multi-national working groups concerned with topics such as waste water treatment, industrial warning systems, and juridical issues. The Secretariat's proposals are based on these evaluations and are approved at an annual general meeting attended by departments heads from the ministries of environment or foreign affairs.

Ministerial conferences provide a high-level political forum for debate of Rhine pollution issues. They are called intermittently, and usually consider issues that have been discussed to the point where the road to final resolution is relatively smooth. Some observers cite the fact that important decisions must generally be explicitly endorsed by ministries of the member nations as a symptom of the limited strength of international bodies such as the ICPR.[56] The original intent of the ministerial meetings was to break impasses as they arose

on the most difficult challenges. For example, a gathering was convened to attempt to resolve the controversy over salt after endless rounds of negotiations within the ICPR failed to make progress which paved the way for a 1976 agreement to buy potassium mine wastes underground. Two accords, the Chemical Convention and the Convention on the Protection of the Rhine against Pollution by Chlorides, both signed in 1976, were hammered out in a series of ministerial conferences. Other agreements reached at this level are limitations on the thermal load and the reduction of mercury effluents.

ICPR's determinations must be unanimously approved at every stage, from the scientific working groups to meetings with high-level diplomats, which makes the decision-making process slow and laborious. Recommendations are not binding, but since they are negotiated and endorsed by representatives of member governments, they generally embody national policy positions and are readily implemented.

G. Funding Mechanism

The budget for FY 1992 was DM 1 million, financed by contributions from member states. This amount covers operating expenses such as salaries and rent, as well as publication, translation, and travel costs. Implementation of ICPR proposals is funded by the nations on whose territory the activity takes place, but cost-sharing arrangements are sometimes agreed upon.

H. Implementation and Compliance

Responsibility for day-to-day monitoring and implementation activities lies with member states' national, regional and local authorities. They perform these tasks according to guidelines elaborated by the ICPR. For example, a special water protection unit in Mannheim is charged with verifying the safety of equipment used by factories along the Rhine.

While the Netherlands continuously press for stricter standards and tighter enforcement measures to improve already high levels of compliance further, three of the five member countries oppose cross-border controls of industrial plants and a more open

information policy for reasons of national sovereignty. Timetables for reaching targets are built into some clean-up plans. Member states are required to submit progress reports, which are synthesized and published by the ICPR, and nations are conscious of that credibility and mutual trust are at stake, despite the absence of formal legal recourse in cases of non-compliance.[57]

I. Dispute Resolution Process

The Convention contains no binding dispute settlement mechanism. Both the Chemical and Chloride Conventions contain arbitration clauses that can be invoked in case of noncompliance.

EVALUATION

A. Record of Success

In its early years, the effectiveness of the ICPR was limited. Until 1970 there was no official coordinated policy on Rhine water quality – except a monitoring effort that revealed where heavy discharges were occurring. These results spurred the erection of purification plants, the only concrete and effective step taken on the national level.[58]

In the late 1970s when pollution rose to unprecedented peaks and the Rhine was called "Europe's biggest sewer," the Commission was deadlocked on the highly sensitive question of salt load. Despite an offer from downstream Netherlands to defray 34 percent of the disposal costs, the French balked at the proposed schemes. The salt controversy dominated the Commission's agenda for 25 years, with long-term detrimental effects on the cohesion of its members and the overall success of the institution. As the ICPR floundered, The Netherlands worked through other channels: a private foundation sued the Alsacian mines for damages in a Dutch court. Similarly, in the late 1980's, the Rotterdam Harbor was so contaminated with heavy metals that port officials bypassed the ICPR, and directly lobbied companies located upstream.[59] Earlier, the Dutch government's frustration was high enough to induce it to contribute funding to a mock international water tribunal. This

elaborate publicity show was sponsored by about 90 environmental groups, which sat to hear cases brought against giant chemical companies and public authorities accused of illegal dumping and otherwise polluting the Rhine.[60] A key "defendant" was the ICPR.

The ICPR's progress on matters other than chloride has sometimes been painfully slow. Bottlenecks existed at different stages of the process. For example, in 1976 a working group was charged with preparing an international agreement on thermal pollution and was inactive for five years. Alternatively, a decision adopted in 1972 requiring that new power stations built along the Rhine have closed cooling systems was not ratified by 1990.[61] Still, some improvements, notably in oxygen balance and heavy metal loads, were accomplished.

It took the 1986 Sandoz disaster --30 tons of mercury and other highly poisonous chemicals were washed into the river following a blaze in a Basel warehouse -- to bring home the message that no nation was impervious to potentially catastrophic consequences from river pollution. A long-overdue shift in priorities occurred in the ICPR. Upstream Switzerland which had been rather aloof and guarded especially felt acute political pressure to take effective action. The ICPR was charged with launching the Rhine Action Plan (RAP), an ambitious clean-up campaign aimed at halving pollution by 1995, safeguarding drinking water, and making the river clean enough for salmon by 2000.

The RAP is currently in the middle of its second concrete implementation phase which emphasizes pollution from non-point sources, the harmonization of technological standards, the reinforcement of safety systems in industrial plants, and the improvement of the Rhine and North Sea ecosystems. The RAP mandates that companies install the best available anti-pollution technology, a costly choice as illustrated by German industry projections that the directive will require spending amounting to a total of $2.5 billion.[62] A third phase (1995-2000) will assess the RAP's achievements and fine-tune programs. Progress has been encouraging and comparatively swift: reduction targets of more than 50 percent had already been met by 1990 for two-thirds of the 45 priority substances identified by the RAP.[63] In 1992, tens of thousands of young salmon and sea trout were released into the river.[64]

The ICPR has thus seen its influence and maneuvering room increase somewhat as it takes a more assertive role in shaping and implementing water management policy. Still,

control of the Rhine is still parceled out among several single-purpose bodies, though the geographical areas they cover and the diverse functions they perform are inextricably linked. There has been a debate over possible institutional reforms that would allow for integrated basin-wide planning, but a concrete proposal embodying this approach is not yet on the horizon.

B. Findings

We identified seven variables as the most influential in the creation and continuing viability of the International Commission for the Protection of the Rhine. (See Figure 2 for the influence of the most salient variables.)

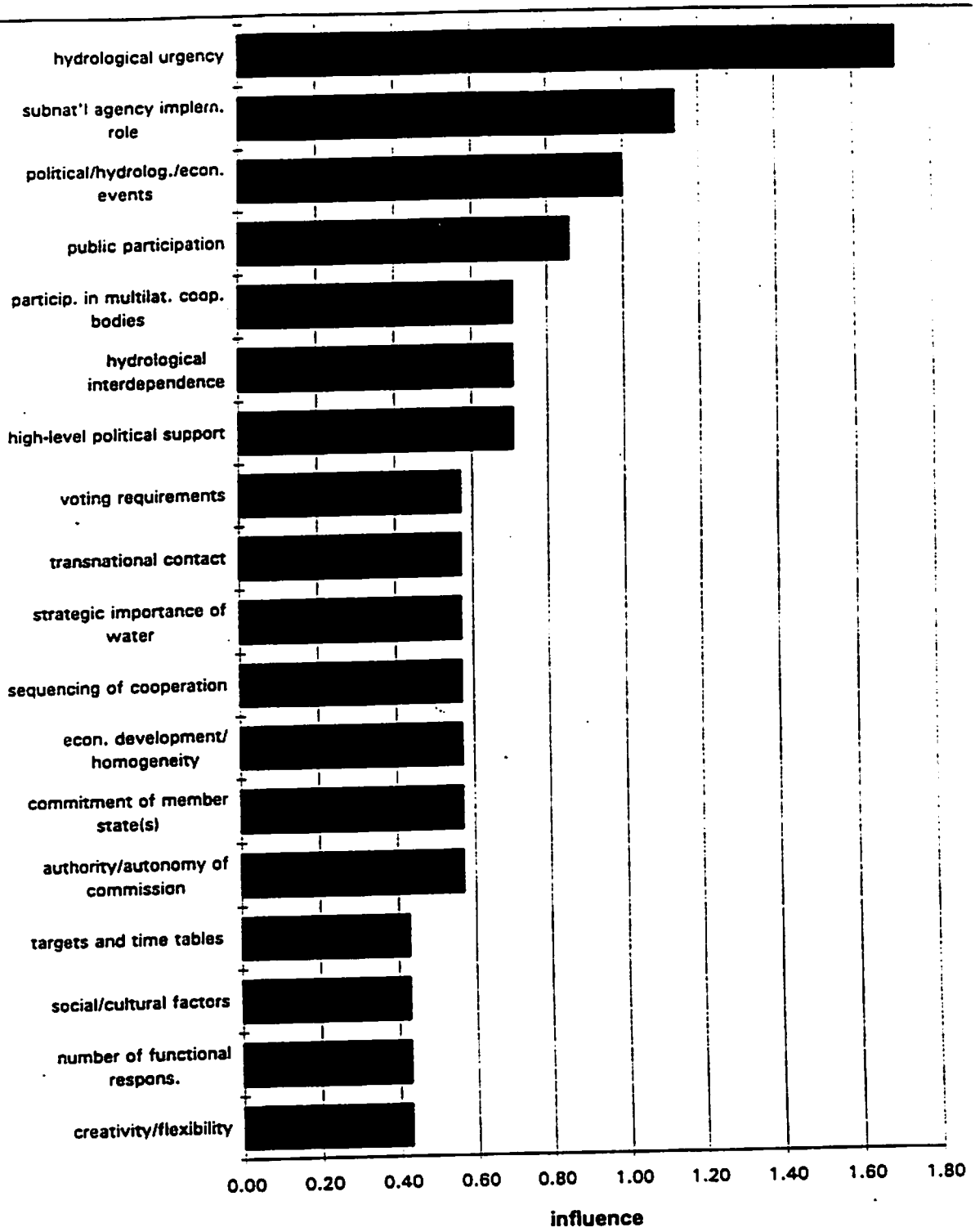

Figure 2: The most salient institutional variables for the International Commission for the Protection of the Rhine

As the figure above illustrates, the most influential variables in the creation and ongoing viability of the International Commission for the Protection of the Rhine are:

- **The urgency of the hydrological problem and interdependence of the countries (Variables No. 13 and 14)**

  Pollution severe enough to impair the social and economic well-being of riparians, especially downstream Holland induced the parties to establish the ICPR and maintain their cooperative effort despite serious disagreements on some issues.

- **The timing of a political or hydrological event (Variable No. 10)**

  Efforts to extinguish the 1986 fire at a Sandoz warehouse washed loads of toxins into the Rhine, with profound consequences for upstream water users and the ecological balance of the river. Galvanized into action by this accident, member governments increased their commitment to the ICPR's mission; they agreed to tough joint clean-up measures and expanded the commission's scope of activity.

- **The members' diplomatic and legal participation in multilateral bodies (Variable No. 3)**

  European integration inspires mutual trust and consolidates working relations among member states. This facilitates communication and decision-making within the ICPR.

- **The high level political support within the domestic political context (Variable No. 7)**

  Progress on many of the ICPR's agenda items became possible only after stumbling blocks were removed at the highest political levels. In some member states, notably the Netherlands and Germany, Rhine pollution is an important domestic issue. High-level concern bolsters the national delegations' leverage in ICPR negotiations.[65] Conversely, domestic opposition to commission plans (such as the Alsacian opposition to the Chloride Convention) can undermine a government's support and block ratification.

- **The role of subnational agencies in compliance (Variable No. 37)**

  Strong local and regional authorities carry primary responsibility for monitoring and enforcement of ICPR directives that have been ratified by member governments. They also play a key role in policy development.

- **Public participation within the domestic political context (Variable No. 9)**

The public does not directly participate in ICPR proceedings. However, in the commission's negotiations on the desirability of intense Rhine clean-up efforts, disparities among member states in public concern about the environment were reflected in the members' positions.

V. THE PERMANENT INDUS COMMISSION PROFILE

A. Hydrological Profile

The Indus Basin has been a center of civilization for more than 4,000 years. It extends from Tibet to Pakistan, and encompasses territories in Afghanistan, the People's Republic of China, and India. The six major rivers of the basin converge into the Indus River, which drains into the Arabian sea more than a 1,000 kilometers from its source. These rivers are commonly divided into two groups: the Eastern Rivers-- Ravi, Beas, and Sutlej--and the Western Rivers--Indus, Jhelum, and Chenab. The drainage basin covers an area of 1,178,440 square km (450 square miles), including the Himalayas, the highest mountain range in the world. About 170 million acre-feet of water flows through the Indus Basin every year.[66] (This is twice the flow of the Nile, ten times that of the Colorado River, and thirty times that of the lower Rio Grande.) The rivers contribute widely varying amounts:

	EASTERN RIVERS			WESTERN RIVERS		
Flow	Ravi	Beas	Sutlej	Indus	Jhelum	Chenab
million acre feet	6.43	12.84	13.55	89.47	22.65	23.50
million cubic meters	7.91	15.79	16.67	110.0	27.86	28.90

The Indus is unnavigable, and has been harnessed by the Sukker and Kotri Dams principally for irrigation and hydroelectricity. The climate in the Indus Basin is mostly arid and semi-arid. Except for a belt 50 to 75 miles wide, it consists of the Indus Plains, most of which is cultivable when irrigated.[67]

Both Pakistan and India are states intent on agricultural development, so water rights and water apportionment are of primary concern. The physiography of the basin is highly suitable to the construction of infrastructure projects, such as an extensive canal network.

B. Historical Background

The antagonism between the Muslim and the Hindu communities of British India was so profound that after the departure of the British in 1947, ending centuries of colonial influence, only the creation of two states bore any promise of stability and peace. Yet

violence erupted, particularly in the populous, multi-ethnic Punjab region, through which the boundary was drawn.

In 1947, the Indus Basin boasted one of the most developed irrigation systems in the world -- from 26 to 37 million acres were irrigated with water from the Indus river system[68] -- and substantial agricultural development had been undertaken. More than 40 percent of the total water supply was being used to support this irrigation and approximately 84 percent of this irrigated land was in what would become Pakistani national territory. The boundary that was drawn between India and Pakistan cut across the Indus rivers and the canal systems, which had previously been developed under a single administration.[69] The partition made India the up-stream riparian and Pakistan the down-stream riparian on five of the six rivers in the Indus basin.[70] It left the irrigation headworks in India while the largest portion of the system was in Pakistan, where the water was used to irrigate 1.6 million acres.[71]

The British government, the Indian National Congress, and the Muslim League had negotiated a settlement without seriously considering the fragmentation of the existing irrigation system.[72] The Indian Independence Bill of the British Parliament failed to address the issue of transboundary water and irrigation works in part because of speed with which the territory was partitioned.

In April 1948, regional authorities within India blocked the flow of water in the irrigation canals that crossed the boundary and demanded that Pakistan recognize India's claim to the rivers flowing through the Pubjab.[73] This conflict was exacerbated when a military confrontation over Kashmir left India in control over the Chenab and Jhelum rivers, vital sources of water for West Pakistan.[74]

Negotiations to resolve Pakistan and India's dispute over water commenced in 1952, and culminated in the Indus River Treaty of 1960. The World Bank and former chairman of the Tennessee Valley Authority[75] David E. Lilienthal played a pivotal role. The Bank was concerned that an escalation of the conflict would have serious economic consequences for the region. It acted as an independent arbitrator to help broker a deal between the two countries,[76] and applied its vast financial and technical resources to this particularly sensitive dispute. The main obstacles to resolution were:[77]

- Inadequate water supplies and storage potentialities'.

