2

Organizational theory

Institutions and law[1]

Just as the flow of water ignores political boundaries, so too does its management strain the capabilities of institutional boundaries. While water managers generally understand and advocate the inherent powers of the concept of a watershed as a unit of management, where surface and groundwater, quantity and quality, are all inexorably connected, the institutions we have developed to manage the resource follow these tenets only in the exception. In the sections that follow, we review the current status of international water institutions and water law.

Water negotiations and institutional capacity

Frederiksen (1992) describes principles and practice of water resources institutions from around the world. He argues that while, ideally, water institutions should provide for ongoing evaluation, comprehensive review, and consistency among actions, in practice this integrated foresight is rare. Rather, he finds rampant lack of consideration of quality considerations in quantity decisions, a lack of specificity in rights allocations, disproportionate political power-by-power companies, and a general neglect for environmental concerns in water resources decision-making. Buck et al. (1993) describe an ''institutional imperative'' in their comparison of transboundary water conflicts in the United States (US) and the former

Soviet Union. Feitelson and Haddad (1995) take up the particular institutional challenges of transboundary groundwater.

To address these deficiencies at the international level, some have argued that international agencies might take a greater institutional role. Lee and Dinar (1995) describe the importance of an integrated approach to river basin planning, development, and management. Young et al. (1994) provide guidelines for coordination between levels of management at the global, national, regional, and local levels. Delli Priscoli (1989) describes the importance of public involvement in water conflict management. In other work (1992), he makes a strong case for the potential of Alternative Dispute Resolution (ADR) in the World Bank's handling of water resources issues. Trolldalen (1992) likewise chronicles environmental conflict resolution at the United Nations, including a chapter on international rivers. Most recently, the creation of the World Water Council has seen among its four primary challenges a ''global institutional framework for water'' (*WWC Bulletin*, December 1995).

While remaining optimistic, it is worth explicitly noting the difficulties that may present themselves as dispute resolution principles begin to permeate the government and non-government agencies responsible for transboundary resource negotiations. The first barrier that may preclude total reliance on ADR in its current state is that between scientific and policy analysis. As Ozawa and Susskind point out,

> Scientific advice is [sometimes] reduced to an instrument for legitimating political demands. Scientific analysis, in turn, can distort policy disputes by masking, beneath a veneer of technical rationality, underlying concerns over the distribution of costs and benefits. (1985: 23)

Exacerbating this problem of science's tenuous relationship with policy analysis is the fact that training of diplomats is often in political science or law, while those scientists most competent to evaluate resource conflicts are rarely skilled in either diplomacy or policy analysis.

The second, somewhat subtler, barrier that diminishes ADR's usefulness in international water disputes is that between ADR practitioners and analysts. Zartman (1992) discusses a common practitioner's approach to environmental disputes either as a case of ''problem-solving,'' where the disputants can dissociate themselves emotionally from the problem which is considered to be a distinct entity, a ''game against nature;'' or as a case of information dispute, where resolution becomes apparent in the process of clarifying the data. Zartman suggests that these views are incomplete, that they ''assume away conflict, rather than explaining and confronting it'' (1992: 114). He suggests steps, based on the ADR analyst's experience, to recognize conflicts of nature also as conflicts of in-

terest: ''Inherent in the conflict with nature is conflict among different parties' interests; inherent in problem solving is a need for conflict management'' (1992: 114).

These barriers – between science and policy, and between practice and analysis – can individually lead to a convoluted and incomplete process of conflict resolution and, together, can preclude arrival at the ''best'' (Pareto-optimal or win-win) solution to a given problem. By concentrating on the process of conflict resolution, rather than the outcome, one can take on a much-needed dynamic, and ideally predictive, component.

International water law

According to Cano (1989: 168), international water law did not begin to be substantially formulated until after World War I. Since that time, organs of international law have tried to provide a framework for increasingly intensive water use, focusing on general guidelines that could be applied to the world's watersheds. These general principles of customary law, codified and progressively developed by advisory bodies and private organizations, are termed ''soft law,'' and are not intended to be legally binding, but can provide evidence of customary law and may help crystallize that law. While it is tempting to look to these principles for clear and binding rules, it is more accurate to think of them in terms of guidelines for the process of conflict resolution.

The concept of a ''drainage basin,'' for example, was accepted by the International Law Association (ILA) in the Helsinki Rules of 1966, which also provides guidelines for ''reasonable and equitable'' sharing of a common waterway (Caponera, 1985). Article V lists no fewer than 11 factors that must be taken into account in defining what is ''reasonable and equitable.''[2] There is no hierarchy to these components of ''reasonable use''; rather they are to be considered as a whole. One important shift in legal thinking in the Helsinki Rules is that they address the right to ''beneficial use'' of water, rather that to water per se (Housen-Couriel, 1994: 10). The Helsinki Rules have explicitly been used only once to help define water use – the Mekong Committee used the Helsinki Rules definition of ''reasonable and equitable use'' in formulation of their Declaration of Principles in 1975, although no specific allocations were determined.[3]

Some nations raised objections as to how inclusive the process of drafting had been when the United Nations (UN) considered the Helsinki Rules in 1970. In addition and, according to Biswas (1993), more importantly, possibly interpreted as an infringement on a nation's sovereignty, some states (Brazil, Belgium, China, and France, for instance) objected to the prominence of the drainage basin approach. Others, notably Finland

and the Netherlands, argued that the most ''rational and scientific'' unit of management was the watershed. Others argued that, given the complexities and uniqueness of each watershed, general codification should not even be attempted. On 8 December 1970, the General Assembly directed its own legal advisory body, the International Law Commission (ILC) to study the ''Codification of the Law on Water Courses for Purposes other than Navigation.''

