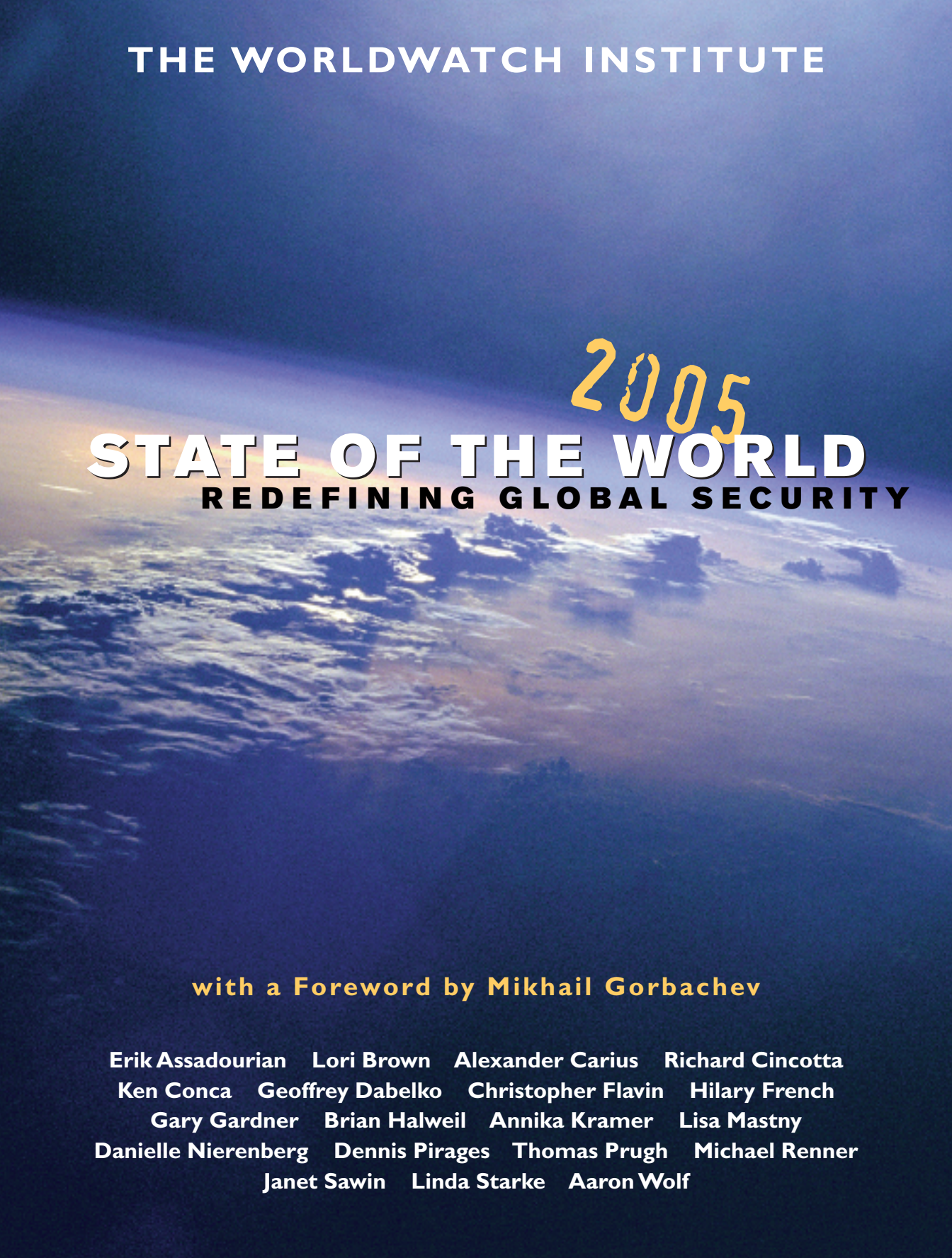
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CHAPTER 5

Managing Water Conflict and Cooperation

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Stanley Crawford, a former *mayordomo* (ditch manager) of an *acequia* (irrigation ditch) in New Mexico, writes of two neighbors who "have never been on good terms…the lower neighbor commonly accusing the upper of never letting any water pass downstream to his place and then of dumping trash into it whenever he rarely does." Such rivalries over water have been the source of disputes since the Neolithic revolution, when humans settled down to cultivate food between 8000 and 6000 BC. Our language reflects these ancient roots: "rivalry" comes from the Latin *rivalis*, or "one using the same river as another." Riparians—countries or provinces bordering the same river—are often rivals for the water they share. Today the downstream neighbor's complaint about the upstream riparian is echoed by Syria about Turkey, Pakistan about India, and Egypt about Ethiopia.[1]

Regardless of the geographic scale or the riparians' relative level of economic development, the conflicts they face are remarkably similar. Sandra Postel, director of the Global Water Policy Project, describes the problem in *Pillars of Sand*: Water, unlike other scarce, consumable resources, is used to fuel *all* facets of society, from biology and economy to aesthetics and spiritual practice. Water is an integral part of ecosystems, interwoven with the soil, air, flora, and fauna. Since water flows, use of a river or aquifer in one place will affect (and be affected by) its use in another, possibly distant, place. Within watersheds, everything is connected: surface water and groundwater, quality and quantity. Water fluctuates wildly in space and time, further complicating its management, which is usually fragmented and subject to vague,

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arcane, or contradictory legal principles.[2]

Water cannot be managed for a single purpose: all water management serves multiple objectives and navigates among competing interests. Within a nation, these interests—domestic users, farmers, hydropower generators, recreational users, ecosystems—are often at odds, and the probability of a mutually acceptable solution falls exponentially in proportion to the number of stakeholders. Add international boundaries, and the chances drop yet again. Without a mutual solution, these parties can find themselves in dispute, and even violent conflict, with each other or with state authorities. Still, water-related disputes must be considered in the broader political, ethnic, and religious context. Water is never the single—and hardly ever the major—cause of conflict. But it can exacerbate existing tensions and therefore must be considered within the larger context of conflict and peace.