- Sovereignty concerns that hampered prospects of joint planning and development of the basin as a hydrological and economic unit;
- Reluctance to accept proposals that would place new irrigation works in territory controlled by an unfriendly neighbor;
- Dim the prospects of establishing an efficient problem-free joint administration; and
- Clashing visions of water apportionment.

At first, negotiations centered on the concept of joint development and administration.[78] To allay Pakistani fears that were aroused by the water stoppage, Lilienthal proposed that the Indus system be administered by a supranational entity, a bilateral authority or an international agency financed by a collection of friendly nations. The idea of joint administration appeared to gain acceptance and the World Bank offered to "lend its good offices."[79] Pakistan and India endorsed this general approach and agreed in principle to cooperatively develop the Indus basin, but irreconcilable differences between them led the World Bank to abandon the concept in 1954.

The Indus Water Treaty divided the contested water resources along geographic lines: the "Eastern Rivers" (Sutlej, Beas, and Ravi) were assigned to the unrestricted use of India, and the "Western Rivers" (Indus, Jhelum, and Chenab) were assigned exclusively to Pakistan.

As part of the bargain, India was obliged to finance irrigation works constructed and operated by Pakistan, including two new storage dams, six diversion dams, and several link canals. These "replacement works," which have been completed, transfer water from the Western Rivers to irrigation canals that had been previously fed by the Eastern Rivers. During a ten-year transition period, Pakistan was permitted to use water from the Eastern Rivers. The Treaty, which embodies the principle of equitable apportionment as later formulated in the Helsinki Rules, allows each country unrestricted development of waters flowing through its territory.[80] The Treaty also provided for hydropower developments and created the Permanent Indus Commission (PIC).

C. Diplomatic Relations and Domestic Political Considerations

India and Pakistan have failed to normalize relations and fought three wars in the first 24 years of independence. They share a history and cultural heritage,[81] but the conflict is rooted in the long-standing hostility between Muslims and Hindus. While Muslims and Hindus often joined to fight British colonial rule, the Muslims soon recognized that expulsion of the British would mean subjection to the Hindu majority.

The disputes over Kashmir and East Pakistan exacerbated Indo-Pakistani relations. Two of the three wars between India and Pakistan were fought over these areas (1948 and 1965). In 1971 East Pakistan revolted against rule by West Pakistan with the support of the Indian government. East Pakistan declared itself independent and was recognized as the state of Bangladesh by the Pakistani government in 1974. Clashes between pro-independence demonstrators in Kashmir and Indian troops continued through 1990 and 1991 after India imposed central government rule, straining relations between the two states. The lack of well-defined geographical boundaries and concerns over each other's nuclear capabilities have contributed to both sides sense of vulnerability.

D. Economic and Social Development

The Islamic Republic of Pakistan has a population of 102 million (1987). About half of the population work in the agriculture sector, about 13 percent in industry, and the rest in services. The country's 1990 GNP was $43 billion, or about $380 per capita. Vast irrigation works support agricultural activity, the mainstay of the Pakistani economy. The principle crops are wheat, rice, cotton, and sugarcane. As in Pakistan, most of India's population is poor and rural. Most Indians work small plots of land and live in simple village communities, as they did in 1947. India's per capita income was $350 in 1989 with a GNP of $287 billion. Wheat is the primary food crop and cotton is grown for the domestic and export markets.

E. Institutional Mandate and Functions

As elaborated in the Indus Water Treaty, the purpose of the Permanent Indus Commission was to:

- establish and maintain cooperative arrangements for implementation of the Treaty;
- report on problems to be referred to the Commission;
- attempt to settle questions about the application and interpretation of the Treaty;
- monitor the implementation of the Treaty; and
- ensure that the arrangements for the supply of water from the Eastern Rivers to the Pakistani canals are implemented.[82]

The Commission was also called upon to:

- furnish or exchange information as required by the Treaty;
- provide notices and responses to notices, as required by the Treaty;
- conduct a general fact-finding tour of inspection of the development and works projects on the Rivers every five years;
- implement the provisions of the Transition Period; and
- submit and annual report of its activities to the Governments of India and Pakistan .[83]

In practice, the PIC has met regularly since 1960, primarily to exchange data on flow discharges. It also monitors the operation of the agreement. The joint planning functions have not been developed.[84]

F. Decision-Making Structure

The PIC consists of two commissioners, one from each member state. The Treaty requires both parties to appoint "a person who should ordinarily be a high-ranking engineer competent in the field of hydrology and water-use." The Commissioners serve as representatives of their governments in "all matters arising out of this Treaty, and will serve as the regular channel of communication on all matters relating to the implementation of the Treaty." The PIC is required to meet regularly, at least once a year. (Extraordinary sessions can also be called). Meetings are alternately located in India and Pakistan.

In 1965, during the transition period, two procedural issues were raised:[85] 1) the ability of Commissioners to enlist the assistance of advisors, and 2) the ability of a Commissioner to make financial claims from a breach of the Treaty. The decision was made that as representatives from their respective Governments, each Commissioner may enlist the help of advisors and may also make financial claims.

Under the treaty, a government that intends to construct works on the rivers must provide information about these works to the other party at least six months before construction begins. Any objections must be communicated within three months.

G. Funding Mechanism

The World Bank played a significant role in securing the financing that was necessary to produce the agreement establishing the Permanent Indus Commission. The Bank arranged loans and grants from countries including the United States, Canada, United Kingdom, Federal Republic of Germany, Australia, and New Zealand to implement the Indus Basin Replacement Plan works, [86]which cost at least $US1,208 million (1964 estimate).[87] India contributed £62,060,000. The works were completed in the 10-year Transition period.[88]

H. Implementation and Compliance

There have been some disagreements about the collection and exchange of data, the PIC's main function. For example, the Pakistani commissioners have accused India of interpreting the Treaty's data exchange provisions in an excessively narrow fashion.[89] According to Pakistan, India's supply of data is inadequate.

I. Dispute Resolution Process

According to Treaty provisions, if the PIC can not resolve an issue related to the Indus waters, the matter would be referred to a "neutral expert" to be appointed for this purpose. Differences that cannot be resolved in this manner would be settled through bilateral negotiations. If these do not reach an agreement, the final step is appeal to a court of arbitration. These dispute resolution provisions have never been applied, though in 1991 Pakistan threatened to resort to international arbitration at the World Court over India's construction of the controversial Wullar Barrage on the Indus River.[90]

EVALUATION

A. The Treaty's Record of Success

The success of the Indus River Treaty can be measured either against the potential for integrated basin management or against the reality of hostile states competing for vital water resources. By the first criterion, the Treaty can be regarded as a failure; the significant economic and hydrological benefits that could be realized integrated basin management were ruled out when the basin was divided. But by the second criterion, the settlement can be viewed as the best possible solution.[91]

Despite its flaws,[92] the Treaty has reduced tensions by eliminating vulnerabilities that would have come with extreme hydrological dependence.[93] Despite three wars and numerous skirmishes, the water facilities and the operations specified under the Treaty have never been targeted.[94] The Treaty has brought economic benefits. Projects for the development of the basin have attracted substantial financial aid from international sources and agricultural production has increased by 33 percent as a result of the Treaty according to J. S. Mehta, former Foreign Secretary of India.

Third-party intervention was vital to the enactment of the Treaty. The World Bank employed substantial technical, financial, and political resources as incentives and disincentives to cajole the parties into agreement. Pakistan and India could ill afford to ignore the proposals of the Bank; acceptance meant substantial financial support for development, whereas refusal to cooperate could reduce the flow of assistance. Pakistan, the downstream, more vulnerable state, was also less likely to abandon a Bank proposal.[95]

B. The Commissions Record of Success

Because of the structure of the Indus Waters Treaty, which ensures a high degree of independence of the parties in the realm of water management, the PIC plays a rather limited role. Each country is responsible for the planning, construction and administration of its own water projects as well as for the allocation of resources within its territory. This independence has reduced the likelihood of interference with vital supplies, and has thus reduced the potential for conflict.[96]Within its circumscribed domain, the PIC is generally

regarded as effective, not least because its norms and rules have been continuously observed despite the parties' turbulent relations.[97] However, in 1991 Pakistan threatened to submit the dispute over the Wullar Barrage to international arbitration, and Abdul Rahim, former Pakistani Commissioner for the Indus Waters. has recently cited India's tendency to withhold or delay the delivery of data.[98]

C. Findings

We identified nine variables as the most influential in the creation and the ongoing viability of the Permanent Indus Commission. (See Figure 3 for the influence of the most salient variables.)

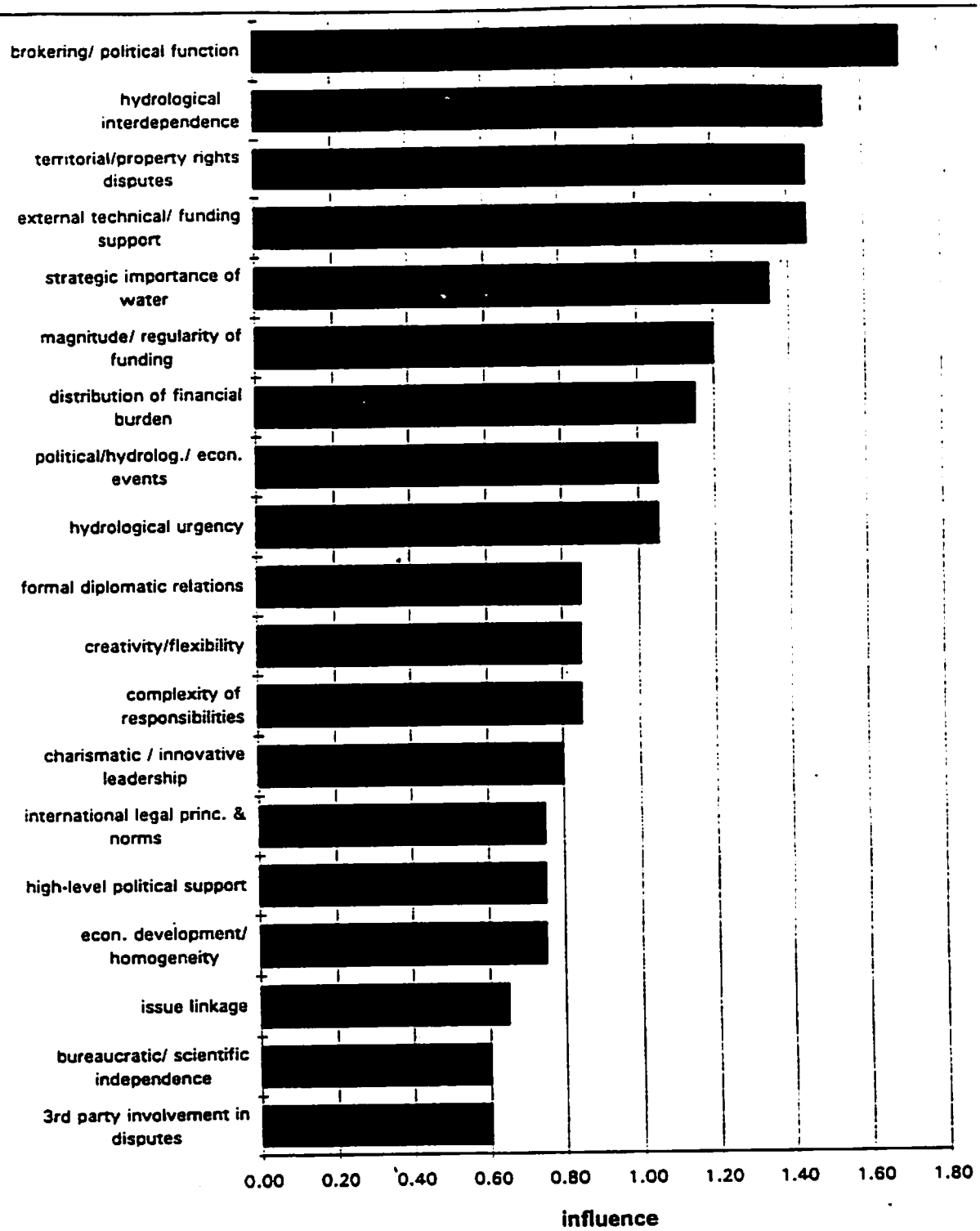

Figure 3: The most salient institutional variables for the Permanent Indus Commission

- **External involvement through technical and financial assistance and brokering (Variable No. 17 and No. 18)**

  The World Bank acted as both mediator and negotiator, often proposing solutions whose feasibility depended on the financial and technical resources of the Bank.

- **Hydrological (inter)dependence and urgency (Variable No. 13 and No. 14)**

  Colonial India's irrigation works were the largest in the world and were the lifeblood of many millions. Partition, which severed the works, gave India the power to cut off water supplies vital to Pakistan.

- **Territorial disputes within the parties' diplomatic relations and legal context (Variable No. 4)**

  India made claims to the Indus waters based on its status as the upstream riparian; Pakistan based its claim on historical use.

- **The strategic importance of water within the parties' diplomatic relations and legal context (Variable No. 5)**

  Pakistan was highly concerned that India could devastate it through control of the upstream waters.

- **Magnitude and distribution of the financial burden of institutional funding (Variable No. 38 and No. 39)**

  A primary stumbling block of the treaty negotiations concerned who was to pay for the replacement irrigation works, according to Eugene Black, former World Bank president. [99]

- **A major political, hydrological or economic development (Variable No. 10)**

  An Indian province cut off water supplies to Pakistan, triggering a dispute over the resources.

- **Formal diplomatic relations (Variable No. 1)**

  Indo-Pakistani relations, exacerbated by the Kashmir dispute, constrained and delayed the negotiating process.

- **The complexity of technical functions in the institutional mandate (Variable No. 20)**

  The mandate of the commission was restricted primarily to the enforcement of the apportionment agreement.

- **Organizational culture/negotiating behavior: creativity and flexibility (Variable No. 31)**

The creativity of the proposals and eventual willingness of the parties to embrace them were vital to the adoption of the Treaty and creation of the Commission.

- **Charismatic and innovative leadership among the decision-making players (Variable No. 27)**

David Lilienthal, former chairman of the Tennessee Valley Authority, in concert with officials from the World Bank played a vital role in forging the Treaty that established the commission.

VI. THE LAKE CHAD BASIN COMMISSION PROFILE

A. Hydrological Profile

The Lake Chad watershed, located in the semi-arid Sahel belt, is one of Africa's 70 international drainage basins. With severe drought conditions and escalating population growth witnessed by much of Africa over the past thirty years, the preservation and rational use of these transboundary resources has become ever more central to the fulfillment of its development potential.

The water stress is acute in the Lake Chad basin, which has an estimated population of 7.4 million. The lake's principal tributary, the Chari River, rises in the Central African Republic and is joined by the Logone River downstream. It is water-rich during the rainy season, when it floods a sizable area, but dwindles to a slow trickle during the rest of the year.

