7

Case studies

Case studies of transboundary dispute resolution

List of cases

Watersheds

Danube
Euphrates
Jordan (including West Bank aquifers)
Ganges
Indus
Mekong
Nile
Plata
Salween

Aquifer systems

US-Mexico aquifers
West Bank aquifers (included with Jordan watershed)

Lakes

Aral sea
Great Lakes

Engineering works

Lesotho Highlands

Table 2 Case studies

NAME	RIPARIAN STATES (w/% of nat'l available water being utilized)#	RIPARIAN RELATIONS (w/dates of most-recent agreements)	AVERAGE ANNUAL FLOW (km^3/yr)*	SIZE OF WATER-SHED (km^2)*	CLIMATE	SPECIAL FEATURES
DANUBE	Albania (1.6) Austria (6.1) Bulgaria (7.1) Croatia (n/a) Czech Republic (n/a) Germany (43.8) Hungary (35.5) Italy (26.6) Moldavia (n/a) Poland (42.9) Romania (22.0) Slovakia (n/a) Slovenia (n/a) Switzerland (9.8) Ukraine (n/a) Yugoslavia (14.4)	Cold to warm (1994 Danube River Protection Convention)	206	810,000	Dry to humid	1994 Convention is first treaty developed through process of public participation
EUPHRATES	Iraq (86.3) Syria (102.0) Turkey (12.1)	Cool	46	1,050,000	Dry to Mediterranean	Ongoing tripartite dialogue but no international agreement

JORDAN	Israel Jordan Lebanon Palestine Syria	(95.6) (67.6) (20.6) (100.0) (102.0)	Cool to warm (1994 Treaty of Peace–Israel/ Jordan; 1995 Interim Agreement – Israel/ Palestine)	1.4	11,500	Dry to Mediterranean	Complex conflict and attempts at conflict resolution since 1919
GANGES-BRAHMA-PUTRA	China Bangladesh Bhutan India Nepal	(19.3) (1.0) (0.1) (57.1) (14.8)	Cold to warm (1985 Agreement between India and Pakistan lapsed in 1988; new treaty in 1996)	971	1,480,000	Humid to tropical	Scheduled to be model/workshop case – limited riparians; ongoing dispute
INDUS	Afghanistan China India Pakistan	(47.7) (19.3) (57.1) (53.8)	Cool (1960 Indus Water Treaty between India and Pakistan)	238	970,000	Dry to humid subtropical	Scheduled as case to be "back-modelled"
MEKONG	Cambodia China Laos Myanmar Thailand Vietnam	(0.1) (19.3) (0.8) (0.4) (32.1) (2.8)	Cool to warm (1957 Mekong Committee re-ratified as 1995 Mekong Commission)	470	790,000	Humid to tropical	Good example of resilience of agreement

Table 2 (cont.)

NAME	RIPARIAN STATES (w/% of nat'l available water being utilized)#	RIPARIAN RELATIONS (w/dates of most-recent agreements)	AVERAGE ANNUAL FLOW (km^3/yr)*	SIZE OF WATER-SHED (km^2)*	CLIMATE	SPECIAL FEATURES
NILE	Burundi (3.1) Egypt (111.5) Eritrea (n/a) Ethiopia (7.5) Kenya (8.1) Rwanda (2.6) Sudan (37.3) Tanzania (1.3) Uganda (0.6) Zaire (0.2)	Cold to warm (1959 Nile Water Agree-ment only includes Egypt and Sudan)	84	2,960,000	Dry to tropical	Scheduled as complex model/ workshop
PLATA	Argentina (3.5) Bolivia (0.7) Brazil (0.5) Paraguay (0.2) Uruguay (0.6)	Warm (1995 Mercosur (Southern Common Market) adds impetus to "hydrovia" canal project)	470	2,830,000	Tropical	Good example of inter-sectoral plus interna-tional dispute
SALWEEN	China (19.3) Myanmar (0.4) Thailand (32.1)	Cool to warm	122	270,000	Humid to tropical	Scheduled as conflict preclu-sion model/ workshop

US-MEXICO aquifers (groundwater)	Mexico (22.3) United States (21.7)	Warm (1944 Water Treaty, modified in 1979)	n/a	n/a	Dry	Groundwater not included in original treaty, leading to uncertainty in relations
WEST BANK aquifers	Israel (95.6) Palestine (100.0)	Cool (1995 Interim Agreement)	n/a	n/a	Dry	Interim Agreement relegates groundwater allocations to future negotiations
ARAL	Afghanistan (47.7) Kazadhstan (n/a) Kyrgyzstan (n/a) Tajikistan (n/a) Turkmentistan (n/a) Uzbekistan (n/a)	Cool to warm (1993 and 1995 Agreements on Aral Action Plans)	1,020[1]	1,618,000	Dry to humid continental	Case of lake management exacerbated by internationalization of basin
GREAT LAKES	Canada (1.4) United States (21.7)	Warm	22,500[1]	509,200	Humid continental	Case of small number of riparians with good relations
LESOTHO HIGHLANDS	Lesotho (1.5) South Africa (28.4)	Warm	n/a	n/a	Humid marine	Interesting institutional arrangement exchanging water, financial considerations, and energy resources

Source: Kulshreshtha (1993)
* Sources: Gleick ed. (1993); UN Register of International Rivers (1978)
[1] Values for lakes under "Annual Flow" are for storage volumes

Danube river

Case summary

River basin	Danube
Dates of negotiation	1985–1994
Relevant parties	All riparian states of the Danube Convention is the first designed through the process of public participation, including NGOs, journalists, and local authorities
Flashpoint	None – good example of ''conflict preclusion''
Issues	
Stated objectives	To provide an integrated, basin-wide framework for protecting Danube water quality
Additional issues	
Water-related	Encourage communication between water-related agencies, NGOs, and individuals
Non-water	None
Excluded	Strong enforcement mechanism
Criteria for water allocations	None determined
Incentives/linkage	World Bank/donor help with quality control
Breakthroughs	No untoward barriers to overcome
Status	Convention signed in 1994. Too early to judge effectiveness of implementation

The problem

Prior to World War II, the European Commission of the Danube, with roots dating back to the 1856 Treaty of Paris and made up of representatives from each of the riparian countries, was responsible for administration of the Danube river. The primary consideration at the time was navigation, and the Commission was successful at establishing free navigation along the Danube for all European countries. By the mid-1980s, it became clear that issues other than navigation were gaining in importance within the Danube basin, notably problems with water quality. The Danube passes by numerous large cities, including four national capitals (Vienna, Bratislava, Budapest, and Belgrade), receiving the at-

tendant waste of millions of individuals and their agriculture and industry. In addition, 30 significant tributaries have been identified as ''highly polluted.'' The breakup of the USSR has also contributed to water quality deterioration, with nascent economies finding few resources for environmental problems, and national management issues being internationalized with redrawn borders. Recognizing the increasing degradation of water quality, in 1985 the (at the time) eight riparians of the Danube signed the ''Declaration of the Danube Countries to Cooperate on Questions Concerning the Water Management of the Danube,'' commonly called the Bucharest Declaration. This Declaration led in turn to the 1994 Danube River Protection Convention.

Background

The Danube river basin lies at the heart of Central Europe and is Europe's second longest river, at a length of 2,857 km. The river's basin drains 817,000 km^2, including all of Hungary, most of Romania, Austria, Slovenia, Croatia, and Slovakia; and significant parts of Bulgaria, Germany, the Czech Republic, Moldova, and Ukraine. Territories of the Federal Republic of Yugoslavia – Bosnia and Herzegovina, and small parts of Italy, Switzerland, Albania, and Poland are also included in the basin. The Danube river discharges into the Black Sea through a delta that is the second largest wetland area in Europe. The river is shared by a large and ever-growing number of riparian states that for decades were allied with hostile political blocs; some of which are currently locked in intense national dispute. As a consequence, conflicts in the basin tended to be both frequent and intricate, and their resolution especially formidable.

Attempts at conflict management

World War II created new political alliances for the riparians, resulting in a new management approach. At a 1948 conference in Belgrade, the East Bloc riparians – a majority of the delegates – shifted navigation over to the exclusive control of each riparian. By the 1980s, though, quality considerations had led to the Bucharest Declaration of 1985, which reinforced the principle that the environmental quality of the river depends on the environment of the basin as a whole, and committed the riparians to a regional and integrated approach to water basin management, beginning with the establishment of a basin-wide unified monitoring network. Basin-wide coordination was strengthened at meetings in Sofia in September 1991, in which the riparians elaborated on a plan for protect-

ing the water quality of the Danube. At that meeting, the countries and interested international institutions met to draw up an initiative to support and reinforce national actions for the restoration and protection of the Danube river. With this initiative, named the Environmental Program for the Danube River Basin, the participants agreed to create an interim task force to coordinate efforts while a convention to steer the programme was being negotiated.

Outcome

The principle of ''participation'' has been taken seriously in the work of the Environmental Program and the Coordination Unit. Initially, each riparian country was responsible for identifying two individuals to help coordinate activity within the basin. The first, a ''country coordinator,'' usually a senior official, would act as liaison between the work of the programme and the country's political hierarchy. The second, a ''country focal point,'' would coordinate the actual carrying out of the work plan.

In July 1992, the coordination unit held a workshop in Brussels to help facilitate communication between the coordinators, the focal points, and the donor institutions. Representatives from each of the (by then) 11 riparians and 15 donor and non-governmental organizations attended. An important outcome of the workshop was that the participants themselves designed a plan for each issue covered. One issue, for example, was an agreement to produce national reviews of data availability and priority issues within each country. The information would be used by prefeasibility teams funded by donors who were to identify priority investments in the basin. During the workshop, participants developed the criteria for the national reviews and agreed on a schedule for their completion.