It is testimony to the difficulty of merging legal and hydrologic intricacies that the ILC, despite an additional call for codification at the UN Water Conference at Mar de Plata in 1977, has only just completed its task. For example, it took until 1984 for the term ''international watercourse'' to be satisfactorily defined (Krishna, 1995: 37–39). Problems both political and hydrological slowed the definition: in a 1974 questionnaire submitted to Member States, about half the respondents (only 20 per cent responded after eight years) supported the concept of a drainage basin (e.g. Argentina, Finland, and the Netherlands), while half were strongly negative (e.g. Austria, Brazil, and Spain) or ambivalent (Biswas, 1993); ''watercourse system'' connoted a basin, which threatened sovereignty issues; and borderline cases, such as glaciers and confined aquifers, both now excluded, had to be determined. In 1994, more than two decades after receiving its charge, the ILC adopted a set of 32 draft articles which, with revisions, were adopted by the UN General Assembly on 21 May 1997 as the ''Convention on the Law of the Non-Navigational Uses of the International Watercourses.''

The convention articles include language very similar to the Helsinki Rules, requiring riparian states along an international watercourse in general to communicate and cooperate. Included are provisions for exchange of data and information, notification of possible adverse effects, protection of ecosystems, and emergency situations. Allocations are dealt with through equally vague but positive language. Balanced with an obligation not to cause significant harm is ''reasonable and equitable use'' within each watercourse state, ''with a view to attaining optimal utilization thereof and benefits therefrom.'' Based on seven factors, reasonable and equitable is defined similar to Helsinki.[4] The text of the convention does not mention a hierarchy of these factors, although Article 10 says both that, ''in the absence of agreement or custom to the contrary, no use ... enjoys inherent priority over other uses,'' and that, ''in the event of a conflict between uses ... [it shall be resolved] with special regard being given to the requirements of vital human needs.''

When attempting to apply this reasonable but vague language to specific water conflicts, problems arise. For example, riparian positions and consequent legal rights shift with changing borders, many of which are still not recognized by the world community. Furthermore, international

law only concerns itself with the rights and responsibilities of nations. Some political entities who might claim water rights, therefore, would not be represented, such as the Palestinians along the Jordan river or the Kurds along the Euphrates river.

Hydrography vs chronology

Extreme principles

Customary international law has focused on providing general guidelines for the watersheds of the world. In the absence of such guidelines, some principles have been claimed regularly by riparians in negotiations, often depending on where along a watershed a riparian state is situated. Many of the common claims for water rights are based either on hydrography, i.e. from where a river or aquifer originates and how much of that territory falls within a certain state, or on chronology, i.e. who has been using the water the longest.

Initial positions are usually extreme (Housen-Couriel, 1994; Matthews, 1984). Often claimed initially by an upstream riparian is the ''doctrine of absolute sovereignty.'' This principle, referred to as the Harmon Doctrine (named for the nineteenth century US attorney-general who suggested this stance regarding a dispute with Mexico over the Rio Grande river), argues that a state has absolute rights to water flowing through its territory. Considering this doctrine was eventually rejected by the United States (itself a downstream riparian of several rivers originating in Canada), never implemented in any water treaty, nor invoked as a source for judgment in any international water legal ruling, the Harmon Doctrine is wildly overemphasized in the literature as a principle of international law.

The downstream extreme claim often depends on climate. In a humid watershed, the extreme principle advanced is ''the doctrine of absolute riverain integrity,'' which suggests that every riparian has entitlement to the natural flow of a river system crossing its borders. This principle has reached acceptance in the international setting as rarely as absolute sovereignty. In an arid or exotic (humid headwaters region with an arid downstream) watershed, the downstream riparian often has an older water infrastructure that is in its interest to defend. The principle that rights are acquired through older use is referred to as ''historic rights'' (or ''prior appropriations'' in the US), that is, ''first in time, first in right.''

These conflicting doctrines of hydrography and chronology clash along many transboundary rivers, with positions usually defined by relative riparian positions. Downstream riparians, such as Iraq and Egypt, often receive less rainfall than their upstream neighbours and therefore have depended on river water for much longer historically. As a consequence,

modern ''rights-based'' disputes often take the form of upstream riparians such as Ethiopia and Turkey arguing in favour of the doctrine of absolute sovereignty, with downstream riparians taking the position of historic rights.[5]

Moderated principles

It quickly becomes clear in a negotiation that keeping to an extreme position leads to very little room for bargaining. Over time, rights become moderated with responsibility such that most states eventually accept some limitation to both their own sovereignty and to the river's absolute integrity. The ''doctrine of limited territorial sovereignty'' reflects rights to reasonably use the waters of an international waterway, yet with the acknowledgement that one should not cause harm to any other riparian state.