In the decade starting in the mid-1970s, the Sahara desert crept 6 to 12 miles per year into the Sahel region.[100] The lake's expanse of shallow water and swamp -- which once stretched for 9,650 square miles into the national territories of Chad, Cameroon, Niger, and Nigeria -- was reduced at its nadir to several disjointed pools with a combined surface area of only 800 square miles.[101] In the northern part, the former lakeshore town of Nguigmi in Niger was over 150 km from the water.[102] At the drought's worst, the Chari's level dropped 1 cm a day.[103] Contractions of even such dramatic proportions are not without historical precedent, however; in 1908, Lake Chad temporarily dried up and again shrank significantly in 1920 and 1940. Such events are not surprising given the low absolute amounts, and high variability, of rainfall in semi-arid and arid climates.[104]

Today, the lake's recovery is reportedly breathing renewed life into fishing villages that had been abandoned. Fishing, traditional agriculture, and domestic water consumption are the principal uses of Lake Chad waters. It is too shallow for navigation, and the development of hydropower in the basin is currently not on the horizon.

B. Historical Background

In 1978 a significant portion of the Lake Chad Basin Commission's (LCBC) records were

destroyed during fighting in N'Djamena, where the organization is headquartered; as a result, historical and political dynamics that shaped the institution's creation and development cannot be fully reconstructed. The LCBC was one of a series of water management organizations created in the aftermath of the independence drive that emancipated many African territories from British and French rule after World War II. In May 1964, Nigeria, Cameroon, and Chad adopted the Convention, which was elaborated under the aegis of the Commission for Technical Cooperation in Africa (later incorporated into the Organization of African Unity). A provisional secretariat had been established by the Chadian government in 1963.

The LCBC was intended as a vehicle for the dispersion of multilateral development assistance in the Lake Chad Conventional Basin, 41.5 per cent of which is on Chadian territory. (In 1985 an invitation was extended to the Central African Republic to sign on to the Convention, which would more than double the original conventional area to approximately 985,000 km.) From the outset, international organizations and donor country aid organizations provided technical and financial support to the Commission: UNDP, the United Nations Development Programme, in its role as the lead agency for water resource development in Africa, funded numerous surveys and projects that were generally executed by FAO, the Food and Agriculture Organization, and UNESCO. In 1988, UNEP, the United Nations Environmental Programme, elaborated a plan for Lake Chad, under the Environmentally Sound Management of Inland Water Program that envisioned the attainment of an optimum water level. The Italian government was asked by the LCBC to engineer a large and controversial water transfer scheme involving diversions from the Zaire River basin.

C. Diplomatic Relations and Domestic Policy Considerations

Internal turmoil and periodic outbreaks of inter-state hostilities have plagued the contracting parties and hampered the LCBC's effectiveness virtually since its inception. Most disruptive has been the intractable civil conflict that has been shaking Chad's foundations since 1965. The country is made up of as many as 200 separate ethnic groups,[105] and centuries-old tribalism drives the bloody struggle for political dominance. The war has brought economic

ruin, spread famine and disease, and led to a breakdown in civil administration. Between 1975 and 1982, power changed hands five times. During that period, the activities of the LCBC came to a virtual standstill. Donors withdrew their support, headquarters were temporarily relocated to Maroua in Cameroon, and the unrest forced a six-year hiatus in summit-level meetings.

Niger has also suffered political upheaval. Toward the end of the Sahelian drought of 1968-1975, Niger came under military rule after an army coup. A civilian government was installed in 1991.

Member states disputed ownership of some territory around Lake Chad region. In 1983, battles between Nigerian and Chadian forces over Kinsara, one of countless islands that emerge and disappear with the rise and fall of the lake's water level, reportedly claimed 300 casualties. Clashes also routinely occur between Nigeria and Cameroon.

D. Economic and Social Development

The level of economic performance and social cohesion varies among contracting states, but none is untroubled.

- *Nigeria* is one of the world's ten most populous nations. It is rich in oil and other natural resources, and is of vital strategic importance. Export agriculture, which supported thriving indigenous communities since colonial times, took a severe hit in the 1970s, and providing adequate food supplies poses an ever-growing challenge.[106] The country's 1990 per capita GNP was $230.[107]
- *Cameroon*, with a 1991 per capita GNP of $1010[108] is the only member country listed as "middle-income" in the World Bank's 1992 World Development Report. Its rich and varied agricultural production assures self-sufficiency. It is a leading exporter of cocoa. Relative stability has allowed the development of infrastructure and petroleum production.
- *Niger*'s work force is almost exclusively engaged in subsistence farming. Stock-raising is also a principal economic activity.
- *Chad*'s conditions are extremely bleak. The country has a negative economic growth rate

and is one of the poorest nations in the world. Almost one-third of GNP is contributed by international aid (1992).[109] The country is completely landlocked and depends on its neighbors' transport systems for the delivery of vital foodstuff. Trade in cattle keeps Chad's agricultural balance positive, but 80 percent of its exports and half of its government revenue is derived from exports of cotton, a very volatile world market. When cotton prices crash -- as they did in the late 1980s -- so does the economy. To call the country's infrastructure is less than rudimentary: outside the capital only approximately 17 miles of paved highway are in good condition (1989), electric power generation amounts to roughly to 12 kWh per capita per year (1991), [110]and N'Djamena has no traffic lights.

Lake Chad provides important economic benefits to this region. The livelihood of several million farmers and fishermen depend on it. The land surrounding the lake is adequate for grain production and pasture. In 1989, Chadians alone caught 100,000 tons of perch and catfish, which were smoked and shipped throughout the country. Natron, a mineral extracted from the lake, is widely used to fertilize Chad's richest agricultural land in the south of the country.[111] Cereal account for half of the total production in each part of the basin.

E. Institutional Mandate and Functions

The LCBC's primary function is the management of the basin's ground and surface water. The focus has been on withdrawals from the lake for the purpose of irrigation, though attention has also been devoted to the development of fisheries, forestry, and animal husbandry. The institution's mission is more far-reaching, however, encompassing telecommunications, transport, and other projects to promote regional economic integration. It supported national insect monitoring and control efforts during locust and grasshopper invasions. Food self-sufficiency has been identified as a common goal, and the member states chief executives outlined a vision of broad socio-economic cooperation that the LCBC was to foster. The LCBC also runs a training school, but its library has not been restored since its destruction in the civil war.

The basin's wetlands are a good habitat for a rich variety of species, including elephants and hippopotamuses, and the LCBC was instrumental in generating the 1977 Joint

Agreement of Regulation of fauna and flora. More recently, protection of the lake's ecosystem has come to the forefront of the LCBC's agenda. The member countries' ministers of the environment have outlined draft regulations on the rational and equitable use of the available water.

F. Decision-Making Structure

The LCBC's Conference of Commissioners consists of eight members, two from each country, who are typically high-level civil servants in regional governments or ministers of agriculture, water resources, rural development, or finance. When operational, the LCBC meets twice a year to approve a program of activities and budget. Decisions must be unanimous. Its authority derives from a biannual Summit of Heads of State. A career diplomat serves as executive secretary and is responsible for operationalizing the commission's decisions through seven functional divisions. Sub-commissions are staffed by technical experts who vary in experience and competence; they are generally adequately skilled.[112] Under the sponsorship of UN agencies, master plans are developed to identify new projects. The first of these, elaborated in 1981, aimed at maximizing agricultural production in the region. It is not uncommon that projects are selected on the basis of political considerations and single-purpose objectives, rather than as parts of an integrated whole.[113]

G. Funding Mechanism

With an operating budget of 450 million Canadian francs and a Development Fund of 500 million Canadian francs (1988), the LCBC is consistently underfunded relative to the broad demands placed upon it.[114] The operating budget supports planning, implementation and maintenance of specific projects, as well as the commission's debt and interest payments. Member countries make payments irregularly and the LCBC's donor coordination is poor.[115]

H. Compliance and Implementation

Theoretically, the LCBC has both planning and executive responsibilities but member states have not vested the organization with sovereign powers, so water resource development policies are primarily shaped by the national authorities. The LCBC independently monitors

some activities: at times it has dispatched teams to verify compliance with a Conventions' clause requiring that countries planning to take measures liable to significantly affect water quantity or quality communicate them to the other signatories. In 1981, the LCBC investigated allegations that Cameroon was building a hydro-electricity dam on the Benoue River, to reveal the scope of the infrastructure project and the amount of water involved.[116] National governments are not always forthcoming and prompt In providing data to the LCBC.[117]

I. Dispute Resolution Process

One of the LCBC's functions is to provide a forum for disputes. The institution's most significant accomplishment in this realm was the agreement it brokered between Chad and Nigeria on border demarcations in Lake Chad. The settlement included provisions for a multi-national patrol force charged with maintaining security inside a completely demilitarized buffer zone. This force was to combat smuggling, illegal collection of taxes and other forms of banditry in the Lake Chad area while refraining from acts that would violate member states' sovereignty. Matters that are not resolved by the LCBC are referred on to the Organization of African Unity.

EVALUATION

A. Record of Success

Political upheaval, financial constraints, and a lack of clearly defined, achievable goals have hampered the LCBC's effectiveness. Like other West African water management institutions, which suffered from similar shortcomings, the LCBC tends to get caught between signatories' domestic agenda and the demands of funders: "The member countries generally pressure the [River Basin Organizations] to emphasize project implementation and fund raising, while the donors ... encourage the [river basin organizations] to first address its planning responsibilities. The situation is usually resolved by the [river basin organizations] trying to do both. The result is that very little is accomplished ..."[118] Because the institutions

are overburdened, they do not produce sound water development plans; this failure weakens the credibility of the organizations, which in turn alienates donors and erodes members' political commitment.

Part of the problem lies in the large number of intergovernmental bodies in West Africa -- according to a 1982 UN study 16 of these focus on natural resource management. A perverse effect is that " ...a large share of the available resources goes to servicing the permanent secretariats of organizations which have no resources left for development programs... "[119]

Nevertheless, survival against long odds is in some sense an achievement, for the institution, and some corrective adjustments have been made. Yielding to economic realities and pressure from the donor community, the LCBC's role was redefined more narrowly in the late 1980s; The Executive Secretariat was streamlined, and the organization was to focus on projects that are regional in nature, and emphasize the monitoring and planning of water resources. [120]

B. Findings

We identified seven variables as the most influential in the creation and the ongoing viability of the Lake Chad Basin Commission. (See Figure 4 for the influence of the most salient variables.)

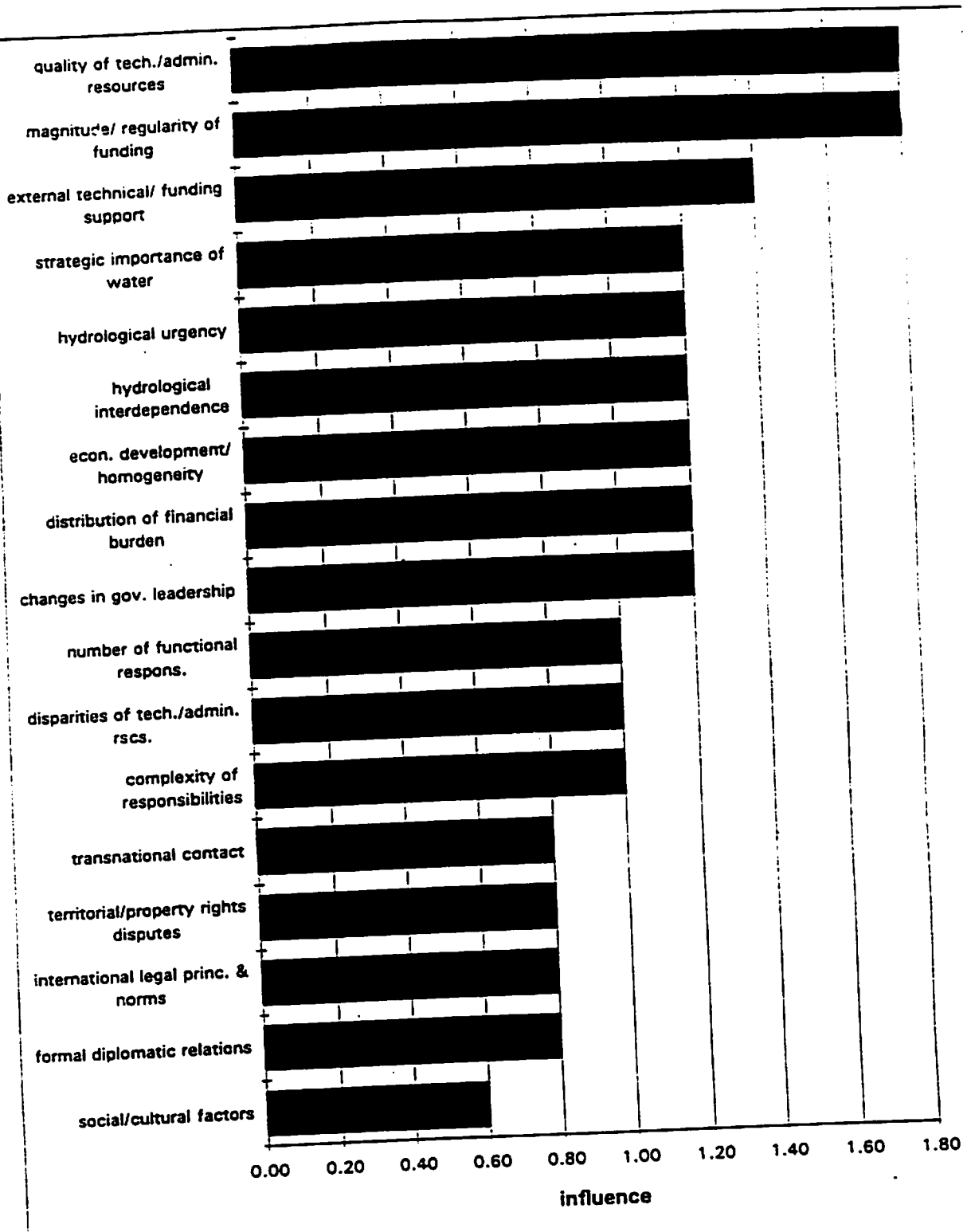

Figure 4: The most salient institutional variables for the Lake Chad Basin Commission

- **Changes in leadership within the domestic political context (Variable No. 8)**
  Continuous civil strife and political upheaval in several member countries severely disrupted LCBC operations, halting all activity for several years.
- **Regional economic development and homogeneity (Variable No. 16)**
  Regional economic development in one of the poorest areas of the world has been stalled by war and natural calamities such as drought and desertification. Nigeria has disproportionate geopolitical influence despite its poverty.
- **Number and complexity of institutional functions (Variables No. 19 and 20)**
  The demands of an ambitious mandate overwhelmed the comparatively fragile LCBC; lost sight of its main objective, the planning and control of water resources. This happened "for various reasons, in particular unforeseen circumstances and difficulties that the Lake Chad Basin Commission had to face, but also the lack of priority attached to this basic objective ... "[121]
- **External involvement through technical and funding support (Variable No. 18)**
  The LCBC would not have been established or capable of at least partially executing its mandate without massive technical and financial assistance from international aid organizations and individual donor countries.
- **Magnitude and regularity of institutional funding (Variable No. 38)**
  Member states often failed to meet their payment obligations to the LCBC, and the commission was heavily dependent on outside support. That support waned as the institution lost credibility with its donors. During much of the 1980s only UNDP still provided monetary aid; although substantial (US $2,500,000), this funding maintained only minimal activities.[122]
- **Technical and administrative resources of the institutional (Variable No. 40)**
  The level of managerial skill and technical competence available to the LCBC was generally inadequate. Supporting indigenous institutions were also weakened by political instability and insufficient funding.