The principle of participation was carried one level deeper at the third task force meeting in October 1993 in Bratislava. At that meeting, the task force agreed to prepare a ''Strategic Action Plan'' (SAP) for the Danube basin, with the provision that, ''consultation procedures should be strengthened.'' This last point is particularly noteworthy because it is the first time public participation has been required during the development of an international management plan. This concept rejects the principle that internal politics within nations ought to be treated as a geopolitical ''black box,'' whose workings are of little relevance to international agreements, and instead embraces the vital need for input at all levels in order to ensure that the plan has the support of the people who will affect, and be affected by, its implementation.

In principle, the individuals who participated in the workshops would form a nucleus that would not only have input in the drafting of a SAP,

but would be involved in reviewing future activities that would be implemented as part of the Plan. By July 1994, two consultation meetings were held in each of the nine countries.

On 29 June 1994, in Sofia, the Danube river basin countries and the European Union signed the Convention on Cooperation for the Protection and Sustainable Use of the Danube River (the Danube River Protection Convention). The convention notes that the riparians of the Danube, ''concerned over the occurrence and threats of adverse effects, in the short or long term, of changes in conditions of watercourses within the Danube River Basin on the environment, economies, and well-being of the Danubian States,'' agree to a series of actions, including:

– striving to achieve the goals of a sustainable and equitable water management, including the conservation, improvement and rational use of surface waters and groundwater in the catchment area as far as is possible;
– cooperating on fundamental water management issues and take all appropriate legal, administrative, and technical measures, to at least maintain and improve the current environmental and water quality conditions of the Danube river and of the waters in its catchment area and to prevent and reduce as far as possible adverse impacts and changes occurring or likely to occur;
– setting priorities as appropriate and strengthening, harmonizing, and coordinating measures taken and planned to be taken at the national and international level throughout the Danube basin aimed at sustainable development and environmental protection of the Danube river.

The Danube Convention is a vital legal continuation of a tradition of regional management along the Danube dating back 140 years. As a political document, it provides a legal framework for integrated watershed management and environmental protection along a waterway with tremendous potential for conflict.

In recent years, the riparian states of the Danube river have extended the principle of integrated management, and established a programme for the basin-wide control of water quality, which, if not the first such programme, has claims to being probably the most active and the most successful of its scale. The Environmental Program for the Danube River is also the first basin-wide international body that actively encourages public and NGO participation throughout the planning process, which, by diffusing the confrontational setting common in planning, may help preclude future conflicts both within countries and, as a consequence, internationally.

Euphrates basin

Case summary

River basin	Tigris-Euphrates
Dates of negotiation	Meetings since mid-1960s to present
Relevant parties	Iraq, Syria, Turkey
Flashpoint	Filling of two dams during low-flow period results in reduced flow to Iraq in 1975
Issues	
Stated objectives	Negotiate an equitable allocation of the flow of the Euphrates river and its tributaries between the riparian states
Additional issues	
Water-related	Water quality considerations Orontes river, which flows from Syria into Turkey
Non-water	Syrian support for PKK Kurdish rebels
Excluded	Possible connection between Tigris and Euphrates
Criteria for water allocations	None determined
Incentives/linkage	Financial: None Political: None
Breakthroughs	None
Status	Bilateral and tripartite negotiations continue with greater and lesser success – no agreement to date

The problem

In 1975, unilateral water developments came very close to provoking warfare along the Euphrates river. The three riparians to the river – Turkey, Syria, and Iraq – had been coexisting with varying degrees of hydropolitical tension through the 1960s. At that time, population pressures drove unilateral developments, particularly in southern Anatolia, with the Keban dam (1965–1973), and in Syria, with the Tabqa dam (1968–1973).

Background

Bilateral and tripartite meetings, occasionally with Soviet involvement, had been carried out between the three riparians since the mid-1960s,

although no formal agreements had been reached by the time the Keban and Tabqa dams began to fill late in 1973, resulting in decreased flow downstream. In mid-1974, Syria agreed to an Iraqi request that Syria increase the flow from the Tabqa dam by 200 MCM/yr. The following year, however, the Iraqis claimed that the flow had been dropped from the normal 920 m3/sec to an "intolerable" 197 m3/sec, and asked that the Arab League intervene. The Syrians claimed that less than half the river's normal flow had reached its borders that year and, after a barrage of mutually hostile statements, pulled out of an Arab League technical committee formed to mediate the conflict. In May 1975, Syria closed its airspace to Iraqi flights and both Syria and Iraq reportedly transferred troops to their mutual border. Only mediation on the part of Saudi Arabia was able to break the increasing tension, and on 3 June, the parties arrived at an agreement that averted the impending violence. Although the terms of the agreement were not made public, Iraqi sources are cited as privately stating that the agreement called for Syria to keep 40 per cent of the flow of the Euphrates within it borders, and to allow the remaining 60 per cent through to Iraq.

Attempts at conflict management

The Southeast Anatolia Development Project (GAP is the Turkish acronym) has given a sense of urgency to resolving allocation issues on the Euphrates. GAP is a massive undertaking for energy and agricultural development that, when completed, will include the construction of 21 dams and 19 hydroelectric plants on both the Tigris and the Euphrates. 1.65 million hectares of land are to be irrigated and 26 billion kWh will be generated annually with an installed capacity of 7,500 MW. If completed as planned, GAP could significantly reduce downstream water quantity and quality.

A Protocol of the Joint Economic Committee was established between Turkey and Iraq in 1980, which allowed for Joint Technical Committee meetings relating to water resources. Syria began participating in 1983, but meetings have been intermittent at best.

A 1987 visit to Damascus by Turkish Prime Minister Turgut Ozal reportedly resulted in a signed agreement for the Turks to guarantee a minimum flow of 500 m3/s across the border to Syria. According to Kolars and Mitchell (1991), this total of 16 BCM/yr is in accordance with prior Syrian requests. However, according to Naff and Matson (1984), this is also the amount that Iraq insisted on in 1967, leaving a potential shortfall. A tripartite meeting between Turkish, Syrian, and Iraqi ministers was held in November 1986, but yielded few results.

Talks between the three countries were held again in January 1990,

when Turkey closed the gates to fill the reservoir behind the Ataturk dam, the largest of the GAP dams, essentially shutting off the flow of the Euphrates for 30 days. At this meeting, Iraq again insisted that a flow of 500 m3/s cross the Syrian-Iraqi border. The Turkish representatives responded that this was a technical issue rather than one of politics and the meetings stalled. The Gulf War, which broke out later that month, precluded additional negotiations.

Outcome

In their first meeting after the war, Turkish, Syrian, and Iraqi water officials convened in Damascus in September 1992, but broke up after Turkey rejected an Iraqi request that flows crossing the Turkish border be increased from 500 m3/sec to 700 m3/sec. In bilateral talks in January 1993, however, Turkish Prime Minister Demirel and Syrian President Assad discussed a range of issues intended to improve relations between the two countries. Regarding the water conflict, the two agreed to resolve the issue of allocations by the end of 1993. Although an agreement has not, to date, been reached, Prime Minister Demirel declared at a press conference closing the summit that, ''There is no need for Syria to be anxious about the water issue. The waters of the Euphrates will flow to that country whether there is an agreement or not'' (Cited in Gruen, 1993). The issue remains unresolved.

Jordan river watershed

Case summary

River basin	Jordan river and tributaries (directly); Litani (indirectly)
Dates of negotiation	1953–1955; 1980s through the present
Relevant parties	United States (initially sponsoring); US and Russia (sponsoring multilateral negotiations)
	Riparian entities: Israel, Jordan, Lebanon, Palestine, Syria
Flashpoints	1951 and 1953 Syrian/Israeli exchanges of fire over water development in demilitarized zone; 1964–1966 water diversions
Issues	
Stated objectives	Negotiate an equitable allocation of the flow of the Jordan river and its tributaries between the riparian entities
	Develop a rational plan for integrated watershed development
Additional issues	
Water-related	Out-of-basin transfers
	Level of international control (''water master'')
	Location and control of storage facilities
	Inclusion or exclusion of the Litani river
Non-water	Political recognition of adversaries
Excluded	Groundwater
	Palestinians as political entity (initially)
Criteria for water allocations	Amount of irrigable land within watershed for each state (in Johnston Negotiations); ''needs-based'' criteria developed in current peace talks
Incentives/linkage	Financial: US and donor communities have agreed to cost-share regional water projects
	Political: Multilateral talks work in conjunction with bilateral negotiations
Breakthroughs	Harza study of Jordan's water needs (in Johnston talks); question of water rights successfully relegated to bilateral talks; creation of a Palestinian Water Authority accepted by all parties

Status	Israel-Jordan Peace Treaty (1994); Israel-Palestine Interim Agreement (1993, 1995) each have major water components

The problem

The Jordan river flows between five particularly contentious riparians, two of which rely on the river as their primary water supply. By the early 1950s, there was little room left for any unilateral development of the river without impacting on other riparian states. The Johnston Negotiations, named after US special envoy Eric Johnston, attempted to mediate the dispute over water rights among all the riparians in the mid-1950s. Egypt was also included in the negotiations, because of its pre-eminence in the Arab world. The initial issue was an equitable allocation of the annual flow of the Jordan watershed among its riparian states – Israel, Jordan, Lebanon, and Syria. Water is and continues to be a highly contentious issue among these countries, along with issues of land, refugees, and political sovereignty. Until the current Arab-Israeli peace negotiations, which began in 1991, political problems were always handled separately from resource problems. Some experts have argued that by separating the two realms of ''high'' and ''low'' politics, each process was doomed to fail. The initiatives that were addressed as strictly water-resource issues, namely – the Johnston Negotiations of the mid-1950s, attempts at ''water-for-peace'' through nuclear desalination in the late 1960s, negotiations over the Yarmuk river in the 1970s and 1980s, and the Global Water Summit Initiative of 1991 – all failed to one degree or another, because they were handled separately from overall political discussions. The resolution of water-resources issues then had to await the Arab-Israeli peace talks to meet with any tangible progress.