In fact, the relationship between ''reasonable and equitable use,'' and the obligation not to cause ''appreciable harm,'' is the more subtle manifestation of the argument between hydrography and chronology. As noted above, the convention includes provisions for both concepts, without setting a clear priority between the two. The relevant articles are:

> *Article 5: Equitable and reasonable utilization and participation*
> 1. Watercourse States shall in their respective territories utilize an international watercourse in an equitable and reasonable manner. In particular, an international watercourse shall be used and developed by watercourse States with a view to attaining optimal and sustainable utilization thereof and benefits therefrom, taking into account the interests of the watercourse States concerned, consistent with adequate protection of the watercourse.
> 2. Watercourse States shall participate in the use, development and protection of an international watercourse in an equitable and reasonable manner. Such participation includes both the right to utilize the watercourse and the duty to cooperate in the protection and development thereof, as provided in the present Convention.
>
> *Article 7: Obligation not to cause significant harm*
> 1. Watercourse States shall, in utilizing an international watercourse in their territories, take all appropriate measures to prevent the causing of significant harm to other watercourse States.
> 2. Where significant harm nevertheless is caused to another watercourse State, the State whose use causes such harm shall, in the absence of agreement to such use, take all appropriate measures, having due regard for the provisions of articles 5 and 6, in consultation with the affected State, to eliminate or mitigate such harm and, where appropriate, to discuss the question of compensation.
>
> *Article 10: Relationship between different kinds of use*
> 1. In the absence of agreement or custom to the contrary, no use of an international watercourse enjoys inherent priority over other uses.

> 2. In the event of a conflict between uses of an international watercourse, it shall be resolved with reference to the principles and factors set out in articles 5 to 7, with special regard being given to the requirements of vital human needs.

Not surprisingly, upstream riparians have advocated that the emphasis between the two principles be on ''equitable utilization,'' since that principle gives the needs of the present the same weight as those of the past. Likewise, downstream riparians have pushed for emphasis on ''no significant harm,'' effectively the equivalent of the doctrine of historic rights in protecting pre-existing use.

According to Khassawneh (1995: 24), the Special Rapporteurs for the ILC project had come down on the side of ''equitable utilization'' until the incumbency of J. Evensen, the third rapporteur who, along with Stephen McCaffrey, the final rapporteur for the project, argued for the primacy of ''no appreciable harm.'' Commentators have had the same problem reconciling the concepts as the rapporteurs: Khassawneh (1995: 24) suggests that the latter rapporteurs are correct that ''no appreciable harm'' should take priority, while, in the same volume, Dellapenna (1995: 66) argues for ''equitable use.'' The World Bank, which must follow prevailing principles of international law in its funded projects, recognizes the importance of equitable use in theory but, for practical considerations, gives ''no appreciable harm'' priority – it is considered easier to define – and will not finance a project which causes harm without the approval of all affected riparians (see World Bank, 1993: 120; Krishna, 1995: 43–45).

Even as the principles for sharing scarce water resources evolve and become more moderate over time, the essential argument still emphasizes the rights of each state, and rests on the fundamental dispute between hydrography and chronology. Resulting agreements tend to be more rigid than is useful, precluding shifting demographics or anthropologic variables within a basin. In addition, many terms that are inherently vague both for reasons of legal interpretation and for political expediencey – ''reasonable,'' ''equitable,'' and ''significant,'' for example – make precise definitions difficult during negotiations. Moreover, by excluding navigation and other non-consumptive uses, the convention might hinder negotiators from ''enlarging the pie'' to achieve an agreement.

Summary

Water not only ignores our political boundaries, it evades institutional classification and eludes legal generalizations. Interdisciplinary by nature, water's natural management unit, the watershed – where quantity, quality, surface and groundwater all interconnect – strains both institutional and legal capabilities often past capacity. Analyses of international water

institutions find rampant lack of consideration of quality considerations in quantity decisions, a lack of specificity in rights allocations, disproportionate political power by special interest, and a general neglect for environmental concerns in water resources decision-making. Very recently, these weaknesses are beginning to be addressed by, for example, the World Bank, United Nations, and the new World Water Council.

Customary legal principles have been equally elusive. The 1997 convention reflects the difficulty of merging legal and hydrologic intricacies: while the articles provide many important principles for cooperation, including responsibility for cooperation and joint management, they also codify the inherent upstream/downstream conflict by calling for both equitable use and the obligation not to cause appreciable harm. They also provide few practical guidelines for allocations – the heart of most water conflicts. In contrast to general legal principles, site-specific treaties have shown great imagination and flexibility, moving from ''rights-based'' to ''needs-based'' agreements in order to circumvent the argument over use versus harm.

Negotiation theory

The structure of the section is broadly divided into (a) conflict (diagnosis) and focuses more extensively on (b) resolution (prognosis), covering more general references to natural resources and domestic transboundary freshwater dispute resolution (TFWDR). The related area of modelling and game theory is dealt with in this review below in Game theory. A second inquiry into the subject includes brief coverage of (c) individual case studies, comparative cases and generalizations. For the sake of simplicity, the term ''conflict resolution'' (CR) is used generically, although ''dispute'' has often been mentioned as a smaller level of ''conflict,'' and ''termination,'' ''dissolution,'' ''reduction,'' ''management'' and other adjectives have been advanced as different from ''resolution.''