VII. COMPARATIVE INSTITUTIONAL ANALYSIS

A. Summary of Findings

We compared the relative influence of each contextual and institutional variable all four commissions.

We identified seven contextual variables that significantly determine the operating environment of an international water management institution:

- **Hydrological interdependence (Variable No. 14)**
- **Urgency of hydrological problems (Variable No. 13)**
- **Territorial disputes in the members' diplomatic relations and legal context (Variable No. 4)**
- **Regional economic development and homogeneity (Variable No. 16)**
- **Strategic importance of water in the members' diplomatic relations (Variable No. 5)**
- **The timing of political, hydrological, or economic development (Variable No. 10)**
- **High-level political support within the domestic political context (Variable No. 7)**

Nine institutional design variables were the most influential in one or more commissions:

- **Number and complexity of institutional functions (Variables No. 19,20)**
- **External involvement in the form of brokering and political support (Variable No. 17)**
- **External involvement in the form of technical and funding support (Variable No. 18)**
- **Institutional authority and autonomy of decision-makers and process (Variable No. 21)**
- **Type and level of expertise of decision makers (Variable No. 23)**
- **The process' voting requirements (Variable No. 25)**
- **Technical and administrative resources of the institution (Variable No. 40)**
- **Public participation within the domestic political context (Variable No. 9)**
- **Charismatic leadership (Variable No. 27)**

(See Chart 5 for the relative and overall weights and rankings of all the variables.)

A best-practices approach must therefore include examining:

1) how the operations of the institution were shaped by each of these variables.

2) the conditions that led to a particular design choice for that variable.

3) the effectiveness of the design choice.

Institutional Variable	IJC Rank	ICPR Rank	PIC Rank	LCBC Rank	Overall Rank
Diplomatic Relations/Intern'l Legal Context					
1. formal diplomatic relations	7	19	10	13	10
2. transnational contact	17	8	30	13	18
3. participation in multilateral bodies	40	5	24	18	25
4. territorial disputes	14	34	3	13	9
5. strategic importance of water	29	8	5	4	4
6. international water law principles	10	27	14	13	17
Domestic Political Context					
7. high-level political support	3	5	14	21	7
8. changes in government leadership	40	27	30	4	24
9. public participation	5	4	20	24	15
Events/Timing					
10. political/hydrological/economic event	24	3	8	24	16
11. cooperative sequencing	22	8	24	24	30
Social/Cultural Context					
12. social/cultural factors	5	15	24	17	12
Hydrological Context					
13. urgency of hydrological problems	17	1	8	4	1
14. hydrological (inter)dependence	22	5	2	4	2
Commission Membership					
15. commitment of member states	29	8	30	18	29
Economic Development					
16. economic development/homogeneity	10	8	14	4	5
External Involvement/Support					
17. brokering/political function	29	27	1	24	19
18. technical/funding support	36	34	3	3	6
Institutional Mandate/Function					
19. number of functions	36	15	36	10	23
20. complexity of functions	24	19	10	10	14

Table 2: All institutional variables for all institutions with rankings by influence

Institutional Variable	IJC Rank	ICPR Rank	PIC Rank	LCBC Rank	Overall Rank
Decision-Makers/Process					
21. authority/autonomy	2	8	30	18	11
22. informal contact	10	19	30	24	34
23. type/level of expertise	1	34	20	24	21
24. political status/clout	17	19	27	24	36
25. voting requirements	17	8	20	24	26
26. de(centralization)	24	19	36	21	37
27. charismatic leadership	14	34	13	24	32
Organizational Culture/Negotiating Behavior					
28. issue linkage	8	27	17	24	28
29. voting block behavior	29	34	30	24	42
30. political sensitivity/pragmatism.	10	19	27	24	33
31. creativity/flexibility	8	15	10	24	20
32. bureaucratic/scientific independence	4	27	18	24	22
Compliance					
33. transparency	29	19	36	24	39
34. targets/time tables	24	15	36	24	38
35. reporting/monitoring	36	27	36	24	41
36. penalties/incentives	40	34	36	24	43
37. role of subnational agencies	29	2	43	24	27
Institutional Funding					
38. magnitude/regularity	14	34	6	1	3
39. distribution of financial burden	29	34	7	4	13
Institutional Capacity					
40. technical/administrative resources	24	19	27	1	8
41. disparities in resources	40	27	42	10	31
Dispute Resolution Mechanism					
42. dispute resolution mechanism	17	34	20	21	35
43. 3rd party involvement	36	34	18	24	40

Table 2 (continued): All institutional variables for all institutions with rankings by influence

VIII. THE PALESTINIAN-ISRAELI CONTEXT

A. Introduction

This section describes the Palestinian-Israeli situation in light of the contextual variables we identified as most influential in the creation and ongoing viability of an international water management institution. We focus on key aspects of the hydrological, geopolitical, and economic environment in which any Palestinian-Israeli water commission would operate to identify pressures and obstacles that would likely appear during negotiations leading up to the creation of a water commission or during its administration of the parties' joint resources. The following section develops institutional responses to prevent such problems or mitigate their impact.

B. Hydrological Context

Water scarcity in Israel and the Occupied Territories is approaching a socio-economic and environmental crisis of dangerous proportions. Large-scale immigration to Israel from Ethiopia and the former Soviet Union as well as the anticipated return of Palestinians refugees add to existing population pressures and further intensify projected demand for water. According to Hillel Shuval, the availability of water in both Israel and Gaza and the West Bank is significantly less than the minimum necessary for a modern nation to survive in an arid area.[123] Israel uses virtually all the natural water resources available to it-- a total of 1.8 billion cubic meters a year -- and its increasing reliance on sewage and other low-grade sources are causing water quality problems.[124] Demand for water in the West Bank is expected to multiply as economic development picks up under Palestinian self-rule (current use is 120 million cubic meters per year). The situation is particularly dire in the Gaza Strip; its sandy aquifer, which is consistently overpumped to support intense agricultural activity and meet the domestic needs of its 800,000 residents, has been contaminated with salt water from the Mediterranean. Ten years ago, experts were already recommending that pumping in Gaza be curtailed by 30 to 60 percent.[125]

The hydrological make-up of the region inextricably links Israel and the Occupied

Territories. The main body of water shared by Palestinians and Israelis is the Mountain Aquifer, a limestone formation beneath the Samarian Hills in the Occupied Territories. This reservoir is largely replenished by rainwater that falls on the West Bank and naturally flows underground to the west and north into Israeli waterways. Palestinian consumption of these resources has been severely restricted under Israeli military control, and significant increases could not be sustained without causing perilous shortfalls in Israel or irreversible salination of the underground reservoir.[126] Sixty to eighty years ago, Jewish settlements began drawing water from the Mountain Aquifer within what was to become Israel's recognized borders.[127] Today these resources account for approximately one-quarter of the country's sustainable yield.[128] Israel also relies on sources such as the Besor River, which could feed the Gaza Strip.[129] Potential cross-boundary pollution problems also arise; for example, sewage from the West Bank could contaminate Israeli drinking water.

C. Diplomatic Relations and Legal Context

- ***Territorial disputes***

  At the center of the clash between the two peoples' nationalist aspirations is control over the land --and as Rubin writes, "without water it cannot be made productive." [130] The dispute over legal entitlements is the key stumbling block in the ongoing multilateral negotiations on water. Water-starved Palestinians challenge Israel's claim, based on historic use, to waters from the Mountain Aquifer. It is clear that Israel consumes more water, though estimates of the magnitude of that disparity vary. Israeli government figures put the annual per capita consumption of fresh-water in Israel at 380 cubic meters, compared with 130 cubic meters in the Gaza Strip and 90 cubic meters in the West Bank.[131] The West Bank town of Jericho, where the first steps towards Palestinian autonomy were taken, is the site where ownership rights of arable land and irrigation water are most contested.[132]

- ***The strategic importance of water***

  In 1964, Israeli Prime Minister Levi Eshkol said that "water is as the blood in our veins."[133] Feelings regarding the strategic and symbolic significance of water are no less intense among Palestinians. Significantly, the first military action by the PLO-affiliated

Fatah targeted the Israeli National Water Carrier.[134] Indeed, disputes over the Jordan Basin waters have been among the most dangerous flashpoints in the Arab-Israeli conflict. In 1967, Israel seized most of the drainage basin,[135] and a two-year old research institute report kept under wraps by previous Israeli governments asserts that Israel must retain access to all water resources it currently controls regardless of possible territorial concessions.[136] "Security arrangements are impossible to achieve without a solution to the water problem," the authors wrote.[137]

D. Timing or Special Events

Political Development

The end of the Cold War has created the potential for shaping a radically different Middle East. As new perspectives for peaceful coexistence open up, prospects for institutionalizing international cooperation in water management also brighten. The Declaration of Principles adopted by Israel and the PLO in September 1993 laid the basis for such an effort by calling for the development of a joint Water Development Program by a new Israeli-Palestinian Continuing Committee for Economic Cooperation.[138]

Hydrological Development

The scarcity of water limits the development of agriculture, [139]which is important to the production systems and collective imaginations of both societies. The growing of olives in the West Bank and citrus fruit in Gaza is critical in the economies of the Occupied Territories.[140]

Despite agriculture's small contribution to Israel's economic output,[141] it is a core part of the nation's ideological foundation and enjoys a privileged, highly protected position. Nevertheless, repeated droughts resulting in serious water shortages in the 1980s led the Israeli government to recommend cuts in farm production. In 1991, the agriculture ministry estimated that the water deficit was 1.3 billion cubic meters.[142] Though subsequent rainy winters relieved the pressure, long-term forecasts have not changed. Increased awareness of the severity of the water emergency is likely to force some reassessment of the agricultural policy which subsidizes heavily irrigated cash crops. It has also increased the attractiveness of international cooperative arrangements.[143]

E. Economic Development

Regional economic development and homogeneity

Significant disparities exist in the level of economic development of the two parties. In 1991, per capita GNP in Israel was $10,900 while the equivalent figures were $2,300 and $1,310 in the West Bank and Gaza.[144] This discrepancy is partly attributable to political barriers to development in the Occupied Territories and to the substantial flow of Palestinian labor to jobs in Israel.[145] The World Bank estimates that public sector investments in the order of $1.35 billion from 1994 to 1998) and $1.6 billion 1999 to 2003 would be necessary to put the economies of the West Bank and Gaza Strip on the road to viability.[146] Like many other infrastructure systems in the Occupied Territories, water distribution networks and quality are poor.[147]

IX. BEST PRACTICES AND THEIR APPLICATION TO THE MIDDLE EAST

A. Introduction

In this section, we lay out a range of policy options for each of the most influential institutional design variables. We highlight the advantages and disadvantages of both extremes of the policy range -- low-level and intensive cooperative arrangements. We also describe the conditions that are likely to guide institutional designers to a particular point on the range, and identify some requirements for successful implementation. Finally, we provide recommendations on how a Palestinian-Israeli water management organization should be structured based on a comparison of conditions in the Middle East with the conditions in North America, the Rhine region, the Indus River Basin, and the Lake Chad Basin. Similarities and differences between these environments and the Palestinian-Israeli situation suggest the mix of attributes would likely enhance the effectiveness of a commission in the Middle East.

B. Institutional Mandate and Functions

Number and complexity of institutional functions

Range of Policy Options:		
Less Directive Option:		**More Directive Option:**
1) single purpose (one of the following: pollution control, water level regulation, navigation, or water allocation of newly developed resources) *2) low-level cooperative functions (such as consultation, data collection/exchange, monitoring, project design and coordination)*		*1) integrated basin management (all of the following: pollution control, water level regulation, navigation, and water allocation of newly developed resources)* *2) high-level cooperative functions (such as project implementation, financing, & administration, determinations of water resource allocations & use)*

The advantages and disadvantages of the policy options presented in the table above are identified below:

Advantages/Disadvantages of Policy Options		
Policy Options:	*1) single purpose (one of the following: pollution control, water level regulation, navigation, or water allocation of newly developed resources)* *2) low-level cooperative functions (such as consultation, data collection/exchange, monitoring, project design and coordination)*	*1) integrated basin management (all of the following: pollution control, water level regulation, navigation, and water allocation of newly developed resources)* *2) high-level cooperative functions (such as project implementation, financing, & administration, determinations of water resource allocations & use)*
Advantages:	simplified mission	increased welfare for all riparians (new and improved supplies and uses through economic/hydrological efficiency; expanded social and ecological benefits)
	simplified management	potentially contributes to "equitable apportionment" (see Helsinki Rules[148])
Disadvantages:	possible economic, hydrological, and bureaucratic inefficiencies: excessive energy and resources may be directed towards some activities while other aspects of basin management are neglected	politically very difficult to achieve (to date, no supranational water authority has been vested with the necessary authority to practice full-fledged integrated basin management)
		vulnerability of water delivery system
		may present substantial technical difficulties
		possible duplication of effort (e.g. overlap with national authorities, international development agencies, and others active in socio-economic planning)

The following table helps to define the contextual environment that would make one policy option preferable to another:

Conditions Under Which the Policy Options May Be Desirable and the *Requirements* for Implementation of this Policy Choice		
Policy Options:	*1) single purpose (one of the following: pollution control, water level regulation, navigation, or water allocation of newly developed resources)* *2) low-level cooperative functions (such as consultation, data collection/exchange, monitoring, project design and coordination)*	*1) integrated basin management (all of the following: pollution control, water level regulation, navigation, and water allocation of newly developed resources)* *2) high-level cooperative functions (such as project implementation, financing, & administration, determinations of water resource allocations & use)*
Conditions:		high level of hydrological interdependence
	low level of trust among member states	high level of trust among member states
		largely overlapping visions and priorities of riparians regarding water resource development
	limited financial, technical, and administrative resources	substantial financial, technical, and administrative resources
Requirements:		continuous and effective communication at all governmental levels
		harmonization of water policy legislation

Case Study Experience:

All four water agreements examined include provisions for consultation and exchange of data among member states. Since "generalized acceptance of common fact-sharing or common fact-finding by co-riparians as a matter of duty"[149] is not a feature of the international legal environment, the significance of a commitment to cooperation even at this level should not be underestimated. While none of the commissions has both the express authority and the capabilities to conduct comprehensive basinwide planning, participants in three of the four institutions acknowledge the benefits inherent in integration and are striving for it.

- Since its inception in 1909, the IJC has gradually broadened its effective powers as

mutual trust among member states and respect for the institution grew over time. Though created primarily to address water level and flow problems, the commission today expends much effort on pollution control (including air pollution) and is moving toward ecosystem management. The IJC's ability to expand its role is not a result of any changes in the institution's formal mandate; rather, informal power derived from its reputation for scientific integrity and objectivity has allowed the institution to venture onto new ground.