Background

In 1951, several states announced unilateral plans for the Jordan watershed. Arab states began to discuss organized exploitation of two northern sources of the Jordan – the Hasbani and the Banias. The Israelis made public their ''All Israel Plan,'' which included the draining of Huleh lake and swamps, diversion of the northern Jordan river and construction of a carrier to the coastal plain and Negev desert – the first out-of-basin transfer for a watershed in the region.

In July 1953, Israel began construction on the intake of its National Water Carrier at the Bridge of Jacob's Daughters, north of the Sea of

Galilee and in the demilitarized zone between Israel and Syria. Syria deployed its armed forces along the border and artillery units opened fire on the construction and engineering sites. Syria also protested to the UN and, though a 1954 resolution allowed Israel to resume work, the USSR vetoed the resolution. The Israelis then moved the intake to its current site at Eshed Kinrot on the northwestern shore of the Sea of Galilee. It was against this tense background that President Dwight Eisenhower sent his special envoy, Eric Johnston, to the Middle East in October 1953 to try to mediate a comprehensive settlement of the Jordan river system allocations, and design a plan for its regional development.

Attempts at conflict management

Johnston worked until the end of 1955 to reconcile US, Arab, and Israeli proposals in a Unified Plan amenable to all of the states involved. His dealings were bolstered by a US offer to fund two-thirds of the development costs. His plan addressed the objections of both Arabs and Israelis, and accomplished no small degree of compromise, although his neglect of groundwater issues would later prove a significant oversight. Though they had not met face-to-face for these negotiations, all states agreed on the need for a regional approach. Israel gave up integration of the Litani river, and the Arab states agreed to allow out-of-basin water transfers. The Arabs objected, but finally agreed, to storage at both the (unbuilt) Maqarin dam and the Sea of Galilee, so long as neither side would have physical control over the share available to the other. Israel objected, but finally agreed, to international supervision of withdrawals and construction. Allocations under the Unified Plan, later known as the Johnston Plan, were also delineated. Although the agreement was never ratified, both sides have generally adhered to the technical details and allocations, even while proceeding with unilateral development. Agreement was encouraged by the United States, which promised funding for future water development projects only as long as the Johnston Plan's allocations were adhered to. Since that time to the present, Israeli and Jordanian water officials have met several times a year, as often as every two weeks during the critical summer months, at so-called ''Picnic Table Talks'' at the confluence of the Jordan and Yarmuk rivers to discuss flow rates and allocations.

Outcome

By 1991, several events combined to shift the emphasis on the potential for ''hydro-conflict'' in the Middle East to the potential for ''hydro-

cooperation.'' The Gulf War in 1990 and the collapse of the Soviet Union caused a realignment of political alliances in the Middle East that finally made possible the first public face-to-face peace talks between Arabs and Israelis, in Madrid on 30 October 1991. During the bilateral negotiations between Israel and each of its neighbours, it was agreed that a second track be established for multilateral negotiations on five subjects deemed ''regional,'' including water resources.

Since the opening session of the multilateral talks in Moscow in January 1992, the Working Group on Water Resources, with the United States as ''gavel-holder,'' has been the venue by which problems of water supply, demand, and institutions have been raised among the parties to the bilateral talks, with the exception of Lebanon and Syria. The two tracks of the current negotiations, the bilateral and the multilateral, are designed explicitly not only to close the gap between issues of politics and issues of regional development, but to use progress on each to help catalyse the pace of the other, in a positive feedback loop towards ''a just and lasting peace in the Middle East.'' The idea is that the multilateral working groups provide forums for relatively free dialogue on the future of the region and, in the process, allow for personal ice-breaking and confidence building to take place. Given the role of the Working Group on Water Resources in this context, the objectives have been more in the order of fact-finding and workshops, rather than tackling the difficult political issues of water rights and allocations, or the development of specific projects. Likewise, decisions are made through consensus only.

The pace of success of each round of talks has vacillated but, in general, has been increasing. By the third meeting in 1992, it became clear that regional water-sharing agreements, or any political agreements surrounding water resources, would not be dealt with in the multilaterals. Rather the role of these talks would be to deal with non-political issues of mutual concern, thereby strengthening the bilateral track. The goal in the Working Group on Water Resources became to plan for a future region at peace, and to leave the pace of implementation to the bilaterals. This distinction between ''planning'' and ''implementation'' became crucial, with progress only being made as the boundary between the two is continuously pushed and blurred by the mediators.

The multilateral activities have helped set the stage for agreements formalized in bilateral negotiations – the Israel-Jordan Treaty of Peace of 1994, and the Interim Agreements between Israel and the Palestinians (1993 and 1995). For the first time since these states came into being, the Israel-Jordan peace treaty legally spells out mutually recognized water allocations. Acknowledging that, ''water issues along their entire boundary must be dealt with in their totality,'' the treaty spells out allocations for the Yarmuk and Jordan rivers, as well as Arava/Araba groundwater,

and calls for joint efforts to prevent water pollution. In addition, ''[recognizing] that their water resources are not sufficient to meet their needs,'' the treaty calls for ways of alleviating the water shortage through cooperative projects, both regional and international. The Interim Agreement also recognizes the water rights of both Israelis and Palestinians, but defers their quantification until the final round of negotiations.

Ganges river controversy

Case summary

River basin	Ganges river
Dates of negotiation	1960 to the present
Relevant parties	Pre-1971: India, Pakistan; Post-1971: India, Bangladesh
Flashpoint	India builds and operates Farakka barrage diversion of Ganges water without long-term agreement with downstream Bangladesh
Issues	
Stated objectives	Negotiate an equitable allocation of the flow of the Ganges river and its tributaries between the riparian states Develop a rational plan for integrated watershed development, including supplementing Ganges flow
Additional issues	
Water-related	Appropriate source for supplementing Ganges flow Amount of data necessary for decision-making Indian upstream water development Flood hazards mitigation Management of coastal ecosystems
Non-water	Appropriate diplomatic level for negotiations
Excluded	Other riparians, notably Nepal, until recently
Criteria for water allocations	Percentage of flow during dry season
Incentives/linkage	Financial: None Political: None
Breakthroughs	Minor agreements reached, but no long-term solution
Status	Short-term agreements reached in 1977, 1982, and 1985. Treaty signed in 1996

The problem

The problem over the Ganges is a typical example of the conflicting interests of up and downstream riparians. India, as the upper riparian, de-

veloped plans for water diversions for its own irrigation, navigability, and water supply interests. Initially Pakistan, and later Bangladesh, had interests in protecting the historic flow of the river for its own downstream uses. The potential clash between upstream development and downstream historic use sets the stage for attempts at conflict management.

Background

The headwaters of the Ganges and its tributaries lie primarily in Nepal and India, where snow and rainfall are heaviest. Flow increases downstream even as annual precipitation drops, as the river flows into Bangladesh – pre-1971 the eastern provinces of the Federation of Pakistan – and on to the Bay of Bengal.

On 29 October 1951, Pakistan officially called Indian attention to reports of Indian plans to build a barrage at Farakka, about 17 kilometres from the border. The barrage would reportedly divert 40,000 cubic feet per second (cusec)* out of a dry season average flow of 50,000 cusec from the Ganges into the Bhagirathi-Hooghly tributary, to provide silt-free flow into Calcutta bay, which would improve navigability for the city's port during dry months and keep saltwater from infiltrating the city's water supply. On 8 March 1952, the Indian government responded that the project was only under preliminary investigation, and that concern was ''hypothetical.''

Over the next years, Pakistan occasionally responded to reports of Indian plans for diversion projects of the Ganges, with little Indian response. In 1957, and again in 1958, Pakistan proposed that the services of the United Nations be secured to assist in planning for the cooperative development of the eastern river systems. India turned down these proposals, although it was agreed that water resources experts of the two countries should ''exchange data on projects of mutual interests.'' These expert-level meetings commenced 28 June 1960.

Attempts at conflict management

The first round of expert-level meetings between India and Pakistan was held in New Delhi from 28 June–3 July 1960 reverse order, with three more rounds to follow by 1962. While the meetings were still in progress, India informed Pakistan on 30 January 1961 that construction had begun on the Farakka barrage. A series of attempts by Pakistan to arrange a

* Since all negotiations were in English units, that is what is reported here. Cusec = cubic feet per second = 0.0283 cubic metres per second.

meeting at the level of minister was rebuffed with the Indian claim that such a meeting would not be useful, ''until full data are available.'' In 1963, the two sides agreed to have one more expert-level meeting to determine what data were relevant and necessary for the convening of a minister-level meeting.

The meeting at which data needs were to be determined, the fifth round at the level of expert, was not held until 13 May 1968. After that meeting, the Pakistanis concluded that agreement on data, and on the conclusions that could be drawn, was not possible, but that enough data were nevertheless available for substantive talks at the level of minister. India agreed only to a series of meetings at the level of secretary, in advance of a minister-level meeting.

These meetings, at the level of secretary, commenced on 9 December 1968 and a total of five were held in alternating capitals through July 1970. Throughout these meetings, the different strategies became apparent. As the lower riparian, the Pakistani sense of urgency was greater, and their goal was, ''substantive talks on the framework for a settlement for equitable sharing of the Ganges waters between the two countries.'' India in contrast, whether actually or as a stalling tactic, professed concern at data accuracy and adequacy, arguing that a comprehensive agreement was not possible until the data available were complete and accurate.

These talks were of little practical value, and India completed construction of the Farakka barrage in 1970. Water was not diverted at the time, however, because the feeder canal to the Bhagirathi-Hooghly system was not yet completed.