Conflict

Often the causes for TFWDs are attributed to the tangible aspects of water as a natural resource. Grey (1994) provides alarming figures regarding the ''carrying capacity'' of the environment as the habitat and provider for human beings, with the increasing per-capita demand of a rapidly growing population and a declining renewable water supply. Postel provides a sober analysis of the available and renewable water supplies, and reminds us that ''viewed globally, fresh water is still undeniably abundant'' (1984: 7) and can sustain a moderate standard of living. However, the distribu-

tion is uneven and most troubled areas of scarcity lie in the regions of Asia and Africa, which feature a high rate of population growth. What makes the picture worrying is that mismanagement may result in as much as a fourth of the world's reliable water supply being rendered unsafe for use by the year 2000. This brings Falkenmark and Widstrand (1992) to the conclusion that more than 20 countries are already experiencing ''water stress'' (fewer than 1,000 cubic metres per capita of renewable water resources).

According to Mather (1989), understanding the constraints that impede development of African river and lake basin resources is a precondition for planning. Hence, one has to take into account both the physical and climatic obstacles, socio-cultural characteristics and current priorities of national economies.

General environmental changes are discussed as affecting the fresh-water situation and are thoroughly studied in Gleick, *Water in Crisis* (1993), which also provides the reader with a wealth of data covering issues of quantity and quality affecting the ecosystem, health, and agriculture. In separate works by Gleick (1988, 1990, 1992) on future climatic changes, he dwells on the effects of trends such as the rise in sea level and changes in the timing and distribution of precipitation and runoff on renewable sources of fresh water. By adding the growing demand for fresh water to already growing populations, climate change may seriously jeopardize the relations among nations sharing a river or lake, a present security consideration. A new concept is being debated, environmental security, which is examined below in Chapter 5 of this document. Politics and unilateral economic development strategies exacerbate the already mentioned difficulties into a crisis situation that leads Gleick and many other contributors (Ohlsson, 1992 also quoting Ismael Serageldin on the cover) to the conclusion of imminent water wars in the coming twenty-first century (Gleick 1993: 108–110).

Through an inductive approach, Frederiksen's (1992) coverage of India's Sardar Sarovar Project *Water Crisis in the Developing World* considers that more attention to the analysis of crisis for a developing world should include the short time available to act, the limited measures available for securing essential water supplies, the competing demands for funds to provide adequate means, and the minimal ability to manage unpredicted droughts.

Other sources of conflict relate to different values, beliefs, and attitudes among stakeholders, individuals, and groups, as illustrated in Lynne et al.'s (1990) study of water management in Florida. Clearly, in unresolved conflicts such obstacles need to be taken into account while trying to set up institutional arrangements. While the Florida study represents a case of rather effective management, improvements are still suggested.

The deteriorating water situation as a potential cause of war is also dealt with by Anderson (1991), who discusses the likelihood of conflict among riparian states while describing the influence of geographical location, national interest, military, political and economic dimensions on hydropolitics.

It is interesting to note, however, that books dealing generically with the causes of war such as Brown (1987) and Cashman (1993) do not particularly focus on water conflicts. Furthermore, Wolf (1996) challenges the often-dramatized assumption of wars in the past as resulting from such conflicts. Gleick's (1993) study of historic conflicts over water shows how water was used and manipulated as an instrument of war, but not necessarily as the main cause for engaging in actual warfare for control of natural resources. Still, the importance of geopolitics as a determinant for the need to share water resources has produced serious crises in dyadic and regional relations. Yet, in relation to the future, the theme of water-driven violence recurs in common with other authors, and there is a flagging of the seriousness of forthcoming conflict over water. Clarke (1991) considers that while freshwater shortage, poverty, and overpopulation have contributed to the international water crisis; he contends that the possibilities for mitigating such conflict are related to traditional and technological solutions. Quigg (1977), in ''Water Agenda to the Year 2000'' presents a comprehensive summary of water problems and issues, discussing on the one hand the development of water resources (pure drinking water, efficient irrigation, recharge and water mining, industrial recycling, the protection of watersheds, wetlands and the problem of arid lands). On the other hand, he examines wastewater and treatment (discharge standards, urban and agricultural runoff, toxic wastes, groundwater, disposal of sewage and sanitation) arguing that water should be regarded as a vulnerable and finite resource, as are food and energy.

With a more political outlook, impediments for conflict resolution are attributed less to the large number of stakeholders in many transboundary waterways, but to the asymmetry in the power relations of those stakeholders. In an international regime such as the one under study, the absence of authoritative allocation standards makes individual states more resistant to compromise, although Krasner (1985) does not consider such asymmetries to be insuperable.

For some authors, in cases of violent and protracted conflicts, TFWDR is viewed as a ''low politics issue'' and is often subordinated to the ''high politics'' of the overall dispute (Lowi, 1993). The Middle East is often given as an example. De Silva (1994) makes a similar point in relation to the intractable political conflicts in South Asia and adds that potential future conflicts may become even more exacerbated over the sharing of scarce resources, especially water and irrigation works.

Resolution

Moving into the prognosis, namely, of how to resolve TFWDs, the writings can be grouped according to the main approaches to the subject.