- Cooperation between Rhine River basin riparians developed over more than a century. Supplementary institutions were created as new problems emerged. The result is a proliferation of single-purpose commissions, each focusing on a particular water management problem with little coordination among them. The ICPR was established to prevent and abate pollution, and its key function is to serve as a forum for joint deliberation on this issue. Despite strong diplomatic ties and hydrological interdependence, persistent concerns over reduced sovereignty slows progress toward transboundary ecosystem management.
- In the Indus River Basin, the idea of integrated basin management, was entertained by all parties during treaty negotiations, but failed because Pakistan feared that the plan could leave it vulnerable to further Indian aggression. The agreement determined allocations of water in such a way as to limit the potential friction between the hostile parties. The clear division of the resources as laid out in the Treaty does not call for extensive institutional cooperation, but the PIC follows strict data gathering and reporting requirements to ensure proper implementation of the accord.
- Formally, the LCBC enjoys a broad mandate that encompasses not only water quantity and quality concerns but also related issues such as economic development and health; thus, its functions include cooperative project financing and supervision. However, the amount and quality of the commission's informational, human, technical, and financial resources are often inadequate to satisfy ambitious demands. The overwhelmed institution tends to lose its sense of purpose, and its financial and political backing erodes as a result.

Middle East Context:

Israelis and Palestinians depend on the same freshwater resources for their survival and economic well-being. A key source of water for both sides is the Mountain Aquifer, an underground reservoir replenished by rainwater over the West Bank that extends into Northeast Israel and the Coastal Plain. The two peoples have lived in intense animosity for more than forty years, creating an atmosphere where "the adversary is dehumanized and ... anger, fear, and wounded pride become the dominant emotions."[150] Mutual recognition of the right to exist has been officially voiced only recently, and full normalization of political and social relations is still a long way off. While the privileges of home rule are likely to be jealously guarded, an agreement in principle to cooperate on the exchange of data, for example, was reached at the Vienna multilateral talks on water in May 1992.

Recommendations:

For a water management institution to be effective and garner necessary political and financial support, its mandate and resources must be commensurate with the intensity of the hydrological problems it is expected to mitigate. (The LCBC is an example of failure.) However, a commission's scope will typically be limited by member states' desire to safeguard their sovereignty; reluctance to cede legislative and executive powers is characteristic even of neighbors living in relative harmony as in Western Europe. Nations embroiled in conflict are likely to value unilateral action even more. (The IJC and PIC exemplify different values for cooperation and autonomy.) Given the acute water scarcity in the Middle East and the high degree of hydrological interdependence, on the one hand, and the history of enmity on the other, we recommend that a Palestinian-Israeli water commission:

- *eventually* engage in all activities -- including those requiring extensive cooperation -- that will promote the alleviation of the region's water scarcity. Such activities could include the conservation and improvement of existing water supply and distribution systems, the development of new storage and diversion projects, and water transfer arrangements with relatively water-rich states. [151]
- move toward higher-level cooperative functions at a pace that strikes a balance between

the need for swift progress and the danger of paralyzing a fledgling commission by provoking political deadlock or overburdening its administrative apparatus. Following an approach we call "fast gradualism," basin management should be sequential, with successive phases of institutional development requiring progressively more commitment to cooperation. Measures that would help induce the parties to advance rapidly from one phase to the next -- for example, targets and time-tables or the periodic publication of the parties' record of compliance (see ICPR) -- should be built into an agreement.

- begin exclusively with the collection and exchange of data, and the establishment of a documentation center. This would lay the technical and political groundwork for more involved cooperation. An accurate and agreed-upon picture of the hydrological challenges provides the basis for rational planning (For example, the LCBC's planning capacity was seriously constrained by the paucity of basic information.[152]) It also helps parties "... appreciate the interdependence of their interests...alert them to any incompatibility of the projected demands by each ... and reveal the important interactions of the system."[153]

C. External Involvement and Funding

institutional design variable: **brokering and technical assistance by third parties**

Range of Policy Options:		
Less Directive Option:		**More Directive Option:**
Riparians negotiate and operate commission without outside assistance		*Extensive 3rd party mediation and technical assistance to riparians*

The advantages and disadvantages of the policy options presented in the table above are identified below:

Advantages/Disadvantages of Policy Options		
Policy Options:	*Riparians negotiate and operate commission without outside assistance*	*Extensive 3rd party mediation and technical assistance to riparians*
Advantages:	reduced transaction costs	Potential for issue-linkage helps motivate/pressure parties into cooperation. Sebenius writes that "third parties who have a variety of other relationships with the negotiators may be used to strengthen commitments...if either negotiating party were to renege on the bargaining agreement, the third party agreement would be affected as well, possibly with consequences in several other areas."[154]
	could simplify negotiations and administrative processes	can help bridge cultural gaps and misperceptions
		creativity: potential for introduction of impasse-breaking proposals
		improved technical capacity
		could help shield parties from glare of the media and domestic political pressure
		confers political acceptability and legitimacy on commission recommendations
Disadvantages:	a political settlement may be difficult or impossible to reach without outside help	sovereign states might perceive 3rd parties to be intrusive
	commission recommendations may be difficult or impossible to implement due to lack of financial and technical resources	necessary to accommodate demands by outside interests, which could add complexity to negotiations process

The table on the following page helps to define the contextual environment that would make one policy option preferable to another.

Conditions Under Which the Policy Options May Be Desirable and the *Requirements* for Implementation of this Policy Choice		
Policy Options:	*Riparians negotiate and operate commission without outside assistance*	*Extensive 3rd party mediation and technical assistance to riparians*
Conditions:	parties have adequate technical resources	parties lack adequate technical resources
	parties have strong diplomatic ties, extensive transnational contact, and enjoy a level of social and economic homogeneity	diplomatic relations are strained or non-existent.
		parties have widely divergent positions regarding water resources and other issues
Requirements:		commitment of time and resources by appropriate (i.e. politically acceptable to all parties involved) and skilled brokers

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institutional design variable: **distribution of financial burden—magnitude and regularity**

Range of Policy Options:		
Less Directive Option:		**More Directive Option:**
self-financing (member states provide or generate financial resources)		*extra-territorial funding (from international lending/aid organizations, NGOs and 3rd party governments)*

The advantages and disadvantages of the policy options presented in the table above are identified below:

Advantages/Disadvantages of Policy Options		
Policy Options:	*self-financing (member states provide or generate financial resources)*	*extra-territorial funding (from international lending/aid organizations, NGOs and 3rd party governments)*
Advantages:	autonomy in policy-making	expanded functional capability
	self-reliance	enhanced institutional credibility
		could balance differences in parties' willingness to pay for a commission. This applies to cases in which an imbalance is created by an unequal distribution of expected benefits from the commission's activities (e.g. in conflicts between upstream and downstream states)
Disadvantages:	possible funding shortages	diminished control over policy
	potentially restricted functional repertoire	donors can stipulate pre-conditions before aid is disbursed

The following table helps to define the contextual environment that would make one policy option preferable to another:

***Conditions* Under Which the Policy Options May Be Desirable and the *Requirements* for Implementation of this Policy Choice**		
Policy Options:	*self-financing (member states provide or generate financial resources)*	*extra-territorial funding (from international lending/aid organizations, NGOs and 3rd party governments)*
Conditions:		monetary incentives are an adequate means for resolving key points of contention between parties
		insufficient indigenous financial resources
Requirements:	adequate government revenues and reliable stream of financial resources	reliable financial commitment from donors
	member state commitment to mission of the water management institution	
	stable domestic institutions	

Case Study Experience

In both the Indus and the Lake Chad Basins, diplomatic relations among riparian states are strained and indigenous technical resources limited. In such environments, third party

involvement was instrumental in the creation of water management commissions. Outside support continues to sustain the West African body.

- In the case of the Indus Treaty, the World Bank provided its good offices along with substantial financial and technical resources to induce the antagonists to settle their dispute over water rights. The negotiating position of the parties appeared irreconcilable until the Bank established the Indus Development Fund, a vehicle through which major industrialized nations financed an impasse-breaking proposal (the "replacement works").
- In the case of the LCBC, the amount of funding and technical support provided by UNDP, FAO, and numerous other international aid organizations has fluctuated and the fortunes of the commission rose and fell accordingly. The LCBC's concrete achievements were accomplished with massive assistance from third parties at all stages of activity, from project planning to implementation. Donor support waned when the LCBC's credibility crumbled due to political instability and economic hardship in members states. As a result, the already fragile organization floundered. When third parties have been actively engaged, the LCBC was torn between meeting its donor's objectives and its member states' goals.

Middle East Context

Leading up to and since the Madrid Conference in 1991, third party brokering has been crucial in getting and keeping the parties at the negotiating table. The end of the Cold War, which ended superpower competition in the Middle East, has thus allowed for an extension of third party involvement. To sustain the still-tenuous peace process, a substantial aid effort is underway. The international community has pledged financial and technical assistance to the Palestinian economy totaling $2.8 billion, or more than 25 percent of current Palestinian GNP.[155] Water is a high priority for both Palestinians and Israelis, and some funds will be allocated for water development and management.

Recommendations

Third party mediation, technical assistance, and funding could significantly enhance the likelihood of success of a Palestinian-Israeli commission, especially if the timing and

magnitude of such aid is satisfactory. We recommend that:

- third parties be active in conceiving, planning, and/or funding hydrological solutions that might break the current impasse in multilateral negotiations on joint water resources. (Such intervention was instrumental in the formation of the PIC.) Given both its experience as an effective broker in water disputes and its current prominent role in the disbursement of aid to the emerging Palestinian entity, the World Bank is one institution that is well-positioned to facilitate the creation of a Palestinian-Israeli water commission.
- third parties display patience and persistence to overcome seemingly insurmountable obstacles.
- third parties provide significant financial assistance in the early phases of development of the commission, and apply such assistance evenly and consistently until the commission achieves financial self-sufficiently. Donor nations must resist the temptation to withdraw financial assistance during periods of turmoil. (Witness the detrimental effects of such pullouts for the LCBC.)
- third parties provide technical assistance in close cooperation and consultation with the member states, in a manner that builds on indigenous technical expertise and establishes an ongoing dialogue.

D. Decision Making Players and Process

Authority and autonomy of commission

The following tables summarize several institutional design choices regarding who can make decisions, and by what process; their advantages and disadvantages; conditions that might make certain choices attractive; and requirements for successful implementation.

Advantages/Disadvantages of Policy Options		
Policy Options:	*commissioners act as national delegates: loyalty owed primarily to member states*	*commission functions as autonomous body*
Advantages:	domestic governments may cooperate more willingly because they are able to a keep a tight leash on the activities of the commission	commission is unfettered and therefore more likely to develop and propose more comprehensive and innovative solutions
	potentially smoother ratification and implementation of commission recommendations	potentially faster progress on hydrological problems
		commission is more likely to address more complex and sensitive issues
		commission may gain legitimacy by establishing a reputation as an independent, objective body
Disadvantages:	potential for getting bogged down in political issues	commission may be seen to be working against domestic interests
	potentially slow progress	potentially inflated expectations about what the commission can accomplish
		element of uncertainty may scare away skittish riparians

***Conditions* Under Which the Policy Options May Be Desirable and the *Requirements* for Implementation of this Policy Choice**		
Policy Options:	*commissioners act as national delegates: loyalty owed primarily to member states*	*commission functions as autonomous body*
Conditions:	domestic government concerned about infringements on sovereignty and reluctant to yield autonomous power to a supranational body	member states must be willing to cede authority to the commission
		hydrological problems are so severe or complex that innovative leadership and technical solutions are necessary
		hydrological problems require swift action
Requirements:	well-functioning national institutions that provide policy directives to commissioners	appointments of commissioner must be relatively high-level

Type and level of expertise within the commission

Advantages/Disadvantages of Policy Options		
Policy Options:	*technical expertise*	*political expertise*
Advantages:	potential to neutralize and de-politicize volatile issues	may allow for examination and resolution of larger policy issues
	confers legitimacy through greater technical grounding of recommendations	
	increased potential for formation of cross-boundary epistemic communities[156] and collegial relations	
Disadvantages:	decreased ability of body to set policy	agenda may become politically charged
	risk of political insensitivity	

***Conditions* Under Which the Policy Options May Be Desirable and the *Requirements* for Implementation of this Policy Choice**		
Policy Options:	*technical expertise*	*political expertise*
Conditions:	poor diplomatic relations and limited mandate of the commission	commission mandate that confers wide latitude in policy formulation
		high degree of one-way or mutual hydrological dependence combined with expansive mandate and/or hostile relations.
		no perceived significant disparities in geo-political power
		some history of cooperation
Requirements:	member states or outside parties must be willing to provide adequate technical resources and personnel	relative political stability in member states

Voting Requirements

Advantages/Disadvantages of Policy Options		
Policy Options:	*unanimity*	*simple majority*
Advantages:	increased legitimacy of decisions	speedier decision-making process
	increased chances of compliance by all member states with commission recommendations	possibility of adopting more comprehensive or controversial proposals, and therefore of making faster progress in mitigation of hydrological problems
Disadvantages:	slower decision-making and progress	potential risk of political insensitivity

***Conditions* Under Which the Policy Options May Be Desirable and the *Requirements* for Implementation of this Policy Choice**		
Policy Options:	*unanimity*	*simple majority*
Conditions:	member states stipulate veto power as a condition for cooperation	higher degree of trust among member states
		member states willing to cede some measure of sovereignty to the commission
Requirements:	delegates' attendance records must be satisfactory	commission consists of 3 or more member countries, or of 4 or more commissioners who vote independently of each other

Case Study Experience:

- The IJC's success is explained in part by its skill in keeping political influence at bay. Principally a fact-finding body, the IJC is self-consciously impartial and not shy about reproaching either member government in case of non-compliance. Personnel at all levels make decisions independently of their national affiliation, as illustrated by former U.S. Chairperson J. A. Tawney's observation that "we are neither Canadian or American, but we are each and all representatives of all people on both sides."[157] The IJC's simple majority voting rule is consistent with this institutional philosophy; each side needs all three of its commissioners to block passage of a proposal unanimously endorsed by the other side. This is a significant departure from the unanimity requirement that characterizes the other three commissions in our case studies. The IJC's high quality of

research has helped it establish a reputation for scientific rigor which has allowed the institution to become more autonomous than the Water Treaty mandated.

- The ICPR is a consultative body that submits jointly elaborated pollution reduction targets and implementation strategies to political delegations from member states for approval. In contrast to the IJC, which neutralizes sensitive matters by emphasizing their technical aspects, debates within the ICPR have been framed predominantly in political terms. As a result, negotiations were often lengthy and laborious, until public pressure that built in the wake of the Sandoz accident galvanized governments. Once adopted, however, the commission's recommendations bear the member governments' stamp of approval, an endorsement that partially explains the ICPR's good compliance record.
- The PIC consists of one engineer from each member state who act as national representatives with very limited autonomy.
- The LCBC is the only one of the four commissions endowed with executive and administrative authority. Officials at the highest level of government, including heads of state, periodically review the commission's activities. Donors also participate in commission meetings and play an active role in policy formulation.

Middle East Context

Water scarcity problems faced by Israelis and Palestinians are extremely acute, and require the speedy elaboration of solutions that are both technically feasible and politically acceptable. The second requirement is a major challenge given the powerful symbolic value of water in this politically charged environment.

Recommendations

The design of a Palestinian-Israeli water commission must carefully balance institutional autonomy and accountability to member governments. We recommend that:

- the commission emphasizes on technical, fact-finding tasks. This approach reflects the common wisdom -- confirmed by the course of the ongoing Middle East peace talks [158]-- that technical discussions can be sustained and productive even during periods when intense acrimony undermines diplomatic relations. (For example, the PIC's continued

operation despite military clashes between India and Pakistan.)