Bangladesh came into being in 1971, and by March 1972, the governments of India and Bangladesh had agreed to establish the Indo-Bangladesh Joint Rivers Commission, ''to develop the waters of the rivers common to the two countries on a cooperative basis.'' The question of the Ganges, however, was specifically excluded, and would be handled only between the two prime ministers.

At a minister-level meeting in Dhaka from 16–18 April 1975, India asked that, while discussions continue, the feeder canal at Farakka be run during the current period of low flow. The two sides agreed to a limited trial operation of the barrage, with discharges varying between 11,000 and 16,000 cusec in ten-day periods from 21 April to 31 May 1975, with the remainder of the flow guaranteed to reach Bangladesh. Without renewing or negotiating a new agreement with Bangladesh, India continued to divert the Ganges waters at Farakka after the trial run, throughout the 1975–1976 dry season, at the full capacity of the diversion – 40,000 cusec. There were serious consequences in Bangladesh resulting from these diversions, including desiccation of tributaries, salination along the coast, and setbacks to agriculture, fisheries, navigation, and industry.

Four more meetings were held between the two states between June 1975 and June 1976, with little result. In January 1976, Bangladesh lodged a formal protest against India with the General Assembly of the United Nations, which, on 26 November 1976, adopted a consensus statement encouraging the parties to meet urgently at the ministerial level for negotiations, ''with a view to arriving at a fair and expeditious settlement.'' Spurred by international consensus, negotiations recommenced on 16 December 1976. At an 18 April 1977 meeting, an understanding was reached on fundamental issues, which culminated in the signing of the Ganges Waters Agreement on 5 November 1977.

Outcome

In principle, the Ganges Water Agreement covers:
1. sharing the waters of the Ganges at Farakka; and
2. finding a long-term solution for augmentation of the dry season flows of the Ganges.

The agreement would initially cover a period of five years. It could then be extended further by mutual agreement. The Joint Rivers Commission was again vested with the task of developing a feasibility study for a long-term solution to the problems of the basin, with both sides reintroducing plans along the lines described above. By the end of the five-year life of the agreement, no solution had been worked out.

In the years since, both sides and, more recently, Nepal, have had mixed success in reaching agreement. Since the 1977 accord:
– A joint communiqué was issued in October 1982, in which both sides agreed not to extend the 1977 agreement, but would rather initiate new attempts to achieve a solution within 18 months – a task not accomplished.
– An Indo-Bangladesh Memorandum of Understanding was signed on 22 November 1985, on the sharing of the Ganges dry season flow through 1988, and establishing a Joint Committee of Experts to help resolve development issues. India's proposals focused on linking the Brahmaputra with the Ganges, while Bangladesh's centred on a series of dams along the Ganges headwaters in Nepal.
– Although both the Joint Committee of Experts and the Joint Rivers Commission met regularly throughout 1986, and although Nepal was approached for possible cooperation, the work ended inconclusively.
– The prime ministers of Bangladesh and India discussed the issue of river water sharing on the Ganges and other rivers in May 1992, in New Delhi. Each directed their ministers to renew their efforts to achieve a long-term agreement on the Ganges, with particular atten-

tion to low flows during the dry season. Subsequent to that meeting, there has been one minister-level and one secretary-level meeting, at which little progress was reportedly made.

In December 1996, a new treaty was signed between the two riparians, based generally on the 1985 accord, which delineates a flow regime under varying conditions. While this agreement should help reduce regional tensions, issues such as extreme events and upstream uses are not covered in detail. Notably, Nepal, China, and Bhutan, the remaining riparians, but not party to the treaty, have their own development plans that could impact the agreement.

The very first season following signing of the treaty, in April 1997, India and Bangladesh were involved in their first dispute over cross-boundary flow. Water passing through the Farakka dam dropped below the minimum provided in the treaty, prompting Bangladesh to request a review of the state of the watershed.

Indus Water Treaty

Case summary

River basin	Indus river and tributaries
Dates of negotiation	1951–1960
Relevant parties	India, Pakistan
Flashpoint	Lack of water-sharing agreement leads India to stem flow of tributaries to Pakistan on 1 April 1948
Issues	
Stated objectives	Negotiate an equitable allocation of the flow of the Indus river and its tributaries between the riparian states Develop a rational plan for integrated watershed development
Additional issues	
Water-related	Financing for development plans Whether storage facilities are ''replacement'' or ''development'' (tied to who is financially responsible)
Non-water	General India-Pakistan relations
Excluded	Future opportunities for regional management Issues concerning drainage
Criteria for water allocations	Historic and planned use (for Pakistan) plus geographic allocations (western rivers vs eastern rivers)
Incentives/linkage	Financial: World Bank organized International Fund Agreement Political: None
Breakthroughs	Bank put own proposal forward after 1953 deadlock; international funding raised for final agreement
Status	Ratified in 1960, with provisions for ongoing conflict resolution. Some suggest that recent meetings have been lukewarm. Physical separation of tributaries may preclude efficient integrated basin management

The problem

Even before the partition of India and Pakistan, the Indus posed problems between the states of British India. The problems became international only after partition, though, and the attendant increased hostility and lack of supralegal authority exacerbated the issue. Pakistani territory, which had relied on Indus water for centuries, now found the water sources originating in another country, one with whom geopolitical relations were increasing in hostility.

Background

Irrigation in the Indus river basin dates back centuries. By the late 1940s the irrigation works along the river were the most extensive in the world. These irrigation projects had been developed over the years under one political authority, that of British India, and any water conflict could be resolved by executive order. The Government of India Act of 1935, however, put water under provincial jurisdiction, and some disputes did begin to crop up at the sites of the more extensive works, notably between the provinces of Punjab and Sind.

In 1942, a judicial commission was appointed by the British government to study Sind's concern over planned Punjabi development. The Commission recognized the claims of Sind, and called for the integrated management of the basin as a whole. The Commission's report was found unacceptable by both sides, and the chief engineers of the two sides met informally between 1943 and 1945 to try to reconcile their differences. Although a draft agreement was produced, neither of the two provinces accepted the terms and the dispute was referred to London for a final decision in 1947.

Before a decision could be reached, however, the Indian Independence Act of 15 August 1947 internationalized the dispute between the new states of India and Pakistan. Partition was to be carried out in 73 days, and the full implications of dividing the Indus basin seem not to have been fully considered, although Sir Cyril Radcliffe, who was responsible for the boundary delineation, did express his hope that, ''some joint control and management of the irrigation system may be found'' (Mehta, 1988: 4). Heightened political tensions, population displacements, and unresolved territorial issues, all served to exacerbate hostilities over the water dispute.

As the monsoon flows receded in the fall of 1947, the chief engineers of Pakistan and India met and agreed to a ''Standstill Agreement,'' which froze water allocations at two points on the river until 31 March 1948,

allowing discharges from headworks in India to continue to flow into Pakistan.

On 1 April 1948, the day that the ''Standstill Agreement'' expired, in the absence of a new agreement, India discontinued the delivery of water to the Dipalpur canal and the main branches of the Upper Bari Daab canal. At an Inter-dominion conference held in Delhi on 3–4 May 1948, India agreed to the resumption of flow, but maintained that Pakistan could not claim any share of those waters as a matter of right (Caponera, 1987: 511). This position was reinforced by the Indian claim that, since Pakistan had agreed to pay for water under the Standstill Agreement of 1947, Pakistan had recognized India's water rights. Pakistan countered that they had historic rights, and that payments to India were only to cover operation and maintenance costs (Biswas, 1992: 204).

While these conflicting claims were not resolved, an agreement was signed, later referred to as the Delhi Agreement, in which India assured Pakistan that India would not withdraw water delivery without allowing time for Pakistan to develop alternate sources. Pakistan later expressed its displeasure with the agreement in a note dated 16 June 1949, calling for the ''equitable apportionment of all common waters,'' and suggesting turning jurisdiction of the case over to the World Court. India suggested rather that a commission of judges from each side try to resolve their differences before turning the problem over to a third party. This stalemate lasted through 1950.

Attempts at conflict management

In 1951, Indian Prime Minister Nehru, whose interest in integrated river management along the lines of the Tennessee Valley Authority had been piqued, invited David Lilienthal, former chairperson of the TVA, to visit India. Lilienthal also visited Pakistan and, on his return to the US, wrote an article outlining his impressions and recommendations (the trip had been commissioned by *Collier's Magazine* – international water was not the initial aim of the visit). His article was read by Lilienthal's friend David Black, president of the World Bank, who contacted Lilienthal for recommendations on helping to resolve the dispute. As a result, Black contacted the prime ministers of Pakistan and India, inviting both countries to accept the Bank's good offices. In a subsequent letter, Black outlined ''essential principles'' that might be followed for conflict resolution. These principles included:

– the water resources of the Indus basin should be managed co-operatively;
– the problems of the basin should be solved on a functional and not on a political plane, without relation to past negotiations and past claims.

Black suggested that India and Pakistan each appoint a senior engineer to work on a plan for development of the Indus basin. A Bank engineer would be made available as an ongoing consultant.

Both sides accepted Black's initiative. The first meeting of the Working Party included Indian and Pakistani engineers, along with a team from the Bank, as envisioned by Black, and they met for the first time in Washington in May 1952.

When the two sides were unable to agree on a common development plan for the basin in subsequent meetings in Karachi, November 1952, and Delhi, January 1953, the Bank suggested that each side submit its own plan. Both sides did submit plans on 6 October 1953, each of which mostly agreed on the supplies available for irrigation, but varied extremely on how these supplies should be allocated.