General theory conflict resolution

1. General theory

To a large extent the general theory on CR did not highlight the cases of intra or inter-state TFWD, stressing general principles and different types of conflicts (dyadic relations among neighbouring countries, borders, domestic minorities strife, economic exploitation, etc.). In concrete illustrations, the tendency of Kelman (1990) and Azar (1990) was to focus primarily on ethnopolitcal disputes or territorial disputes. Furthermore, Diamond and MacDonald's (1992) work on Multitrack Diplomacy and Montville's (1987) relevant work on ''Track Two Diplomacy'' does not directly refer to water disputes. Kaufman (1996) brought this subject down to the actual exercises that allow participants to move forward from an initial adversarial stage to the search for common ground, introducing a framework that may be applicable to TFWDR cases.

On the other hand, the potential for utilizing problem-solving workshops as negotiating techniques are more broadly explored in the specific area of natural resources. Bingham (1986) investigated a decade of environmental disputes in the United States and the development of the use of dispute resolution techniques, defined as ''voluntary processes that involve some form of consensus building, joint problem solving, or negotiation'' – excluding litigation, administrative procedures or arbitration (p. xv). These techniques were involved in at least 160 cases. In about 132 cases, the parties' objective was to find a solution, 78 per cent of them were successful in reaching agreements. Within such an extensive list, about 10 per cent were specific cases involving water resources, including water supply, water quality, flood protection, and the thermal effects of water plants. In addition there were cases of watershed management, fishing rights, and whitewater recreation. Many interesting findings come up in reference to the factors contributing to success and observations relating to the variety of stakeholders and the duration of negotiations. Bingham and others emphasized that one of the first areas for the search for common ground is the joint identification of the key factors in data collection that normally deal with technical issues of great complexity.

More specific work on environmental dispute resolution such as Zartman's (1992) article on ''International Environmental Negotiation'' provides a good link between the generalists and specialists in this field by identifying the main challenge and providing an enlarged pie with the largest shares possible for each party in the negotiations. A significant

amount of research undertaken by Druckman (1993) on ''Situational Levers of Negotiating Flexibility,'' resulting from a simulation on international negotiation on the regulation of gases contributing to the depletion of the ozone layer, provides light on the transformation from the initial rigid positions of the parties to the search for new solutions touching upon a large number of factors clustered into broad categories (issues, background factors, context, structure of conferences and teams and immediate situation) and analysed at the different stages, from pre-negotiation planning up to the endgame.

One of the most systematic attempts to assess the impact of Alternative Dispute Resolution (ADR) techniques as alternatives to adjudication in natural resources cases is provided by MacDonnell's (1988) leading piece to an issue of the *Natural Resources Journal* featuring articles on international and domestic cases of disputes. Identifying many types of stakeholder, from private to multiple actors including government agencies, and cross referencing the cases to types of dispute on natural resources, the author introduces the different approaches to their resolution. Water resources, together with land use, public lands, energy, and air quality are classified. Subsequently, mediation and facilitation as auxiliaries for the process of negotiation are discussed, and special emphasis is rightly given to the potential of collaborative problem solving for generating new options. Another article by Hayton (1993) examines the current status of cooperative arrangements for the development of water resources shared by two or more countries. Such arrangements may range from the simple exchange of data to the implementation of major projects and formal resolution of disputes. According to the author, there is a growing concern with the management of shared water resources, but the use and protection of water resources is still a distant goal, and increased institutionalization is required. Environmental resources other than water are examined in more detail in Chapter 5, Other resources, of this document.

Susskind and Weinstein (1980) provide ''nine steps'' for early identification of the parties that have a stake in the outcome of the dispute through to the follow-up for holding the parties to their agreed commitments. In a related book, Susskind and Cruikshank (1987) suggest how to move from a ''win-lose'' decisional framework into ''all-gain'' solutions by systematically defining the assisted and unassisted consensus-building process through the pre-negotiation, negotiation, and post-negotiation phases. The book provides the potential users of facilitators with specific advice on how to move from the planning stages through to the completion of the process. They also provide the readers with abundant references to other works on specific issues of the theory and practice of conflict resolution. As mentioned by Susskind and Cruikshank, the under-utilization of

such methods has to do with the concern of public officials that delegating the decision to a consensual forum means losing control over the decision process and abdicating their responsibilities (1987: 241). The fear of being pressurized into compromises concluded by a group in which the stakeholder is in a weak position fails to grasp the voluntary nature of the exercise. One comprehensive analysis of both the nature of environmental conflict and dispute resolution theory is provided by Bacow and Wheeler (1984) in a book that provides the lessons drawn from eight cases in the United States. The bulk of the book explores negotiation and bargaining from a decision-theory perspective and incorporates the main elements to be applied in dispute resolution of the issue. Flashing the obstacles and elaborating on the incentives to negotiate, the different types of setting and technique are discussed using each case as an illustration of a particular dimension.

''Negotiated Rulemaking'' (Reg-Neg), a particular technique developed in the United States for disputes arising in the environmental area has received a great deal of attention in this country and has been established as an official instrument in a Congressional Act in 1990. Used by the Environmental Protection Agency (EPA), the stages of Reg-Neg are conceived as: ''evaluation of issues, parties; convening (2 phases); the actual negotiations and rulemaking'' (Pritzker and Dalton, 1990). The different publications of Delli Priscoli present a survey of broad ADR ''people oriented'' techniques (1989) or its application to case studies (1988). He stresses that whereas incrementally such ADR principles are being introduced in domestic cases, the survey's incorporation into the process of solving TFW is nearly absent.