- technical work be done by advisory boards assigned to investigate and propose solutions to a host of water resource questions. (Far from limiting the IJC's scope of activities, such a mechanism was extremely effective in allowing it to expand its scope of activity as it earned the trust of member states.)
- the political umbrella of the commission be constituted by national delegations of high-level civil servants from ministries such as foreign, natural resources, or agriculture (as in the ICPR and LCBC). It is not remotely feasible for commission personnel to aspire to neutrality since the water conflict centers on the question of national self-determination.
- that decisions be taken unanimously (as in the ICPR, LCBC, and PIC). While the potential gains of a simple majority voting rule may be substantial, we believe that the current diplomatic climate precludes its adoption in a Palestinian-Israeli water commission.
- the commission be in session on a continuous basis. The urgency of the hydrological problems in the Middle East and the need for swift progress warrant ongoing, intense activity despite the potential great cost. Uninterrupted cooperation could minimize time lags between technical elaboration and political evaluation of policy proposals, and could help solidify working relationships and develop staff loyalty.

E. Institutional Capacity

Technical and administrative resources

The following table summarizes institutional design choices with regard to institutional capacity; their advantages and disadvantages; conditions that might make certain choices attractive; and requirements for successful implementation.

Advantages/Disadvantages of Policy Options		
Policy Options:	*build on existing institutional technical and administrative capacity*	*develop new technical and administrative capacity proper to the commission*
Advantages:	puts limited strain on financial resources	increases ability to implement commission recommendations
		enhances ease of coordination
		may help correct political imbalances resulting from disparities in technical and administration capacity among member states
Disadvantages:	commission recommendations may have to be more limited if indigenous institutions are weak	costly
	forces existing institutions to modify their missions (marginally or radically), which may cause resistance, bureaucratic infighting, and unsatisfactory implementation of commission recommendations	potential for duplication of efforts
		bureaucratization of commission (increases complexity of institutional structure, which may render decision-making process more cumbersome)[159]

***Conditions* Under Which the Policy Options May Be Desirable and the *Requirements* for Implementation of this Policy Choice**		
Policy Options:	*build on existing institutional technical and administrative capacity*	*develop new technical and administrative capacity proper to the commission*
Conditions:	sound institutional structures in place	imbalances in or general absence of indigenous technical and administrative capacity
	confidence on the part of member states that others will ensure enforcement of joint decisions	
	balance in technical and administrative capacity	
Requirements:		adequate financial resources to support new institutional structures

Case Study Experience

- Officials and experts from established national institutions (e.g. , the U.S. Environmental

Protection Agency) contribute substantially to the development and execution of IJC proposals. Often the same staff members that sit on the IJC's policy-making advisory boards are held responsible for national implementation of their committee's recommendation.

- Several of the ICPR member states have strong federalist structures, and the commission depends on national, regional, and local authorities to shape and reliably implement its directives. Many of the experts that participate in the ICPR's technical working groups live in areas traversed by the Rhine river and have a personal stake in the ICPR's clean-up efforts. Some believe this element of immediacy significantly enhances the ICPR's effectiveness. [160]
- While most environmental challenges in the Lake Chad Basin require local, district, or state management, there is no clear picture of the institutional resources devoted to resource conservation at those levels. [161]More generally, the development of administrative capacity in some member states has been constrained by persistent political upheaval. The caliber of LCBC technical personnel was adequate, but the institution often lacked competent managerial staff, even though qualified people were available in member countries.[162] The organization suffered from poor management, excessive personnel turnover, and poor implementation. In an attempt to build increased technical expertise in the field, the LCBC established a training center.

Middle East Context

Israel has had a functioning state apparatus since 1948, built in part on institutions founded before independence.[163] The other is a nascent entity with rudimentary institutional grounding and outstanding questions regarding its final status. Technologically advanced Israel has more hydrological expertise and has invested some $30 billion in water management over the decades.[164] A substantial international effort is currently being launched to create working government structures and spread technical know-how in the West Bank and Gaza Strip, though delays in planning worrisome to donors are reported.[165] The World Bank has urged that from 1994 to 1998, financial aid for infrastructure development in the Territories be accompanied by technical assistance worth $50 million.

Roughly half of this assistance would be devoted to project preparation. The rest would serve institution building purposes, such as studies on the desirable organizational structure of Palestinian water utilities and the training of officials in public administration and local governments.[166] Under the September 1993 accord, the Interim Self-government is to establish a Palestinian Water Administration Authority and a Palestinian Environmental Authority. [167]

Recommendations

For political and monetary reasons, international organizations must rely to some degree on domestic institutions and expertise to perform potentially sensitive activities within the borders of member states. This dependence on national authorities becomes problematic when indigenous resources are inadequate (as with the LCBC). Chayes and Chayes argue that deficiencies in administrative capacity or technical competence often lie at the root of a party's failure to adhere to international agreements. Yet acts of non-compliance may be misinterpreted by other parties as "a deliberate decision to violate an international undertaking on the basis of a calculation of interest."[168] At worst, such perceptions can contribute to the deterioration of the cooperative effort and overall relations. To avoid the danger that a Palestinian-Israeli commission would fall prey to such a pattern, we recommend that:

- any existing imbalances between the parties in administrative or technical capacity be redressed to ensure the stability of the institution. Efforts to strengthen Palestinian hydrological expertise should be intensified and tailored to specific tasks of the international commission.
- a core of permanent technical staff constitute the commission's professional backbone.
- in-house experts be routinely aided by outside consultants with special expertise on the decision-making process, when appropriate (as with the science advisory boards in IJC), and add local perspective (as with the ICPR working groups). This "revolving door" personnel policy could avoid excessive bureaucratization and help extend the cross-boundary hydrological epistemic community.
- consider operating a training center to spread knowledge of water-related fields such as

hydrological engineering, agronomy, water conservation and pollution control. (The importance of such a center was recognized during the creation of the LCBC.)

F. Domestic Political Context

Public Participation

The following table summarizes the institutional design choices regarding public participation; their advantages and disadvantages; conditions that might make certain choices attractive; and requirements for successful implementation.

Advantages/Disadvantages of Policy Options		
Policy Options:	*public participation not integrated into decision-making process*	*public participation as an integral part of the decision-making process*
Advantages:	insulation from domestic political pressures that might distract the commission from its primary mission	increased legitimacy of commission's decisions
	potentially less politicization of issues	potential for new and innovative proposals
	potentially rapid decision-making process	increased relevance to local concerns
		may help avoid politically unworkable recommendations
Disadvantages:	could produce politically insensitive and/or unworkable decisions and recommendations	potentially protracted decision-making process
	potential failure to address local needs	creates risk that special interest groups might dominate decision-making
	could provoke accusations that the commission lacks accountability	increased politicization of the issues
		increases level of political conflict: protests against the decisions of the commission could become unrestrained. Opposition tends to be directed across the border at the other side and therefore typically remains unchallenged[169]

Conditions Under Which the Policy Options May Be Desirable and the *Requirements* for Implementation of this Policy Choice		
Policy Options:	*public participation not integrated into decision-making process*	*public participation as an integral part of the decision-making process*
Conditions:	hostile relations among parties	established democratic practices and a reasonably well-informed public
Requirements:	commission is held accountable for its decisions and actions in other ways (e.g., referral to member governments)	

Case Study Experiences

- Public concern over pollution in the Great Lakes and elsewhere has run especially deep, and has had a notable influence on the commission's policies. Public hearings are an important part of a formal public participation program.

- Public environmental sensitivity, and attention to Rhine River pollution in particular, varied across ICPR member states until the Sandoz fire unleashed a clamor for tighter standards everywhere. The ICPR operated in relative obscurity until the accident, but has made a concerted effort to garner public support for its ambitious Rhine Action Program.

Middle East Context

Within the dynamic Palestinian-Israeli negotiations, representatives often publicly place the "emphasis ... on how tough and unyielding one is, so as to persuade the adversary that one cannot be pushed around."[170] Significantly, the breakthroughs that led to the historic peace accord signed in September 1993 were accomplished in a remote, secret forum.

Recommendations

Negotiation theorists hold that broad participation in decision-making gives the public a sense of "ownership" over decisions and enhances the probability of implementation.[171] Yet in antagonistic environments, the costs may outweigh the benefits; extensive public participation could cause further politicization of already volatile issues. Delegates could face the choice between opposing the other side's proposals or incurring sharp criticism at home. To avoid the risk of polarization we recommend that:

- commission proceedings be carried out without public input until a time when less intense discord separates the parties.
- the parties eventually consider the adoption of a formal process that would allow public participation in the commission's activities while keeping the level of controversy at a minimum. For example, the commission could accept and review written comments submitted by all interested and affected parties before issuing final decisions.
- more sophisticated and involved forms of public participation be contemplated only in later phases of political and institutional development.

G. Dispute Resolution Mechanism

The design of formal dispute resolution mechanisms did not emerge as an influential Institutional Design Variable from our analysis. This was a surprise, given the importance

attributed to this institutional feature in academic literature on regime formation and evolution. Several respondents did highlight dispute resolution as an indicator of institutional success. These individuals approached the subject largely from a juridical perspective. Our conclusion is *not* that the existence and structure of formal dispute resolution systems is inconsequential for the longevity of multilateral agreements. Too much evidence -- including the international arbitration proceedings set in motion in 1986 to settle the dispute over Taba[172] [173] -- points to the contrary. We believe that this institutional design variable did not emerge as significant in our study because dispute resolution provisions were seldom invoked in the combined 180-year history of the commissions examined.

H. Charismatic Leadership

Vision and charisma cannot be institutionalized; they are left to history or chance. Our case studies confirm that the importance of leadership and ingenuity in bridging gaps between nations and engineering cooperative arrangements cannot be overemphasized: the Indus River Treaty would not have come about without the perseverance and resourcefulness of World Bank President Eugene Black and former Chairman of the Tennessee Valley Authority David E. Lilienthal. And a lawyer from Ontario, George Gibbons, was the inspirational force behind the establishment of the IJC at the beginning of this century. [174]

X. CONCLUSION

Acute water scarcity threatens Palestinians and Israelis with economic, political, and ecological disruption. While many remedies can be taken by the two sides unilaterally, hydrological conditions necessitate cooperative effort to save both from long-term distress. Collective action will present considerable political, social, and emotional challenges to all participants. The design of a Palestinian-Israeli water commission must acknowledge these difficulties, and help the members overcome them.

Our design recommendations emphasize a gradual build-up in institutional power, scope, and function. Outside parties should provide resources and shepherd the parties through inevitable periods of difficulty. Much might be accomplished in this fashion. But in the end, the region's hydrological security depends upon Israelis' and Palestinians' accepting that "there is no substitute for the will to cooperate." [175]

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[54] Dupont, Christophe, "The Rhine: A Study of Inland Water Negotiations," *in International Environmental Negotiation*, edited by Gunnar Sjöstedt, SAGE publications, 1993.
[55] "EEC Makes Waves on Polluted Waters," *Environment*, October 22, 1975.
[56] Bouchez, Leo J., "Rhine Pollution: International Public Law Aspects" *International Business Lawyer*, 1981,pg. 56; and Kiss, Alexander, "The Protection of the Rhine Against Pollution," *Natural Resources Journal*, Vol. 25, No.3, July 1985, p. 637.
[57] Dr. Schulte-Wülver-Leidig, Op.Cit.
[58] Van der Veen, op.cit., p. 44.
[59] Guilford, Peter, "Tensions Hurt Rhine Cleanup," *Engineering News-Record*, June 29, 1989.
[60] The Tribunal prepared its cases over the course of two years to assure that its charges were based on sound scientific evidence and boasted a panel of judges who were experts in ecology or chemistry.
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[63] "Diffuse Sources of Pollution A Concern, International Rhine Commission Maintains" *International Environmental Daily*, July 16, 1993.
[64] "Protection of the Rhine: Quality of Water Brings Back Salmon," *Europe Environment*, July 14, 1992.
[65] Van Hoorn, Henk, International Water Policy Division, Secretary of the Netherlands' delegation to the ICPR, questionnaire response, March 1994.
[66] Ministry of Irrigation, India; "The Indus Commission and the Indo-Bangladesh Joint Rivers Commission" in United Nations Department of Technical Co-operation for Development, "Experiences in the Development and Management of International River and Lake Basins," from the Proceedings of the United Nations Inter-Regional Meeting of International River Organizations in Dakar, Senegal, 5-14 May, 1981; Natural

Resources/Water Series No. 10. p. 359.

[67] Niranjan D., (1973) *Indus Water Treaty, An Exercise in International Mediation,* Bombay: Allied Publishers.

[68] Ministry of Irrigation, India; "The Indus Commission and the Indo-Bangladesh Joint Rivers Commission" in United Nations Department of Technical Co-operation for Development, "Experiences in the Development and Management of International River and Lake Basins," from the Proceedings of the United Nations Inter-Regional Meeting of International River Organizations in Dakar, Senegal, 5-14 May, 1981; Natural Resources/Water Series No. 10. p. 359; Rahim, Abdul, Commissioner for the Indus Waters, Ministry of Water and Power, Government of Pakistan; "Indus Basin Development," from UN Natural Resources Water Series No. 20, River and Lake Basin Development; Addis Ababa; 1988.

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[70] Gulhati, Niranjan D., (1973) *Indus Water Treaty, An Exercise in International Mediation,* Bombay: Allied Publishers. p. xiii.

[71] Bernauer, Thomas, "Functions and Effectiveness of International River Management Institutions in Developing Countries: Some Ideas for a Project," Center for Science and International Affairs, John F. Kennedy School of Government, Harvard University, p. 37.

[72] Gulhati, Niranjan D., (1973) *Indus Water Treaty, An Exercise in International Mediation,* Bombay: Allied Publishers. p. 272. and Mehta, Jagat S., "The Indus Water Treaty: a Case Study in the Resolution of an International River Basin Conflict," from *Natural Resources Forum,* published for the UN, vol. 12, no. 1, February 1988.

[73] Office of the Commission for Indus Waters, Pakistan, "The Permanent Indus Commission," in United Nations Department of Technical Co-operation for Development, "Experiences in the Development and Management of International River and Lake Basins," from the Proceedings of the United Nations Inter-Regional Meeting of International River Organizations in Dakar, Senegal, 5-14 May, 1981; Natural Resources/Water Series No. 10. p. 376.

[74] Michel, Aloys Arthur, *The Indus Rivers, A Study of the Effects of Partition;* New Haven : Yale University Press; 1967.

[75] a government enterprise responsible for hydro-energy and economic development in the Tennessee Valley

[76] Mehta, Jagat S., "The Indus Water Treaty: a Case Study in the Resolution of an International River Basin Conflict," from *Natural Resources Forum,* published for the UN, vol. 12, no. 1, February, 1988.

[77] From a World Bank proposal, dated February 5, 1954. See Rahim, Abdul, Commissioner for the Indus Waters, Ministry of Water and Power, Government of Pakistan; "Indus Basin Development," from UN Natural Resources Water Series No. 20, River and Lake Basin Development; Addis Ababa; 1988.