The Bank concluded that not only was the stalemate likely to continue, but that the ideal goal of integrated watershed development for the benefit of both riparians was probably too elusive an arrangement at this stage of political relations. On 5 February 1954, the Bank issued its own proposal, abandoning the strategy of integrated development in favour of one of separation. The Bank proposal called for the entire flow of the eastern rivers to be allocated to India, and all of the western rivers, except for a small amount from the Jhelum, to be allocated to Pakistan. According to the proposal, the two sides would agree to a transition period while Pakistan would complete link canals dividing the watershed, during which India would continue to allow Pakistan's historic use to continue to flow from the eastern rivers.

The Bank proposal was given to both parties simultaneously. On 25 March 1954, India accepted the proposal as the basis for agreement. Pakistan viewed the proposal with more trepidation, and gave only qualified acceptance on 28 July 1954. The Pakistanis considered the flow of the western rivers to be insufficient to replace their existing supplies from the eastern rivers, particularly given limited available storage capacity. To help facilitate an agreement, the Bank issued an aide-mémoire, calling for more storage on the western rivers and suggesting India's financial liability for ''replacement facilities'' – increased storage facilities and enlarged link canals in Pakistan, which could be recognized as the cost replacement of pre-partition canals.

By 1959, the Bank evaluated the principal issue to be resolved as follows: which works would be considered ''replacement'' and which ''development.'' Stated differently, for which works India would be financially responsible. To circumvent the question, Black suggested an alternate approach in a visit to India and Pakistan in May. Perhaps one might settle on a specific amount for which India was responsible, rather than arguing over individual works. The Bank might then help raise additional funds

among the international community for watershed development. India was offered help with construction of its Beas dam, and Pakistan's plan, including both the proposed dams would be looked at favourably. With these conditions, both sides agreed to a fixed payment settlement, and to a 10-year transition period during which India would allow for Pakistan's historic flows to continue.

In August 1959, Black organized a consortium of donors to support development in the Indus basin and raised close to $900 million, in addition to India's commitment of $174 million. The Indus Water Treaty was signed in Karachi on 19 September 1960 and government ratifications were exchanged in Delhi in January 1961.

Outcome

The Indus Water Treaty addressed both the technical and financial concerns of each side, and included a timeline for transition. The main points of the treaty included:

- an agreement that Pakistan would receive unrestricted use of the western rivers, which, with minor exceptions, India would allow to flow unimpeded;
- provisions for three dams, eight link canals, three barrages, and 2,500 tube wells to be built in Pakistan;
- a 10-year transition period, from 1 April 1960 to 31 March 1970, during which water would continue to be supplied to Pakistan according to a detailed schedule;
- a schedule for India to provide its fixed financial contribution of $62 million, in 10 annual instalments during the transition period;
- additional provisions for data exchange and future cooperation.

The treaty also established the Permanent Indus Commission, made up of one Commissioner of Indus Waters from each country. The two Commissioners would meet annually in order to:

- establish and promote cooperative arrangements for the treaty implementation;
- promote cooperation between the parties in the development of the waters of the Indus system;
- examine and resolve by agreement any question that may arise between the parties concerning interpretation or implementation of the treaty;
- submit an annual report to the two governments.

In case of a dispute, provisions were made to appoint a ''neutral expert.'' If the neutral expert fails to resolve the dispute, negotiators can be appointed by each side to meet with one or more mutually agreed-upon

mediators. If either side (or the mediator) views mediated agreement as unlikely, provisions are included for the convening of a Court of Arbitration. In addition, the treaty calls for either party, if it undertakes any engineering works on any of the tributaries, to notify the other of its plans and to provide any data that may be requested.

Since 1960, no projects have been submitted under the provisions for ''future cooperation,'' nor have any issues of water quality been submitted at all. Other disputes have arisen, and been handled in a variety of ways. The first issues arose from Indian non-delivery of some waters during 1965–1966, but became instead a question of procedure and the legality of commission decisions. Negotiators resolved that each commissioner acted as government representatives and that their decisions were legally binding.

One controversy surrounding the design and construction of the Salal dam was resolved through bilateral negotiations between the two governments. Other disputes, over new hydroelectric projects and the Wuller barrage on the Jhelum tributary, have yet to be resolved.

Mekong Committee

Case summary

River basin	Mekong river
Dates of negotiation	Committee formed 1957
Relevant parties	Cambodia, Laos, Thailand, Vietnam (directly), China, Myanmar (indirectly)
Flashpoint	None – studies by UN-ECAFE (1952, 1957) and US Bureau of Reclamation provide impetus for creation of Mekong Committee
Issues	
Stated objectives	Promote, coordinate, supervise, and control the planning and investigation of water resources development projects in the Lower Mekong basin
Additional issues	
Non-water	General political relations between riparians
Excluded	China and Myanmar were not included since inception; Cambodia not included between 1978 and 1991
Criteria for water allocations	Allocations have not been an issue; ''reasonable and equitable use'' for the basin defined in detail since 1975
Incentives/linkage	Financial: Extensive funding from international community Political: Facilitated relations between riparians, aid from both east and west despite political tensions
Breakthroughs	Studies by UN-ECAFE and US Bureau of Reclamation in 1950s
Status	Mekong Committee established in 1957 became the Interim Committee in 1978 with original members except for Cambodia. Early momentum has dropped off – extensive data networks and databases established, but few extensive projects implemented; none yet on the mainstream; Committee reratified as Mekong Commission in 1995

The problem

As is common in international river basins, integrated planning for efficient watershed management is hampered by the difficulties of coordinating between riparian states with diverse and often conflicting needs. The Mekong, however, is noted mostly for the exceptions as compared with other basins, rather than the similarities. For example, because the region is so well watered, allocations per se are not a major issue. Also, negotiations for joint management of the Mekong were not set off by a flashpoint, but rather by creativity and foresight on the part of an authoritative third party – the United Nations – with the willing participation of the lower riparian states.

Background

The Mekong is the seventh largest river in the world in terms of discharge (tenth in length). Rising in China, it then flows 4,200 kilometres through Myanmar, Laos, Thailand, Cambodia, and finally through the extensive delta in Vietnam into the South China Sea. The Mekong is also both the first successful application of a comprehensive approach to planning development of an international river and, at the same time, is one of the least developed major rivers in the world, in part because of difficulties inherent in implementing joint management between its diverse riparians.

A 1957 study performed by the United Nations Economic Commission for Asia and the Far East (ECAFE) noted that harnessing the main stem of the Mekong would allow hydropower production, expansion of irrigated land, a reduction of the threat of flooding in the delta region, and the extension of navigability of the river as far as northern Laos. As had earlier studies, the ECAFE report emphasized the need for comprehensive development of the river, and close cooperation between the riparians in coordinating efforts for projects and management. To facilitate coordination, the report suggested the establishment of an international body for exchanging information and development plans between the riparian states. Ultimately, the report suggested, such a body might become a permanent agency responsible for coordinating joint management of the Mekong basin. When the report was presented in the tenth-anniversary meeting of ECAFE in Bangkok in March 1957, representatives from the four lower riparian states themselves adopted a resolution calling for further study.

Attempts at conflict management

In mid-September 1957, after ECAFE's legal experts designed a draft charter for a ''Coordination Committee,'' the lower riparians convened again in Bangkok as a ''Preparatory Commission.'' The Commission studied, modified, and finally endorsed a statute that legally established the Committee for Coordination of Investigations of the Lower Mekong (Mekong Committee), made up of representatives of the four lower riparians, with input and support from the United Nations. The statute was signed on 17 September 1957.

The committee was composed of ''plenipotentiary'' representatives of the four countries, meaning that each representative had the authority to speak for their country. The committee was authorized to ''promote, coordinate, supervise, and control the planning and investigation of water resources development projects in the Lower Mekong Basin.''

The first committee session was on 31 October 1957, as was the first donation from the international community – 60 million francs (about $120,000) from France. With rapid agreement between the riparians came extensive international support for the work of the committee. By 1961, the committee's resources came to $14 million, more than enough to fund field surveys, which had been agreed to as priority projects. By the end of 1965, 20 countries, 11 international agencies, and several private organizations had pledged a total of more than $100 million. The secretariat itself was funded by a special $2.5 million grant made by UNDP. This group of international participants has been dubbed ''the Mekong club,'' which has infused the international community with ''the Mekong spirit.''

Outcome

The early years were the most productive for the Mekong Committee. Networks of hydrologic and meteorologic stations were established and continued to function despite hostilities in the region, as were programmes for aerial mapping, surveying, and levelling. Navigation has been improved along the main stem of the river.

The work of the committee has also helped overcome political suspicion through increased integration. In 1965, Thailand and Laos signed an agreement on developing the power potential of the Nam Ngum river, a Mekong tributary inside Laos. Since most of the power demand was in Thailand, which was willing to buy power at a price based on savings in fuel costs, and since Laos did not have the resources to finance the project, an international effort was mobilized through the committee to help

develop the project. As a sign of the committee's viability, the mutual flow of electricity for foreign capital between Laos and Thailand was never interrupted, despite hostilities between the two countries.

By the 1970s, the early momentum of the Mekong Committee began to subside, for several reasons. First, the political and financial obstacles necessary to move from data gathering and feasibility studies to concrete development projects have often been too great to overcome. A 1970 Indicative Basin Plan marked the potential shift between planning and large-scale implementation, including immense power, flood control, irrigation, and navigation projects, and set out a basin development framework for the following 30 years. In 1975, the riparians set out to refine the committee's objectives and principles for development in support of the Plan in a ''Joint Declaration on Principles,'' including the first (and so far only) precise definition of ''reasonable and equitable use'' based on the 1966 Helsinki Rules ever used in an international agreement. The plan, which included three of the largest hydroelectric power projects in the world as part of a series of seven cascading dams, was received with scepticism by some in the international community (Kirmani, 1990: 203). At the current time, while many projects have been built along the tributaries of the Mekong within single countries, and despite the update of the Indicative Plan in 1987 and a subsequent ''Action Plan'' which includes only two low dams, no single structure has been built across the main stem.