Additionally, a negotiation strategy was developed in cases for intractable environmental conflicts. Understanding the distracting effects (confused interests, technical disagreements, misunderstandings, questions of procedural fairness, escalation, and polarization) can bring the parties to assess the costs of the confrontational alternative.

2. Legal aspects of conflict resolution

A large body of the literature covers the rules and principles that emerged from different gatherings and in particular of the work of the International Law Commission in the area of international watercourses (Bourne 1992). Caponera has stressed cooperation in the drafting of International Water Resources in several documents and articles in academic journals (i.e. 1985, 1993, 1994). The section in itself necessitates a separate review of the literature and general references include work such as the FAO publications in 1978 and subsequently in 1984.

The rather large body of general principles brings up the question of volume and the further need for norm creation when the most serious

question is weak regime formation and the lack of international enforcement mechanisms.

The normative value of such a body of literature should not be disregarded, even if recognizing the gap between the slow but significant norm-creation process and the application of such principles to the resolution of concrete cases. The issue of equity is addressed by Goldie (1985), who suggests cooperative management in place of competitive management to create a shared criterion for such measures, and could serve as a common basis for partners in conflict. But the question of water rights remains elusive and controversial, as discussed by McCaffrey (1992–3). The prevailing different doctrines are clearly favouring riparian positions according to geographic location and power asymmetries.

But clearly, the learning from the successful cases is not universal. McCaffrey states, ''while there are numerous treaties regulating the utilization of water resources shared by two or more countries, international agreements are either inadequate or lacking entirely in some parts of the world where water is in greatest demand'' (1992–3: 4). Hence, the use of international water law has a marginal value unless there is a common sharing of mechanisms and structure that could jointly use such principles for the advantage of the basin at large. For a more detailed discussion of water law, see the section Institutions and law in Chapter 2 and the section Water treaties in Chapter 4 of this document.

3. The role of third parties

Given the sensitivity of TFWD particularly when there is a fear of scarcity, the possibility of submission to arbitration is less likely than mediation or facilitation. In the particular cases of developing countries and water scarcity, the role of third parties, such as the contribution of international agencies, has been mentioned (Fano, 1977). Relevant works include several in-house publications of the World Bank stressing the role of this institution in contributing towards solutions of international waterways disputes. Kirmani and Rangeley's (1994) ''Concepts for a More Active World Bank Role'' in international inland waters, illustrates from the Indus Water Treaty that so far the Bank has made only limited direct interventions, and recommends a more proactive role in assisting riparian countries' efforts to establish cooperative arrangements. Reference to such a role in South Africa is made by Kuffner (1993) and by Rogers (1993) in reference to the ''development triangle in South Asia'' and in the ''dying Aral Sea'' (Serageldin, 1995). In other cases, reference to third parties in CR means an active intervention in the process itself using facilitation and mediation (Kaufman et al. 1997).

Whereas the effectiveness of mediation and problem solving has been highlighted in the context of domestic environmental conflicts, Dryzek

and Hunter (1987) elaborate on the necessary conditions of this method for the resolution of international problems in the field of water resources. Issues such as pollution in the Mediterranean are provided, yet there is only one specific reference to a successful case of TFWDR through mediation: the Skagit river case, considered by some experts to be ''one particularly straightforward United States-Canada issue'' (Dryzek and Hunter, 1987: 96).

4. Lateral learning and expanding the package

Rather than focusing on water allocation itself, several authors have introduced externalities that can be conducive to resolution of what has been perceived as a finite resource conflict of a zero-sum nature. Allan (1992) introduces the concept of ''virtual water'' which adds as an incentive to scarce water allocation the international commitment for food security. The provision of wheat or other food from other countries in reasonable quantities and attractive prices may be an incentive to compromise.

The literature on technical solutions such as water transfers (Golubev and Biswas, 1979: 115) provides important tools for addressing mutual gains, and as such is a necessary albeit not sufficient condition for the resolution of TWDR. Kuffner's (1993) ''Water Transfer and Distribution Schemes'' article suggests the pooling of financial resources and investments in reservoirs and treatment facilities to provide greater security against local supply failure. Increasingly, the zero-sum issue of water allocation is seen within a more comprehensive water planning structure that includes a wider spectrum of objectives.

More remote yet relevant cases are offered from other areas of environmental dispute. An analogy has been made between solutions to energy and water disputes in terms of vital needs, supply-demand and pricing, and environmental damage (Brooks, 1994).

According to Gardner et al., water issues share attributes with other ''Common-pool resources'' defined as ''sufficiently large natural and manmade resources that it is costly (but not necessarily impossible) to exclude potential beneficiaries from obtaining benefits from their use'' (1991: 335), and as such, learning can be drawn from resolutions in other fields. This and other works provide an important insight for the facilitation of negotiation process in relation to common pool resources. Given the slow development of successful cases of TFWDR, looking for clues in other areas and using the tools of different disciplines is greatly needed. One case in point is Maida's contribution to Blackburn and Bruce's (1995) book *Mediating Environmental Conflicts: Theory and Practice*, borrowing ideas from *Law and Economic Perspectives*.