[78] Gulhati, Niranjan D., (1973) *Indus Water Treaty, An Exercise in International Mediation,* Bombay: Allied Publishers. p. 331. and Mehta, Jagat S., "The Indus Water Treaty: a Case Study in the Resolution of an International River Basin Conflict," from *Natural Resources Forum,* published for the UN, vol. 12, no. 1, February, 1988.

[79] Letter dated September 6, 1951, from Eugene R. Black, President of the World Bank to the Prime Ministers of India and Pakistan. Taken from Gulhati, Niranjan D., (1973) *Indus Water Treaty, An Exercise in International Mediation,* Bombay: Allied Publishers. p. 96.

[80] M. Hirsh and D. Housen-Couriel, "Aspects of the Law of International Water Resources".

[81] Sayed Mehtab Ali Shah, "Anatomy of Indo-Pak Discord," *Journal of Asian and African Affairs,* July, 1989.

[82] Gulhati, Niranjan D., (1973) *Indus Water Treaty, An Exercise in International Mediation,* Bombay: Allied Publishers. p. 272.

[83] Indus Waters Treaty 1960.

[84] Office of the Commission for Indus Waters, Pakistan, "The Permanent Indus Commission," in United Nations Department of Technical Co-operation for Development, "Experiences in the Development and Management of International River and Lake Basins," from the Proceedings of the United Nations Interregional Meeting of International River Organizations in Dakar, Senegal, 5-14 May, 1981; Natural Resources/Water Series No. 10. p. 379.

[85] Office of the Commission for Indus Waters, Pakistan, "The Permanent Indus Commission," in United Nations Department of Technical Co-operation for Development, "Experiences in the Development and Management of International River and Lake Basins," from the Proceedings of the United Nations

Interregional Meeting of International River Organizations in Dakar, Senegal, 5-14 May, 1981; Natural Resources/Water Series No. 10. p. 378.

[86] Rahim, Abdul, Commissioner for the Indus Waters, Ministry of Water and Power, Government of Pakistan; "Indus Basin Development," from UN Natural Resources Water Series No. 20, River and Lake Basin Development; Addis Ababa; 1988.

[87] The following contributions were made to the Indus Basin Development Fund: £A 6,965,000 from Australia; CanS 22,100,000 from Canada, DM 126,000,000 from Germany; ; £NZ1,000,000 from New Zealand; £20,860,000 from the U.K.; and U.S. $177,000,000 from the U.S.; the U.S. also made a loan of $70,000,000 to Pakistan and made an addition contribution of $80,000,000 to the fund; See Indus Basin Development Fund Agreement, September 19, 1960.

[88] Ministry of Irrigation, India; "The Indus Commission and the Indo-Bangladesh Joint Rivers Commission" in United Nations Department of Technical Co-operation for Development, "Experiences in the Development and Management of International River and Lake Basins," from the Proceedings of the United Nations Interregional Meeting of International River Organizations in Dakar, Senegal, 5-14 May, 1981; Natural Resources/Water Series No. 10. p. 360.

[89] Office of the Commission for Indus Waters, Pakistan, "The Permanent Indus Commission," in United Nations Department of Technical Co-operation for Development, "Experiences in the Development and Management of International River and Lake Basins," from the Proceedings of the United Nations Interregional Meeting of International River Organizations in Dakar, Senegal, 5-14 May, 1981; Natural Resources/Water Series No. 10. p. 382. also Rahim, Abdul, Commissioner for the Indus Waters, Ministry of Water and Power, Government of Pakistan; "Indus Basin Development," from UN Natural Resources Water Series No. 20, River and Lake Basin Development; Addis Ababa; 1988. p. 210.

[90] *The Financial Times*, August 26, 1991.

[91] J. S. Mehta, former Foreign Secretary of India in "The Indus Water Treaty: a Case Study in the Resolution of an International River Basin Conflict," from *Natural Resources Forum*, published for the UN, vol. 12, no. 1, February, 1988.

[92] according to Abdul Rahim, former Pakistan Commissioner for Indus Waters (from correspondence dated March 25, 1994) the Treaty c ontains the following flaws: 1) The Sailab areas would suffered from a loss of flood irrigation waters after India fully developed the Sutlej, Beas, and Ravi rivers, 2) the fear that channels would silt up after the Eastern Rivers lost their regular flow, 3) The up-keep of new link canals and storage would mean heavy additional maintenance costs.

[93] Concerns have recently been raised, however, about the failure of the Treaty's Replacement Plan to account for the potential mixing of sweet and brackish groundwater, according to written correspondence from Abdul Rahim, former Pakistan Commissioner for Indus Waters

[94] Joseph W. Dellapenna, "Treaties as Instruments for Managing Internationally-Shred Water Resources: Restricted Sovereignty vs. Community Property," also Brian Concannon, *The Indus Waters Treaty, Three Decades of Success, Yet Will it Endure?*; *The River Basin History and Law* 1967; p. 163-165, 183-184.

[95] Mehta, Jagat S., "The Indus Water Treaty: a Case Study in the Resolution of an International River Basin Conflict," from *Natural Resources Forum*, published for the UN, vol. 12, no. 1, February, 1988.

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[97] Bernauer, Thomas, "Functions and Effectiveness of International River Management Institutions in Developing Countries: Some Ideas for a Project," Center for Science and International Affairs, John F. Kennedy School of Government, Harvard University p. 37 and Mehta, J. S. (1986): "The Indus Water Treat (as a case study in the Resolution of International River Basin Conflict)." In Vlachos, Webb, and Murphy (Ed.).

[98] from written correspondence with the Commissioner, dated March 25, 1994.

[99] Eugene Black quoted by David Lilienthal in *The Journals of David E. Lilienthal*, New York, Harper & Row, 1983.

[100] Kamm Henry, "In one year, Sahara Engulfs much of Chad," *The New York Times*, Jan. 2, 1985.

[101] Brooke James, "Some Gains in West Africa's War on the Desert," *The New York Times*, Sept. 13, 1987.

[102] Encyclopedia of Public International Law, Geographic Issues: Number 12, Published under the Auspices of the Max Plank Institute for Comparative Public law and International Law, 1990.

[103] *Agence France Press*, "Report on Drought and Food Situation in Chad," Jan. 19, 1985.

[104] Hutchinson, Warshall, Arnoud, and Kindler, "Lessons from Lake Chad," *Environment*, , Vol. 34. Number 6, July/August, 1992.
[105] Brunold George, "Grenzstadt Ndjamena," *Neue Zürcher Zeitung*, Feb. 12, 1994.
[106] *The Economist*, "Down and Out on the Farm," Jan. 1, 1982.
[107] The Concise Columbia Encyclopedia, Columbia University Press, 1991 .
[108] Ibid.
[109] *Mining Annual Review*, July 1992.
[110] *Mining Annual Review*, June 1992.
[111] Linnee Susan, "Shrinking Lake Chad Targeted For Rescue," *Los Angeles Times*, May, 27, 1990.
[112] Gould Michael and Zobrist Frederick, "An Overview of Water Resources Planning in West Africa," *World Development*, 1989, p. 1719.
[113] Ibid.
[114] Ibid., p. 1720.
[115] Ibid.
[116] *BBC* Summary of World Broadcasts, "Investigations Into Cameroon Dam," July 21, 1981.
[117] Olusegun, C. Irivboje, Director, Water Division of the LCBC, "Lake Basin Development -- the Experience of the Lake Chad Basin Commission," in UN Natural Resources Water Series No. 20, New York, NY, 1990, p. 260.
[118] Gould Michael and Zobrist Frederick, op.cit., p. 1719.
[119] Okidi C.O., "The State and the Management of International Drainage Basins in Africa," *Natural Resources Journal*, Fall 1988, Vol. 28, no. 4, p. 663.
[120] Jauro Abubakar Bobboi, Executive Secretary , Introductory Remarks to Report: *The Lake Chad Basin Commission at 25*, 1989.
[121] UN Documents, Natural Resources/Water Series No. 20, Annex I, p. 87.
[122] Ibid., p. 88.
[123] Shuval, Hillel, I. "Approaches to Resolving the Water Conflicts Between Israel and her Neighbours -- A Regional Water for Peace Plan," *Water International*, 17, 1992, pg. 134. Shuval's conclusions are based on the system of a "Water Stress Index" developed by Malin Falkenmark who suggests that availability of freshwater resources below the order of 500 cubic meters per person per year defines a "Water Stress Zone" in which critical shortages occur. Shuval estimates the Water Stress Index for Israel to amount to approximately 300 CM/P/Yr and puts the Water Stress Index for the Palestinians at 165 CM/P/Yr. According to Shuval, "since the total amount of water resources available is insufficient, it is a zero sum game and any attempt to find a solution by reallocation of the limited resources between the disputants is likely to lead to a deadlock."
[124] Kally, Elisha, "Water and Peace -- Water Resources and the Arab-Israeli Peace Process," Praeger Publishers, 1993.
[125] Schwarz, J. "Water Resources in Judea, Samaria, and the Gaza Strip," written in May 1980 and published in *Water Resources*, American Enterprise Institute, p. 100.
[126] Ibid., p. 93. While groundwater levels are still above the critical threshold, the rate of salinization is already on the order of 1-2 ppm chloride per year.
[127] Shuval, Hillel, I. "Approaches to Resolving the Water Conflicts Between Israel and her Neighbours -- A Regional Water for Peace Plan," *Water International*, 17, 1992, p. 135.
[128] Faure Guy Olivier and Rubin, Jeffrey Z. "Culture and Negotiation -- the Resolution of Water Disputes," SAGE Publications, p. 163.
[129] Kally, Elisha, "Water and Peace -- Water Resources and the Arab-Israeli Peace Process," Praeger Publishers, 1993, p. 104.
[130] Faure Guy Olivier and Rubin, Jeffrey Z. "Culture and Negotiation -- the Resolution of Water Disputes," SAGE Publications, p. 59.
[131] Cowell, Alan, "Hurdle to Peace: Parting the Mideast's Waters," *The New York Times*, October 10, 1993.
[132] Lowi, Miriam, R. Bridging the Divide, "Transboundary Resource Disputes and the Case of West Bank Water," *International Security*, Vol. 18, No. 1, Summer 1993, p. 133.
[133] Quoted in Kally, Elisha, *Water and Peace -- Water Resources and the Arab-Israeli Peace Process*. Praeger Publishers, 1993.
[134] Isaac, Jad, and Zarour, Hisham, "Nature's Apportionment and the Open Market: a Promising Solution to the Arab-Israeli Water Conflict," *Water International*, 1993, p. 41.

[135] Thomas Naff, in a study published in 1984, argues that water, while not a direct cause of the 1967 Six Day War, was the foremost reason for Israel to retain the West Bank after the territory had fallen under its control.

[136] The study was written by Yehoshua Schwartz and Aharon Zohar for Tel Aviv University's Jaffe Center for Strategic Studies. Its content was related by Clyde Haberman, "Water and Concessions can Mix, Israeli Study Says," *The New York Times*, October 10, 1993, based on extracts that appeared in the Haaretz newspaper.

[137] quoted in "Israel must Control Water in Territories: Report," Agence France Presse, October 8, 1993.

[138] Annex III.

[139] Kally, Elisha, *Water and Peace -- Water Resources and the Arab-Israeli Peace Process*, Praeger Publishers, 1993.

[140] Agriculture accounts for about 21 % of the GDP of the Occupied Territories. (Source: report by the Institute for Social and Economic Policy in the Middle East, John F. Kennedy School of Government, Harvard University).

[141] Agriculture, forestry and fisheries made up 6 % of the Israeli GDP in 1991 and employed 4.6 % of the country's workforce in 1989. (Source: Walden Country Reports, ISRAEL). Agriculture alone accounts for only 2.4 % of GDP (Source: report by the Institute for Social and Economic Policy in the Middle East, John F. Kennedy School of Government, Harvard University).

[142] Walden Country Reports, Israel, Section on Production.

[143] Kally, Elisha, "Water and Peace -- Water Resources and the Arab-Israeli Peace Process," Praeger Publishers, 1993.

[144] Fisher, Stanley and Shelling Thomas C. *Securing Peace in the Middle East: Projects on Economic Transitions*, published by the Institute for Social and Economic Policy in the Middle East, John F. Kennedy School of Government, Harvard University, June 1993.

[145] Fisher, Stanley and Shelling Thomas C., Op Cit, pg. 61. This flow has been intermittently restricted or cut off altogether by the Israeli government in response to terrorist attacks inside Israel, sometimes for substantial periods.

[146] Middle East Executive Reports, "The Occupied Territories: Technical Assistance and Investment Needs," October 1993.

[147] Economist Intelligence Unit, "Economic Infrastructure," January 1, 1994.

[148] The Helsinki Rules, drafted by the International Law Association in 1966, are the most comprehensive list of principles applicable to international drainage basins to date. Article IV holds that "each Basin State is entitled, within its territory, to a reasonable and equitable share in the beneficial uses of the waters of an international drainage basin."

[149] Cohen, Maxwell, Former Chairman of the International Joint Commission, Canadian Section, *River Basin Planning:Observations from International and United States-Canada Experience*, in"Experiences in the Development and Management of International River and Lake Basins," Proceedings of the United Nations Interregional Meeting of International River Organizations, Dakar, Senegal, 5-14 May, 1981, UN Documents: Natural Resources/Water Series No. 10, p. 110.

[150] Pruitt, Dean G. and Rubin, Jeffery Z., *Social Conflict, Escalation, Stalemate, and Settlement*, McGraw Hill, 1986.

[151] Water marketing, while implemented in the western US and elsewhere on an experimental basis, is not currently practiced by any multi-lateral water authority. The promise such trading mechanisms hold for improving economic efficiency in water allocation within a hydrological basin is substantial, however, and the desirability and feasibility of introducing water marketing schemes in the Middle East should be seriously explored. One potential advantage that could accrue to a water management commission involved in buying and selling activity would be that profits could bolster the institution's financial position, reducing its reliance on direct contributions from members and third parties.

[152] Lake Chad Basin Commission, with the assistance of UNEP and UNSO, *Master Plan for the Development and Environmentally Sound Management of the Natural Resources of the Lake Chad Conventional Basin*, 1989, p. 7.

[153] Hayton, Robert, D., *Progress in Cooperative Arrangements*, in "Experiences in the Development and Management of International River and Lake Basins," Ibid. p. 74.

[154] Sebenius, James K, "Negotiation Arithmetic: Adding and Subtracting Issues and Parties," *International Organization*, 1983, 37: p. 281-316.