Second, while the committee continued to meet despite political tensions, and even despite outright hostilities, political obstacles did take their toll on the committee's work. Notably, the committee became a three-member ''interim committee'' in 1978 with the lack of a representative government in Cambodia. Cambodia rejoined the committee as a full participant in 1991, although the latter still retained its ''interim'' status until 1995. Likewise, funding and involvement from the United States, which had been about 12 per cent of total aid to the committee, was cut off in June 1975 and has not been restored to significant levels.

Renewed activity came with the signing of the Paris Peace Agreement in 1991, after which Cambodia requested the reactivation of the Mekong Committee. The four lower riparians took up the call and spent the next four years determining a future direction for Mekong activities. The results of these meetings culminated in a new agreement, signed in April 1995, in which the Mekong Committee became the Mekong Commission. While it is too early yet to evaluate this renewed body, the fact that the riparians have made a new commitment to jointly manage the lower basin speaks for the resiliency of agreements put into place in advance of hot conflict. It should also be noted that Myanmar and China are still not party to the agreement, effectively precluding integrated basin management.

Nile Waters Agreement

Case summary

River basin	Nile river
Dates of negotiation	1920–1959 – treaties signed in 1929 and 1959
Relevant parties	Egypt, Sudan (directly); other Nile riparians (indirectly)
Flashpoint	Plans for a storage facility on the Nile
Issues	
Stated objectives	Negotiate an equitable allocation of the flow of the Nile river between Egypt and Sudan Develop a rational plan for integrated watershed development
Additional issues	
Water-related	Upstream vs downstream storage
Non-water	General Egypt-Sudan relations
Excluded	Water quality Other Nile riparians
Criteria for water allocations	Acquired rights plus even division of any additional water resulting from development projects
Incentives/linkage	Financial: Funding for Aswan High Dam Political: Fostered warm relations between Egypt and new government of Sudan
Breakthroughs	1958 coup in Sudan by pro-Egypt leaders made agreement possible
Status	Ratified in 1959. Allocations between Egypt and Sudan upheld till today. Other riparians, particularly Ethiopia, are planning development projects, which may necessitate renegotiating a more inclusive treaty

The problem

As the Nile riparians gained independence from colonial powers, riparian disputes became international and consequently more contentious, particularly between Egypt and Sudan. The core question of historic versus sovereign water rights is complicated by the technical question of where the river ought best be controlled – upstream or down.

Background

With the end of World War I, it became clear that any regional development plans for the Nile basin would have to be preceded by some sort of formal agreement on water allocations. In 1920, the Nile Projects Commission was formed, with representatives from India, the United Kingdom, and the United States. The same year saw publication of the most extensive scheme for comprehensive water development along the Nile, now known as the Century Storage Scheme.

The plan worried some Egyptians, and was criticized by nationalists, because all the major control structures would have been beyond Egyptian territory and authority. Some Egyptians saw the plan as a British means of controlling Egypt in the event of Egyptian independence.

Attempts at conflict management

In 1925, a new water commission made recommendations, based on the 1920 estimates that would lead finally to the Nile Waters Agreement between Egypt and Sudan on 7 May 1929. Four billion cubic metres of water per year (BCM/yr) were allocated to Sudan but the entire timely flow (from January 20 to July 15) and a total annual amount of 48 BCM/yr was reserved for Egypt. Egypt, as the downstream state, had its interests guaranteed by:

- having a claim to the entire timely flow. This claim meant that any cotton cultivated in Sudan would have to be grown during the winter months;
- having rights to on-site inspectors at the Sennar dam, outside of Egyptian territory;
- being guaranteed that no works would be developed along the river or on any of its territory that would threaten Egyptian interests.

In accord with this agreement, one dam was built and one reservoir raised, with Egyptian acquiescence.

The Aswan High Dam, with a projected storage capacity of 156 BCM/yr, was proposed in 1952 by the new Egyptian government, however debate over whether it was to be built as a unilateral Egyptian project or as a cooperative project with Sudan kept Sudan out of negotiations until 1954. The negotiations that ensued, and were carried out with Sudan's struggle for independence as a backdrop, focused not only on what each country's legitimate allocation would be, but whether the dam was even the most efficient method of harnessing the waters of the Nile.

The first round of negotiations between Egypt and Sudan took place between September and December 1954, even as Sudan was preparing

for its independence, scheduled for 1956. Negotiations broke off inconclusively, then briefly, and equally inconclusively, resumed in April 1955. Relations then threatened to degrade into military confrontation in 1958, when Egypt sent an unsuccessful expedition into territory in dispute between the two countries. In the summer of 1959, Sudan unilaterally raised the Sennar dam, effectively repudiating the 1929 agreement.

Sudan attained independence on 1 January 1956, but it was with the military regime that gained power in 1958 that Egypt adopted a more conciliatory tone in the negotiations that resumed in early 1959. Progress was speeded in part by the fact that any funding that would be forthcoming for the High Dam would depend on a riparian agreement. On 8 November 1959, the Agreement for the Full Utilization of the Nile Waters (Nile Waters Treaty) was signed.

Outcome

The Nile Waters Treaty had the following provisions:

- The average flow of the river is considered to be 84 BCM/yr. Evaporation and seepage were considered to be 10 BCM/yr, leaving 74 BCM/yr to be divided.
- Of this total, acquired rights have precedence, and are described as being 48 BCM for Egypt and 4 BCM for Sudan. The remaining benefits of approximately 22 BCM are divided by a ratio of $7^1/_2$ for Egypt (approx. 7.5 BCM/yr) and $14^1/_2$ for Sudan (approx. 14.5 BCM/yr). These allocations total 55.5 BCM/yr for Egypt and 18.5 BCM/yr for Sudan.
- If the average yield increases from these average figures, the increase would be divided equally. Significant decreases would be taken up by a technical committee, described below.
- Since Sudan could not absorb that much water at the time, the treaty also provided for a Sudanese water ''loan'' to Egypt of up to 1,500 MCM/yr through 1977.
- Funding for any project that increases Nile flow (after the High Dam) would be provided evenly, and the resulting additional water would be split evenly.
- A Permanent Joint Technical Committee to resolve disputes and jointly review claims by any other riparian would be established. The committee would also determine allocations in the event of exceptionally low flows.
- Egypt agreed to pay Sudan £E15 million in compensation for flooding and relocations.

Egypt and Sudan agreed that the combined needs of other riparians

would not exceed 1,000–2,000 MCM/yr, and that any claims would be met with one unified Egyptian-Sudanese position. The allocations of the treaty have been held to until the present.

Ethiopia, which had not been a major player in Nile hydropolitics, served notice in 1957 that it would pursue unilateral development of the Nile water resources within its territory, estimated at 75–85 per cent of the annual flow, and suggestions were made recently that Ethiopia may eventually claim up to 40,000 MCM/yr for its irrigation needs both within and outside of the Nile watershed. No other state riparian to the Nile has ever exercised a legal claim to the waters allocated in the 1959 treaty.

Plata basin

Case summary

River basin	Plata
Dates of negotiation	Plata Basin Treaty signed 1969
Relevant parties	Argentina, Bolivia, Brazil, Paraguay, Uruguay
Flashpoint	None
Issues	
Stated objectives	Promote and coordinate joint development of the basin; ''Hydrovia'' proposed in 1989
Additional issues	
Water-related	Joint management
Non-water	None
Excluded	Treaty does not provide any supralegal authority
Criteria for water allocations	None
Incentives/linkage	Possibility of linking water projects with transportation infrastructure
Breakthroughs	None
Status	Intergovernmental Coordinating Committee functions; ''Hydrovia'' technical and environmental studies due in October 1996

The problem

A cooperative management body has been in place on the Plata basin since 1969. While generally successful and productive, the cooperative nature of basin management is being strained by the size and possible economic and environmental impacts of the proposed Hydrovia project, which is designed to improve barge transportation and represents the largest project for river development proposed to date.

Background

The Plata river basin drains more than 2 million km^2 of southeastern South America, including territory in Argentina, Bolivia, Brazil, Paraguay, and Uruguay. It encompasses some of the major rivers of the continent – the Paraná, the Paraguay, and the Uruguay – and the largest wetlands in the world – the Pantanal.

The states of the basin have traditionally been willing to cooperate with management of the watershed, and have stressed the river's binding them to each other. A 1969 umbrella treaty, to which all of the riparians are signatories, provides a framework for joint management of the basin.

This framework is being tested with a current river transportation proposal to dredge and straighten major portions of the Paraná and the Paraguay, including through the Pantanal wetlands. The initial backers of the proposal, which was dubbed ''Hydrovia'' (''waterway'' in Spanish and Portuguese), were the governments of the Plata basin states. The project would allow year-round barge transportation – current conditions only allow for barges during the three dry months – and open up a major transportation thoroughfare for landlocked sections of the riparian states. Environmentalists and those whose livelihoods depend on traditional economies have expressed trepidation at the project.

Attempts at conflict management

The Plata Basin Treaty of 1969 provides an umbrella framework for several bilateral treaties between the riparians and a direction for joint development of the basin. The treaty requires open transportation and communication along the river and its tributaries, and prescribes cooperation in education, health, and management of 'non-water' resources (e.g. soil, forest, flora, and fauna). The foreign ministers of the riparian states provide the policy direction and a standing Inter-Governmental Coordinating Committee is responsible for ongoing administration.

Basin states agree to identify and prioritize cooperative projects, and to provide the technical and legal structure to see to their implementation. The treaty also has some limitations, notably the lack of a supra-legal body to manage the treaty's provisions. The necessity to go through each country's legal system for individual projects has resulted in some delays, or halts, in project implementation.