We have separately mentioned reference to domestic river dispute

resolution as a source for lateral learning that can be applied to TFWDR. A large body of literature relates to agreements reached within states and suggests techniques and mechanisms that could be applicable to TFWD, calling for a systematic review of this literature's lessons. An innovative effort to learn from successful examples of domestic FWDR and the possible adaptation of their outcomes to transboundary disputes is provided by Bingham et al. (1994).

Even if the added element of sovereignty requires adaptation rather than copying of such mechanisms, the ideas can be to a large extent transferable. On the broader environmental issues we find several of such cases developed in Blackburn and Bruce (1995) as well as in Dworkin and Jordan's (1995) ''Midwest Energy Utilities,'' Baird et al.'s (1995) ''Mediating the Idaho Wilderness Controversy'' and Mangerich and Luton's (1995) ''The Inland Northwest Field Burning Summit.'' Amy (1987) stresses the role of mediation mechanisms in the United States as a tool for ADR and Brown (1984) presents the Central Arizona Water Control Study as a case for multi-objective planning and public involvement in a specific area of storage and flood control.

5. Integrative and institutional approaches

As mentioned earlier, the literature covering integrative solutions often emphasizes water management from a technical and engineering perspective, while in the area of CR, the term ''management'' has been used to refer to less ambitious outcomes than ''resolution.'' This point is particularly relevant for TFWDs. For instance, in relation to Hennessy and Widgery's (1995) article on an holistic approach to river basin development, the appropriate water management is defined ''as the use of the right solution to make development needs in a particular environment sustainable'' (with examples from the Komati river basin in Swaziland, the Lesotho Highlands water project in South Africa and the project on the Roseires dam in Sudan).

Glasbergen (1995) elaborates the concept of ''Network Management'' as an organizational framework for the development of consensual approaches common to the method of ''collaborative problem solving.'' A similar idea of the formation is ''epistemic communities'' (Keohane et al., 1992; Hass and Hass, 1995), which defines the riparian basin as an interdependent community with an interest that transcends the narrow view of each party and stresses the search for common ground across national lines. They further consider the conditions under which such networks or epistemic communities could develop.

Well-covered examples of shared management are the Canada/United States International Joint Commission (IJC) and the Mexico/United States International Boundary and Water Commission (IBWC) as shown

in the pages of the *Natural Resources Journal* (Spring 1993), which calls attention to the progress made in resolving the multiple management issues throughout the Great Lakes basin and along the United States-Mexico border. While the latter had a lower degree of public participation in the process, we are nevertheless reminded that the agreement reached there on transboundary groundwater is the source for the Bellagio Draft Treaty, which is expected to serve as a standard for aquifers disputes among countries elsewhere.

The lack of sufficient agreements on underground water and conjunctive planning with surface water provides little precedent for reaching integrative solutions as stressed by Frederiksen (1996) and others. In some recent work on the Joint Management of the Israeli-Palestinian shared aquifers, Feitelson and Haddad (1995) provide a comprehensive framework of institutional arrangements, incorporating in a typology of 19 types a large variety of functions and mechanisms. Often the selection of case studies stresses the success that has been achieved in the Northern and Western hemispheres, among affluent societies, generally with abundant water resources.

Hofius (1991) covers the case of hydrologic cooperation among the Rhine basin countries and deals with the administrative problems associated with implementing the cooperation of several states bordering a large river basin. He stresses that programmes should not be too comprehensive and should lead to results within reasonable time.

Another reference to affluent societies is made by Frederiksen (1992) focusing on the international treaties between Canada and the United States and Mexico, the Rhine Riparian and the less effective treaties on the Baltic, the North, and Mediterranean Seas. Interstate institutions in Canada, Japan, and Australia are also introduced. The author rightly raises the question of applicability to developing countries and suggests that principles of organization are also available in farmer-owned irrigation entities that have existed for several hundred to two thousand years in places such as Nepal, southern India, Sri Lanka and Bali and the issue is not necessarily a radical change but improved results through sound legislation and, more importantly, comprehensive institutions. In Bali, Bell (1988) points out that the many engineering projects undertaken several decades ago were not due to scarcity of water in the physical sense but rather the economic cost of containing and managing it, an issue of relevance to other developing countries.

Many references are made to the successful way the US and Canada have resolved outstanding issues through an evolving shared management mechanism (Dworsky et al., 1993). Generally, observations for developing countries are being drawn, pointing out the lack of readily available information among the obstacles but on the other hand stress-

ing that longstanding native institutional principles are in existence for many of such countries. This latter point recognizes that comprehensive institutions are in place and that the problem is to translate existing institutions into modern legislation and operating rules.

Case studies – illustrations and generalizations

Single case studies

As mentioned before, successful case studies of conflict resolution focus mostly on affluent, developed countries. Such is the case of Petts's (1988) contribution on Japan's Lake Biwa case and a large number of cases covering the United States, as mentioned in the section above dealing with domestic conflict resolution.

Cases of the developing third world focus on the difficulties in resolving conflict, and are illustrated in Gautam (1976), or Howell and Allan's (1994) edited book on the Nile, covering geography, hydrology, and historic aspects as well as proposals for the future management of the Nile waters. Another relevant work on the Nile, Hultin (1992), shows the impact of civil wars within many of the riparian states on the lack of resolution to the urgent issues at stake in the Basin.