[155] Fisher, Hausman, and Karasik, *Near East Economic Progress Report*, The Institute for Social and Economic Policy in the Middle East, Number 1, March 199, pg. 7; Fisher, Hausman and Karasik write that "...the amounts of aid actually *disbursed* will be well below the amounts specified...especially in the early years as the aid projects get under way. Accordingly, the *amounts of financial transfers from the donors to the Palestinian economy will start out well below the quantities specified...*" (Emphasis in the original text).
[156] Haas, Peter, M. *Saving the Mediterranean, The Politics of International Environmental* Cooperation, Columbia University Press, NY, 1990.
[157] quoted in Arnold Heeney, Chairman, Canadian Section of the IJC, taken from "Along the Common Frontier, The International Joint Commission," in *Behind the Headlines*, Toronto : Canadian Institute of International Affairs; July, 1967, Volume XXVI, No. 5.
[158] "Fiddling While Peace Burns," *The Economist*, April 2-8, 1994, p. 14.
[159] LeMarquand, D. G., "Institutional Arrangements for Water Resource Development," *World Bank Technical Paper Number 175*, 1992.
[160] Roussel, Odile, Former French delegate to the Rhine Commission, Interview, November 1993.
[161] Lake Chad Basin Commission, with the assistance of UNEP and UNSO, *Master Plan for the Development and Environmentally Sound Management of the Natural Resources of the Lake Chad Conventional Basin*, 1989, p. 16.
[162] United Nations Development Program, The Multi-donor Approach in Large River and Lake Basin Development in Africa, UN Documents, Natural Resources/Water Series, No. 20, p. 80.
[163] The Mekorot national water company, for example, was founded as a colonial enterprise in 1935. (Source: Kally, Elisha, *Water and Peace--Water resources and the Arab-Israeli Peace Process*, Praeger, 1993.)
[164] Cowell, Alan, "Hurdle to Peace: Parting the Mideast's Waters," *The New York Times*, October 10, 1993.
[165] Hedges, Chris, "P.L.O. Called Unready to Take Over," *The New York Times*, April 8, 1994.
[166] Middle East Executive Reports, "The Occupied Territories: Technical Assistance and Investment Needs," October 1993.
[167] Article VII of Interim Agreement.
[168] Chayes Abram and Chayes Antonia, *On Compliance*, International Organization, Vol. 47, No. 2, Spring 1993, p. 176.
[169] LeMarquand, D. G., "Preconditions to Cooperation in Canada-United States Boundary Waters," *Natural Resources Journal*, Vol. 26, Spring, 1986.
[170] Pruitt, Dean G. and Rubin, Jeffery Z., *Social Conflict, Escalation, Stalemate, and Settlement*, McGraw and Hill, 1986.
[171] Susskind Lawrence, Professor at the Massachusetts Institute of Technology, Teaches and Writes Extensively on the Subject of International Environmental Negotiations, In-Class Discussion, Fall 1993.
[172] Redden, Jack, *Israeli Return of Taba Strip to Egypt has Left it In-Between*, Reuter News Service, December 30, 1991.
[173] A dispute over Taba, a small stretch of Red Sea coastline, marred relations between Israel and Egypt for several years after the signing of the 1979 peace treaty which returned the Sinai to Egyptian control. The argument was resolved through international arbitration resulting in a ruling in Egypt's favor. Israel consequently withdrew from Taba on March 15, 1989.
[174] Heeney, A.D.P., "Along the Common Frontier, The International Joint Commission," in *Behind the Headlines*, Toronto : Canadian Institute of International Affairs; July, 1967, Volume XXVI, No. 5, p. 5.
[175] (Adapted from Fox and Le Marquand 1977) Zgheib, Philippe W., "International Protocol for the Integrated Development of Water in the Litani and Jordan River Basins," *Proceedings of the International Symposium on Water resources in the Middle East: Policy and Institutional Aspects*, Urbana, Illinois, October 24-27, 1993.

Appendix A - Case Study Expert Sources and Source Material

This appendix lists the literature sources and experts consulted for the four water commissions.

International Joint Commission

Gordon K. Durnil, Co-Chairman, International Joint Commission, 1989-present, taken from questionnaire dated 3/15/94.

F.A. Ross, Secretary, Canadian Water Resources Association; from completed questionnaire dated 3/22/94.

David G. LeMarquand, Environment Canada, senior advisor in intergovernmental affairs; taken from written response to questionnaire and from "Preconditions to Cooperation in Canada-United States Boundary Waters," in Natural Resources Journal, Vol. 26. Spring 1986.

Arnold Heeney, Chairman, Canadian Section of the IJC and former Clerk of the Privy Council and Secretary to the Cabinet, Under-Secretary of State for External Affairs, and twice Ambassador to the U.S. and President of the Canadian Institute of International Affairs; taken from "Along the Common Frontier, The International Joint Commission," in *Behind the Headlines,* Toronto: Canadian Institute of International Affairs; July, 1967, Volume XXVI, No. 5.

International Joint Commission; United Nations Department of Technical Co-operation for Development, "Experiences in the Development and Management of International River and Lake Basins," from the *Proceedings of the United Nations Interregional Meeting of International River Organizations in Dakar, Senegal,* 5-14 May, 1981; Natural Resources/Water Series No. 10.

Carol Reardon (1992), in "The International Joint Commission: A Possible Model for International Resource Management", from the book *International Environmental Treaty Making* edited by Lawrence E. Susskind, Eric Jay Dlin and J. William Breslin. Published by the Program on Negotiation at Harvard Law School, Cambridge, MA.

R. Pentland, Director, Water Planning and Management Branch, Environment Canada, 1983. From a paper submitted by the Government of Canada to appear in the United Nations Department of Technical Co-operation for Development, "Experiences in the Development and Management of International River and Lake Basins," and the *Proceedings of the United Nations Interregional Meeting of International River Organizations in Dakar, Senegal,* 5-14 May, 1981; Natural Resources/Water Series No. 10.

Marcel Cadieux, "The View from the Person Building" in the *International Joint Commission, Seventy Years On* (1981). Marcel Cadieux worked for the Canadian Department of External Affairs and was Special Negotiator for Canadian-United States Boundaries and Fisheries prior to his death in 1981. He also taught at the University of Ottawa.

Lawrence J. Burpee, Canadian Secretary, International Joint Commission; taken from *Good Neighbours,* Published under the auspices of the Canadian Institute of International Affairs; Ryerson Press: Toronto; 1940.

Stewart H. Fonda, Jr. taken from *The IJC: A Neighborly Idea;* Water spectrum, v. 9, summer 1977: 19-28.

James G. Chandler, Legal Advisor, U.S. Section of the International Joint Commission, and Michael J. Vechsler, Legal Advisor, Canadian Section of the International Joint Commission; taken from "The Great Lakes-St. Lawrence River Basin From an IJC Perspective," *Canada United States Law Journal Annual,* Vol.10, 1992, p.261.

Chirakaikaran Joseph Chacko from *The International Joint Commission between The United States of America and the Dominion of Canada,* AMS Press : New York; 1968.

William R. Willoughby, from literature review of *The Joint Organizations of Canada and the United States,* University of Toronto Press : Toronto; 1979. from chapter, "The IJC: An Appraisal"

International Commission for the Protection of the Rhine

Urs Sieber, Swiss Federal Office of Environment, Forests and Landscape, Water Chemistry Section, from questionnaire on 3/28/94.

Henk van Hoorn, International Water Policy Division, Secretary of the Netherlands Delegation to the Rhine Commission, from questionnaire on 3/26/94.

Dr. A. Schulte-Wülwer-Leidig of the Scientific/Technical Secretariat of the International Commission for the Protection of the Rhine, from interview, January 7, 1994; Koblenz, Germany

Cristophe Dupont, taken from "The Rhine: A Study of Inland Water Negotiations" in *International Environmental Negotiations* edited by Gunnar Sjöstedt, a publication of the IIASA, Laxemburg, Austria and "Switzerland, France, Germany, the Netherlands: The Rhine" *in Cefulture and Negotiation --the Resolution of Water Disputes* edited by Jeffrey Z. Rubin and Guy Olivier Faure, SAGE, 1993

W.van der Kleij, R.H. Dekker, H. Kersten and J.A.W de Wit from literature review of "Water Management of the River Rhine: past, Present, and Future" in *European Water Pollution Control,* Vol. I, No. 1, 1991

A. Nollkaemper, from literature review of "The Rhine Action Programme: A Turning Point on the Protection of the North Sea?"in *International Journal of Estuarine and Coastal Law,* Vol. 5, No. 1, 2, and 3 February 1990

Alexandre Kiss, from literature review of "The Protection of the Rhine Against Pollution," in *Natural Resources Journal,* Vol. 25, No.3, July 1985

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Abdul Rahim, former Pakistan Commissioner for Indus Waters, from questionnaire dated 3/25/94.

David M. Goldberg, Deputy General Counsel, The World Bank, and Dr. Raj Krishna, Chief Counsel, South Asia Branch of the World Bank, from questionnaire dated 3/11/94.

Nasir Gazdar, Secretary General, Environmental Management Society, Pakistan, from questionnaire dated 3/3/94.

Aban Marker Kabraji, Pakistan Country Representative, IUCN World Conservation Union; Karachi, Pakistan; taken from questionnaire.

R. Bandyopadhyay, Director, Center for Applied Systems Analysis in Development; taken from questionnaire received on 4/1/94.

Dhirendra Sharma, President of the Indian Science Writers Association and Director of the Asian Community International Policy Research Centre; from questionnaire dated 3/29/94.

Professor M. C. Chaturvedi, New Dehli, from questionnaire received on 4/11/94.

Gulhati, Niranjan D., Chief Negotiator for the Indian Delegation in the Indus Treaty; taken from Gulhati, Niranjan D. (1973) *Indus Water Treaty, An Exercise in International Mediation,* Bombay: Allied Publishers.

Sir William Iliff, Vice-President of the World Bank during the India-Pakistan negotiations over the Indus Basin; taken from the Forward of Gulhati, Niranjan D. (1973) *Indus Water Treaty, An Exercise in International Mediation,* Bombay: Allied Publishers.

Office of the Commissioner for Indus Waters, Pakistan, from "The Permanent Indus Commission," in UN Dept. of Technical Co-operation for Development, "Experiences in the Development and Management of International River and Lake Basins," from the Proceedings of the UN Interregional Meeting of International River Organizations in Dakar, Senegal, 5-14 May, 1981; Natural Resources/Water Series No. 10.

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David E. Lilienthal, former chairman of the Tennessee Valley Authority, the US Atomic Energy Commission, and principle negotiator in the Indus Basin Dispute from a literature review of *The Journals of David E. Lilienthal* Volumes III, IV, and V and from his piece, "Another Korea in the Making" in *Collier's* July, 1951.

Lowi, Miriam R. *Water and Power, The Politics of a scarce resource in the Jordan River Basin;* Cambridge University Press : Cambridge, England; 1993.

K. S. Sharma; Commissioner for Indus Water, Ministry of Water Resources, Government of India, "India's Experience in Developing the Indus River Basin Programme," from UN Natural Resources Water Series No. 20 River and Lake Basin Development; Addis Ababa; 1988.

David G. LeMarquand, Environment Canada, senior advisor in intergovernmental affairs; taken from written response to questionnaire dated 3/29/94.

Hafeez-ur-Rahman Khan, Research Officer in Pakistan Institute of International Affairs, from literature review of "Indo-Pakistan Waters Dispute," in *Pakistan Horizon,* Dec, 1959, Volume XII, No 4, p. 323-336.

Caponera, Danta A., Executive Countril, International Association of Water Law, from literature review of "International water resources law in the Indus Basin," from *Water Resources Policy for Asia*, edited by Mohammed Ali, George E. Radosevich, and Akbar Ali Kahn; AA. Balkema : Rotterdam, Netherlands, 1987

Embassy of Pakistan, from literature review of "Indus Basin Water Dispute," July 10, 1958.

Lake Chad Basin Commission

Abubakar B. Jauro, Executive Secretary, Lake Chad Basin Commission, from questionnaire dated March 31, 1994.

Charles F. Hutchinson, Associate Director, Office of Arid Land Studies, University of Arizona, Tuscon Arizona taken from a questionnaire on in March 15, 1994.

Program Officer, United Nations Development Programme, Lagos, Nigeria, from questionnaire dated 3/28/94.

Michael S. Gould and Frederick A. Zobrist, taken from "An Overview of Water Resources Planning in Africa" in *World Development*, 1989, pages. 1717-1722

Olusegun C. Irivboje, Director, Water Resources Division, Lake Chad Basin Commission, taken from "Lake Basin Development--the Experience of the Lake Chad Basin Commission" presented, at the Interregional Meeting on River and Lake Basin Development with Emphasis on the African Region, Addis Ababa, Ethiopia, 10-15 October 1988 (UN Natural Resources Water Series No.20)

Appendix B - Quantitative Analysis

The influence and ranking of the 43 institutional variables was done with the following weighting and averaging algorithm:

1) For each questionnaire received and literature analysis performed, the numerical value of "2" was assigned to each variable identified as "very important," "1" to each variable identified as "somewhat important," and "0" for "not important."

2) For each commission, the total absolute influence value for each variable was computed by adding up the "2's," "1's," and "0's." (The absolute values would therefore be anywhere between 0 and two times the number of questionnaires received.)

3) An average or normalized influence value for each variable was computed by dividing the absolute influence value by the number of questionnaires received for that commission. The resulting "normalized" values should fall within the range between 0 and 2, inclusive. A value close to 0 represents a relatively unimportant variable, close to 1, a somewhat important variable, and those close to 2 are presumed to be very influential institutional variables.

4) These normalized variable influence values were ranked against one another for each of the four commissions.

5) An overall influence for each variable was computed for all commissions by adding the normalized influence values for each variable for all commissions and then dividing by "4," the number of commissions. The resulting values should again fall between 0 and 2 inclusive where 0, 1, and 2 represent unimportant, somewhat important, and very important variables, respectively.

6) Each variable was ranked against the others based on its overall influence.

A step-by-step description of our methodological framework follows:

Step 1 **Select Institutional Cases for Analysis.** The institutional case studies are selected based on a number of criteria (economic, political, and hydrological factors, perceived success, geographical distribution, etc.)

Step 2 **Construct a Set of Variables for Analysis.** This is a set of potentially influential variables. This set includes both contextual and institutional design variables which could have plausibly been believed to influence the creation and/or the ongoing viability of a water commission.

Step 3 **Design Survey Instrument.** The survey instrument must be designed to effectively identify which variables from the above set indeed were influential, why they were so, whether they were positively or negatively influential, and the period in which they were influential (creation vs. ongoing viability).

Step 4 **Identify Experts and Expert Analysis for each Institutional Case.** This list of experts includes current and former commissioners, academic experts, area experts from international lending institutions, and members of non-governmental organizations. Expert analysis includes literature produced by these individuals. (See Appendix B for a list of individuals surveyed)

Step 5 **Apply Survey Instrument.** The survey instrument is used as a questionnaire to query institutional experts and as a systematic tool in reviewing existing expert literature on the case studies.

Step 6 **Perform Quantitative Analysis on Qualitative Survey Data.** The results of the previous step are compiled and analyzed to yield a set of contextual and institutional design variables that were most influential in both the creation and ongoing viability of each institutional case study, how they were influential, and why (see Appendix C for a description of the algorithm employed to determine the relative influence of each institutional variable).

Step 7 **Perform Cumulative and Comparative Analysis.** The results of this step will reveal which contextual and institutional design variables were most influential in all or most institutional case studies.

Step 8 **Define the Target Context, the Palestinian-Israeli Situation, in Terms of the Set of Influential Contextual Variables.**

Step 9 **A Range of Policy Options is Defined For Each Influential Institutional Design Variable.** The conditions and requirements associated with each extreme end of the range of policy choices are provided for each influential institutional design variable.

Step 10 **Institutional Recommendations Are Made for Each Influential Institutional Design Variable in Light of the Target Context.** Final institutional design recommendations for a Palestinian-Israeli water commission are made for each influential institutional design variable by drawing on the case experiences and considering the consequences and requirements that accompany each policy choice.

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