The treaty's success has been in the area of transportation, so it is not altogether surprising that the Hydrovia project has been put forward. The first meeting of the backers of the project was in April 1988, out of which the Intergovernmental Commission on the Paraná-Paraguay Hydrovia was formed.

Outcome

Positions between supporters and opponents of the project have sharpened, however, these positions are based on very little information. The Inter-American Development Bank has only recently helped to finance a technical and environmental feasibility study.

Salween river

Case summary

River basin	Salween river
Dates of negotiation	Joint working group established in 1989
Relevant parties	Myanmar, Thailand (directly); China (indirectly)
Flashpoint	None
Issues	
Stated objectives	Promote and coordinate joint development of hydropower projects within the Salween basin
Additional issues	
Water-related	Possibility of out-of-basin transfers to Thailand
Non-water	River flows through regions of ethnic unrest and drug trade
Excluded	China has not been included in any planning
Criteria for water allocations	None
Incentives/linkage	Possibility of linking water projects with transportation infrastructure
Breakthroughs	None
Status	Talks are in most preliminary stage; meetings continue although no plan for the basin, nor any main-stem project, has yet been established

The problem

The Salween basin is a good case of river planning in advance of conflict. Preliminary meetings are being held between Myanmar and Thailand, and some project feasibility studies are being implemented although, to date, no basin-wide plan, nor any main-stem project, has been implemented.

Background

The Salween originates in the Tibetan plateau and drains an area of 320,000 km^2 in China, Myanmar, and Thailand before it flows into the Gulf of Martaban. Despite the fact that studies since the 1950s have identified tremendous hydropower potential, the Salween is a relatively

undeveloped basin – with only one major hydro-electric project at Baluchaung. The power companies of Thailand and Myanmar, as well as private Japanese concerns, have pursued individual feasibility studies but it is only since the 1970s that the potential of the basin as a whole has been investigated.

Attempts at conflict management

In June 1989, following the visit of a Thai government delegation to Rangoon, a joint technical committee was established between Thailand and Myanmar, made up primarily of representatives from the power companies of the two countries. Since that time, the committee has continued to meet and to pursue feasibility studies, but no project or management body has been developed. To date, China has not been included in discussions.

Outcome

As mentioned, the Salween is a basin in its earliest stages of development. What is noteworthy is that technical and management discussions have been proceeding in advance of major development projects, thus allowing for integrated management almost from the beginning.

Discussions have included issues outside of hydropower, and studies have suggested linkages between power, irrigation and drinking water diversions, barge transportation, and related surface infrastructure. Complicating management issues is the fact that sections of the watershed include regions of ethnic unrest and the tensions brought about by the international drug trade. Nevertheless, the basin offers the opportunity for integrated management to be implemented in advance of any flashpoint brought about by unilateral development.

US/Mexico shared aquifers

Case summary

River basin	Aquifers which straddle the US/Mexico boundary
Dates of negotiation	US-Mexico Water Treaty signed 1944; groundwater negotiations since 1973
Relevant parties	Mexico, United States
Flashpoint	Salinity crisis of 1961–1973 raised groundwater as important issue not detailed in 1944 treaty
Issues	
Stated objectives	Develop an equitable apportionment of shared aquifers
Additional issues	
Water-related	Pollution
Non-water	None
Excluded	None
Criteria for water allocations	None
Incentives/linkage	None
Breakthroughs	None
Status	Talks have been ongoing since 1973

The problem

The complications of groundwater are exemplified in the border region between the United States and Mexico where, despite the presence of an active supralegal authority since 1944, groundwater issues have yet to be resolved. Mentioned as vital in the 1944 treaty, and again in 1973, the difficulties in quantifying the ambiguities inherent in groundwater regimes have confounded the efforts of legal and management experts ever since.

Background

The border region between the United States and Mexico has fostered its share of surface-water conflict, from the Colorado to the Rio Grande/Rio Bravo. It has also been a model for peaceful conflict resolution, notably through the work of the International Boundary and Water Commission (IBWC), the supralegal body established to manage shared water resources as a consequence of the 1944 US-Mexico Water Treaty. Yet the

difficulties encountered in managing shared surface-water pale in comparison to trying to allocate groundwater resources. Each aquifer system is generally so poorly understood that years of study may be necessary before one even knows what the bargaining parameters are.

Mumme (1988) has identified 23 sites in contention in six different hydrogeologic regions along the 3,300 kilometres of shared boundary. While the 1944 treaty mentions the importance of resolving the allocations of groundwater between the two states, it does not do so. In fact, shared surface-water resources were the focus of the IBWC until the early 1960s, when a US irrigation district began draining saline groundwater into the Colorado river and deducting the quantity of saline water from Mexico's share of freshwater. In response, Mexico began a ''crash programme'' of groundwater development in the border region, in order to make up the loss.

Attempts at conflict management

Ten years of negotiations resulted in a 1973 addendum to the 1944 treaty – Minute 242 of the IBWC, which limited groundwater withdrawals on both sides of the border, and committed each nation to consult the other regarding any future groundwater development. Allocations were not quantified and negotiations to do so have continued ever since.

A 1979 agreement – Minute 241 – grants the IBWC comprehensive authority to resolve conflicts arising from border water pollution. It has been suggested that this authority may be extended to encompass groundwater overpumping.

Outcome

It is testimony to the complexity of international groundwater regimes that despite the presence of an active authority for cooperative management, and despite relatively warm political relations and few riparians, negotiations have continued since 1973 without resolution.

Aral sea

Case summary

River basin	Aral sea and its tributaries, notably the Syr Darya and the Amu Darya
Dates of negotiation	Agreements signed in 1992 and 1993
Relevant parties	Kazakhstan, Kyrgystan, Tajikistan, Turkmenistan, and Uzbekistan (directly); Afghanistan, Iran, and China (indirectly); Russia has been active observer
Flashpoint	None – Soviet agricultural policies set off ''creeping'' crisis from 1960s
Issues	
Stated objectives	Stabilize and rehabilitate watershed, improve management, and build capacity of regional institutions
Additional issues	
Water-related	None
Non-water	General political relations between riparians
Excluded	Transboundary oil pipelines
Criteria for water allocations	Initially based on Soviet formula, now moving to ''equitable use''
Incentives/linkage	Financial: Extensive funding from international community Political: Facilitated relations between riparians
Breakthroughs	Breakup of Soviet Union required coordination between new states
Status	Agreements reached in 1992, 1993. Initial programme implemented in 1995. Some concerns about funding, legal overlap, priorities.

The problem

The environmental problems of the Aral sea basin are among the worst in the world. Water diversions, agricultural practices, and industrial waste have resulted in a disappearing sea, salinization, and organic and inorganic pollution. The problems of the Aral, which previously had been an internal issue of the Soviet Union, became internationalized after its col-

lapse in 1991. The five new major riparians – Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan – have been struggling since that time to help stabilize and, eventually to rehabilitate, the watershed.

Background

The Aral sea was, until comparatively recently, the fourth largest inland body of water in the world. Its basin covers 1.8 million km^2, primarily in what used to be the Soviet Union, and what is now the independent republics of Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan. Small portions of the basin headwaters are also located in Afghanistan, Iran, and China. The major sources of the sea, the Amu Darya and the Syr Darya, are fed by glacial meltwater from the high mountain ranges of the Pamir and Tien Shan in Tajikistan and Kyrgyzstan.

Irrigation in the fertile lands between the Amu Darya and the Syr Darya dates back millennia, although the sea itself remained in relative equilibrium until the early 1960s. At that time, the central planning authority of the Soviet Union devised the ''Aral sea plan'' to transform the region into the cotton belt of the USSR. Vast irrigation projects were undertaken in subsequent years, with the irrigated area expanding by over one-third from 1965 to 1988.

Such intensive cotton monoculture has resulted in extreme environmental degradation. Pesticide use and salinization, along with the region's industrial pollution, have decreased water quality, resulting in high rates of disease and infant mortality. Water diversions, sometimes totalling more than the natural flow of the rivers, have reduced the Amu Darya and the Syr Darya to relative trickles – the sea itself has lost 75 per cent of its volume, half its surface area, and salinity has tripled, all since 1960. The exposed seabeds are thick with salts and agricultural chemical residue, which are carried aloft by the winds as far as the Atlantic and Pacific oceans and further contribute to air pollution and health problems in the region.

Attempts at conflict management

The intensive problems of the Aral basin were internationalized with the breakup of the Soviet Union. Prior to 1988, both use and conservation of natural resources often fell under the jurisdiction of branches of the same Soviet agency, each of which acted as powerful independent entities. In January 1988, a state committee for the protection of nature was formed, which was elevated later to the Ministry for Natural Resources and En-

vironmental Protection in 1990. The ministry, in collaboration with the republics, had authority over all aspects of the environment and the use of natural resources. This centralization came to an end with the collapse of the Soviet Union in 1991.

The five major riparians were initially regulated by ad hoc intergovernmental agreements based on Soviet quotas. In February 1992, the five republics negotiated an agreement to coordinate policies on their transboundary waters.

Outcome

The Agreement on Cooperation in the Management, Utilization and Protection of Interstate Water Resources was signed on 18 February 1992 by representatives from Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan. The agreement calls on the riparians, in general terms, to coordinate efforts to ''solve the Aral Sea crisis,'' including exchanging information, carrying out joint research, and adhering to agreed-to regulations for water use and protection. The agreement also establishes the Interstate Commission for Water Management coordination to manage, monitor, and facilitate the agreement. Since its inception, the Commission has prepared annual plans for water allocations and use, and defined water use limits for each riparian state.