In Islam's (1992) work on the Indo-Bangladesh common rivers, attention is given to the environmental and legal problems that have soured the relationship between India and Bangladesh. The competing claims for land where meandering rivers have altered land structure have already taken the form of armed skirmishes, and failure to tackle the problem could have a disastrous impact on the environment. As another example, ''[m]any case studies of water conflicts point to the Middle East as a region with dyadic or subregional settings with gloomy forecastings that in 30 years no water will be available for agriculture and industry unless it is reused from elsewhere in the water cycle or new, highly expensive sources are developed'' (Wolf, 1993: 825). Often, in the Israeli/Arab conflict, findings come to support one or the other side of the conflict, as in the case of Stauffer (1996). Stressing that the Malthusian imperative is still alive in the Middle East, the author reaches the conclusion that water may prove to be the ultimate stumbling block to an Arab-Israeli peace, and Israel may have to give up about one-half of its current total water consumption. Replacement of such quantity is going to be too costly and the best answer is to cut the agricultural subsidies. A large number of books and articles such as Kally and Fishelson (1993) relate to engineering solutions from water transfers, with monumental ideas, without necessarily covering the political and psychological aspects that seem to be the major obstacles for their implementation.

Comparative case studies

Often several case studies are brought up without rigorous comparative analysis. This is the case of Murphy and Sabadell (1986) who suggest a policy model for conflict resolution stressing the intranational political process when focusing on the negotiated settlements of the Paraná (Brazil-Paraguay), the Nile (Egypt-Sudan), and the Colorado (United States-Mexico) rivers. Priest (1992) reviews the cases of six rivers in the South Asian continent, the Middle East and Africa, and stresses how decolonization has affected disputes regarding water allocation and the motivations for dispute resolution. Additionally, Salewicz (1991) takes the case studies of the Danube and Zambezi river basins and deals with institutional and organizational aspects. Housen-Couriel (1994) searching through lessons for the Jordan river basin agreement focuses systematically on four treaty regimes that are presently in force (Columbia, Plata, and Indus river basins and Lake Chad) and an additional 18 cases.

Putting the emphasis in the process of negotiations rather than on the outcome (treaty), Delli Priscoli (1988) compares two cases of water resources in the United States granting general permits for wetland fill on Sanibel Island (Florida) and hydrocarbon exploration drilling throughout Louisiana and Mississippi, arguing that facilitation, mediation, and collaborative problem-solving techniques contributed to durable agreements among seemingly irreconcilable adversaries.

Learning from incorporating 63 propositions of ''grounded theory'' and through interviews with 30 environmental mediators, Blackburn (1995) extracts the parts specifically relevant to the learning for environmental mediation (Chapter 18) and provides the reader with a clear ten-stage approach with practical recommendations. In the same book, Guy and Heidi Burgess's ''Beyond the Limits: Dispute Resolution of Intractable Environmental Conflicts'' addresses the crucial issue of power asymmetry as a deterring factor for engaging in mediation and the tendency to resort to other power driven methods. Some misperceptions are mentioned, leading to polarization and escalation, suggesting ways to tackle constructively the ''bitter-end syndrome'' of such disputes. Even in such difficult processes, it is possible to discover win-win trade-offs emanating from opportunities of the results of the often crude power driven contests.

Summary

From this preliminary review, it is clear that the literature provides ample examples of cases with solutions to transwater disputes (TWD). A great portion of the work on conflict resolution (CR) stresses institutional and

technical arrangements. CR is perceived as mechanisms that need to be incorporated once the agreement is reached, but few relate the incorporation of CR as instrumental to the process of reaching such agreements.

In retrospect, one of the most serious obstacles for resolution is how to prompt parties to act and look for innovative solutions before water disappears, or matters between countries reach a crisis situation. In a more optimistic vein, Newson (1992) comments on the development of an international movement towards sustainability in the management of large river basins. His two examples, however, illustrate that there is still a gap in the impact of the ''Freshwater Europe Campaign'' on the European Community, and the effect of the Earth Summit coalition on the developing world.

Notes

1. Some of these arguments are drawn from Wolf (1999). Equitable Water Allocations: The Heart of Transboundary Water Conflicts. *Natural Resources Forum* (February, forthcoming).
2. The factors include a basin's geography, hydrology, climate, past and existing water utilization, economic and social needs of the riparians, population, comparative costs of alternative sources, availability of other sources, avoidance of waste, practicability of compensation as a means of adjusting conflicts, and the degree to which a state's needs may be satisfied without causing substantial injury to a co-basin state.
3. While this is the sole case of the Helsinki Rules definitions being used explicitly in treaty texts, the concept of ''reasonable and equitable use'' is quite common, as is described below.
4. These factors include: geographic, hydrographic, hydrological, climatic, ecological, and other natural factors; social and economic needs of each riparian state; population dependent on the watercourse; effects of use in one state on the uses of other states; existing and potential uses; conservation, protection, development and economy of use, and the costs of measures taken to that effect; and the availability of alternatives, of corresponding value, to a particular planned or existing use.
5. For examples of these respective positions, see the exchange between Jovanovic (1985, 1986) and Shahin (1986) in respective issues of *Water International* about the Nile; and the description of political claims along the Euphrates in Kolars and Mitchell (1991).