In a parallel development, an Agreement on Joint Actions for Addressing the Problems of the Aral Sea and its Coastal Area, Improving of the Environment and Ensuring the Social and Economic Development of the Aral Sea Region was signed by the same five riparians on 26 March 1993. This agreement also established a coordinating body, the Interstate Council for the Aral Sea, which was designated as the organization having primary responsibility for ''formulating policies and preparing and implementing programs for addressing the crisis.'' Each state's minister of water management is a member of the Council. In order to mobilize and coordinate funding for the Council's activities, the International Fund for the Aral Sea was created in January 1993.

A long term ''Concept'' and a short-term ''Program'' for the Aral sea was adopted at a meeting of the Heads of Central Asian states in January 1994. The Concept describes a new approach to development of the Aral sea basin, including a strict policy of water conservation. The Aral sea itself was recognized as a legitimate water user for the first time. The Program has four major objectives:

– to stabilize the environment of the Aral sea;
– to rehabilitate the disaster zone around the sea;
– to improve the management of international waters of the basin; and

– to build the capacity of regional institutions to plan and implement these programmes.

Phase I of the Program, which will cost $260 million over three years, began implementation in 1995. These regional acitivies are supported and supplemented by a variety of governmental and non-governmental agencies, including the European Union, the World Bank, UNEP, and UNDP.

Despite this forward momentum, some concerns have been raised about the potential effectiveness of these plans and institutions. Some have noted that not all promised funding has been forthcoming. Others, Dante Caponera (1995), for example, have noted duplication and inconsistencies in the agreements, and warn that they seem to accept the concept of ''maximum utilization'' of the waters of the basin. Vinagradov (1996) has noted especially the legal problems inherent in these agreements, including some confusion between regulatory and development functions, especially between the Commission and the Council.

The International Joint Commission: Canada and the United States of America

Case summary

River basin	All transboundary waters along the US-Canada boundary
Dates of negotiation	1905–1909
Relevant parties	Canada (originally negotiating through UK), United States
Flashpoint	Water quality concerns of early twentieth century
Issues	
Stated objectives	To provide an institutional framework to deal with issues related to boundary waters
Additional issues	
Water-related	Water quality issues were re-emphasized in 1978
Non-water	1987 Protocol and 1991 Agreement added air pollution
Excluded	Tributaries to transboundary waters; some sovereignty issues
Criteria for water allocations	''Equal and similar rights''
Incentives/linkage	None
Breakthroughs	Canada accepted sovereignty argument; US accepted arbitration function
Status	Over 130 disputes have been averted or reconciled

The problem

Canada and the United States share one of the longest boundaries in the world. Industrial development in both countries, which in the humid eastern border region primarily has relied on water resources for waste disposal, had led to decreasing water quality along their shared border to the point where, by the early years of the twentieth century, it was in the interest of both countries to seriously address the matter. Prior to 1905, only ad hoc commissions had been established to deal, as they arose, with issues relating to shared water resources. Both states considered it within their interests to establish a more permanent body for the joint management of their shared water resources.

Background

Canada and the United States share a 6,400 km boundary between the main portions of their provinces and states, and an additional 2,400 km between the Canadian Northwest Territories and Alaska. Crossing these boundaries are some of the richest waterways in the world, not least of which are the vast water resources of the five Great Lakes. The ad hoc commissions which until then had been established to resolve water-related issues were not sufficient to handle the growing problem. Even the International Waterways Commission, established in 1905, only dealt with issues on a case-by-case basis.

Attempts at conflict management

As Canada and the United States entered into negotiations to establish a permanent body to replace the International Waterways Commission, the tone of the meeting was informed by the concerns of each state. For the United States, the overriding issue was sovereignty. While it was interested in the practical necessity of an agreement to manage transboundary waters, it did not want to relinquish political independence in the process. This concern was expressed by the United States position that absolute territorial sovereignty be retained by each state over the waters within its territory – tributaries should not be included in the Commission's authority. In addition, the new body might retain some of the ad hoc nature of prior bodies, so as not to acquire undue authority. Canada was interested in establishing an egalitarian relation with the United States. It was hampered not only because of the relative size and level of development of the two states at the time, but also because Canadian foreign policy was still the purview of the United Kingdom – negotiations had to be carried out between Ottawa, Washington, and London. Canada wanted a comprehensive agreement, which would include tributaries, and a commission with greater authority than the bodies of the past.

Outcome

The ''Treaty Relating to Boundary Waters between the United States and Canada,'' signed between the United Kingdom and the United States in 1909, reflects the interest of each negotiating body. The treaty establishes the International Joint Commission with six commissioners, three appointed by the governments of each state. Canada accepted US sovereignty concerns to some extent – tributary waters are excluded. The

United States in turn accepted the arbitration function of the Commission and allowed it greater authority than the US would have liked.

The treaty calls for open and free navigation along boundary waters, allowing Canadian transportation also on Lake Michigan, the only one of the Great Lakes not defined as a boundary water. Although it allows each state unilateral control over all of the waters within its territory, the treaty does provide for redress by anyone affected downstream. Furthermore, the Commission has ''quasi-judicial'' authority: any project which would affect the ''natural'' flow of boundary waters has to be approved by both governments. Although the Commission has the mandate to arbitrate agreements, it has never been called to do so. The Commission also has investigative authority – it may have development projects submitted for approval, or be asked to investigate an issue by one or another of the governments. Commissioners act independently, not as representatives of their respective governments.

Water quality has been a focal concern of the Commission, particularly in the waterways of the Great Lakes. The Great Lakes-St Lawrence river system contains one-fifth of the world's surface fresh water and includes the industrial lifelines of each state. Perhaps as a consequence, the anti-pollution provisions of the treaty met little opposition on either side. A 1972 ''Great Lakes Water Quality Agreement'' calls for the states both to control pollution and to clean up waste waters from municipal and industrial sources. This led to the signing of a new agreement in 1978, and a comprehensive protocol in 1987, each of which expanded the Commission's authorities and activities with respect to water quality.

These agreements define specific water quality objectives – the 1987 Protocol called on the Commission to review ''Remedial Action Plans,'' prepared by governments and communities, in 43 ''Areas of Concern'' – yet allow the appropriate level of government of each side to develop its own plan to meet objectives. The 1987 Protocol implemented an ''eco-system'' approach to pollution control, and called for the development of ''lakewide management plans'' to combat some critical pollutants. It also included new emphasis on non-point source pollution, groundwater contamination, contaminated sediment, and airborne toxics. In 1991, the two states signed an ''Agreement of Air Quality'' under which the Commission was given limited authority over joint air resources.

The International Joint Commission has met some criticism over the years; most recently some have questioned whether the limited authority of the Commission – politically necessary when the Commission was established – is really conducive to the ''eco-system'' approach called for in the 1987 Protocol or whether greater supralegal powers are necessary. Others have questioned the commitment of the Commission to the process of public participation. Nevertheless, given the vast amount of water

resources under its authority, and the myriad layers of government to which it must be responsible, the Commission stands out as an institution which has effectively and peacefully managed the boundary waters of two nations for over some 90 years, reconciling or averting more than 130 disputes in the process.

Lesotho Highlands water project

Case summary

River basin	Senqu river
Dates of negotiation	1978–1986
Relevant parties	Lesotho, South Africa
Flashpoints	Water deficit in South African industrial hub
Issues	
Stated objectives	Negotiate technical and financial details of water transfer from Lesotho to South Africa
Additional issues	
Water-related	Hydropower for Lesotho internal consumption
Non-water	General development
Excluded	None
Criteria for water allocations	Amount for sale negotiated for treaty
Incentives/linkage	South Africa buys water from Lesotho and finances diversion; Lesotho uses payments and development aid for hydropower generation and general development
Breakthroughs	Financing arrangement negotiated which allowed for international funding
Status	Project completed in 1990; no complications despite significant shift in South African government

The problem

Lesotho, completely surrounded by South Africa, is a state poor in most natural resources, water being the exception. The industrial hub of South Africa, from Pretoria to Witwatersrand, has been exploiting local water resources for years and the South African government has been in search of alternate sources. The elaborate technical and financial arrangements that led to construction of the Lesotho Highlands project provide a good example of the possible gains of an integrative arrangement including a diverse ''basket'' of benefits.

Background

Development in Lesotho has been limited by its lack of natural resources and investment capital. Water is its only abundant resource, which is precisely what regions of neighbouring South Africa have been lacking. A project to transfer water from the Senqu river to South Africa was investigated in the 1950s, and again in the 1960s. The project was never implemented due to disagreement over appropriate payment for the water.

Attempts at conflict management

In 1978, the governments of Lesotho and South Africa appointed a joint technical team to investigate the possibility of a water transfer project. The first feasibility study suggested a project to transfer 35 m^3/sec, four dams, 100 km of transfer tunnel, and a hydropower component. Agreement was reached to study the project in more detail, the cost of the study to be borne by both governments.

The second feasibility study, completed in 1986, concluded that the project was feasible, and recommended that the amount of water to be transferred be doubled to 70 m^3/sec. A treaty between the two states was necessary to negotiate for this international project. Negotiations proceeded through 1986 and the ''Treaty on the Lesotho Highlands Water Project between the Government of the Kingdom of Lesotho and the Government of the Republic of South Africa'' was signed into law on 24 October 1986.

Outcome

The treaty spells out an elaborate arrangement of technical, economic, and political intricacy. A boycott of international aid for apartheid South Africa required that the project be financed, and managed, in sections. The water transfer component was entirely financed by South Africa, which would also make payments for the water that would be delivered. The hydropower and development components were undertaken by Lesotho, which received international aid from a variety of donor agencies, particularly the World Bank. Phase I of the Lesotho Highlands water project was completed in 1990, at a cost of $2.4 billion.

The Lesotho Highlands project provides lessons for the importance of a ''basket'' of resources being negotiated together. South Africa receives

cost-effective water for its continued growth, while Lesotho receives revenue and hydropower for its own development. It is testimony to the resilience of these arrangements that no significant changes were made despite the recent dramatic political shifts in South Africa.