From the Middle East to New Mexico, the problems remain the same. So, however, do many of the solutions. Human ingenuity has developed ways to address water shortages and cooperate in managing water resources. In fact, cooperative events between riparian states outnumbered conflicts by more than two to one between 1945 and 1999. In addition, water has also been a productive pathway for building confidence, developing cooperation, and preventing conflict, even in particularly contentious basins. In some cases, water provides one of the few paths for dialogue in otherwise heated bilateral conflicts. In politically unsettled regions, water is an essential part of regional development negotiations, which serve as de facto conflict-prevention strategies.[3]

Key Issues

While the underlying reasons for water-related controversy can be numerous, such as power struggles and competing development interests, all water disputes can be attributed to one or more of three issues: quantity, quality, and timing. (See Table 5–1.)[4]

Competing claims for a limited quantity of water are the most obvious reason for water-related conflict. The potential for tensions over allocation increases when the resource is scarce. But even when pressure on the resource is limited, its allocation to different uses and users can be highly contested. As people become more aware of environmental issues and the economic value of ecosystems, they also claim water to support the environment and the livelihoods it sustains.

Another contentious issue is water quality. Low quality—whether caused by pollution from wastewater and pesticides or excessive levels of salt, nutrients, or suspended solids—makes water inappropriate for drinking, industry, and sometimes even agriculture. Unclean water can pose serious threats to human and ecosystem health. Water quality degradation can therefore become a source of dispute between those who cause it and those affected by it. Further, water quality issues can lead to public protests if they affect livelihoods and the environment. Water quality is closely linked to quantity: decreasing water quantity concentrates pollution, while excessive water quantity, such as flooding, can lead to contamination from overflowing sewage.

Third, the timing of water flow is important in many ways. Thus the operational patterns of dams are often contested. Upstream users, for example, might release water from reservoirs in the winter for hydropower production, while downstream users might need it for irrigation in the summer. In addition, water flow patterns are crucial to maintaining freshwater ecosystems that depend on seasonal flooding.

Conflicting interests concerning water

Table 5–1. Selected Examples of Water-related Disputes

Location	Main Issue	Observation
Cauvery River	Quantity	The dispute on India's Cauvery River sprung from the allocation of water between the downstream state of Tamil Nadu, which had been using the river's water for irrigation, and upstream Karnataka, which wanted to increase irrigated agriculture. The parties did not accept a tribunal's adjudication of the water dispute, leading to violence and death along the river.
Okavango River	Quantity	In the Okavango River basin, Botswana's claims for water to sustain the delta and its lucrative ecotourism industry contribute to a dispute with upstream Namibia, which wants to pipe water passing through the Caprivi Strip to supply its capital city with drinking water.
Mekong River basin	Quantity	Following construction of Thailand's Pak Mun Dam, more than 25,000 people were affected by drastic reductions in upstream fisheries and other livelihood problems. Affected communities have struggled for reparations since the dam was completed in 1994.
Incomati River	Quality and quantity	Dams in the South African part of the Incomati River basin reduced freshwater flows and increased salt levels in Mozambique's Incomati estuary. This altered the estuary's ecosystem and led to the disappearance of salt-intolerant plants and animals that are important for people's livelihoods.
Rhine River	Quality	Rotterdam's harbor had to be dredged frequently to remove contaminated sludge deposited by the Rhine River. The cost was enormous and consequently led to controversy over compensation and responsibility among Rhine users. While in this case negotiations led to a peaceful solution, in areas that lack the Rhine's dispute resolution framework, siltation problems could lead to upstream/downstream disputes, such as those in Central America's Lempa River basin.
Syr Darya	Timing	Relations between Kazakhstan, Kyrgyzstan, and Uzbekistan—all riparians of the Syr Darya, a major tributary of the disappearing Aral Sea—exemplify the problems caused by water flow timing. Under the Soviet Union's central management, spring and summer irrigation in downstream Uzbekistan and Kazakhstan balanced upstream Kyrgyzstan's use of hydropower to generate heat in the winter. But the parties are barely adhering to recent agreements that exchange upstream flows of alternate heating sources (natural gas, coal, and fuel oil) for downstream irrigation, sporadically breaching the agreements.

SOURCE: See endnote 4.

quality, quantity, and timing can occur on many geographic scales, but the dynamics of conflict play out differently at international, national, and local levels. (See Table 5–2.) Whether the dispute is over quality, quantity, and timing, or at the international, national, or local level, however, the key to understanding—and preventing—water-related conflicts can be found in the institutions established to manage water resources.

International Basins

International basins that include political boundaries of two or more countries cover 45.3 percent of Earth's land surface, host

Table 5–2. Conflict Dynamics on Different Spatial Levels

Geographic Scale	Characteristics
International	Disputes can arise between riparian countries on transboundary waters
	Very little violence, but existing tensions between parties are pervasive and difficult to overcome, resulting in degraded political relations, inefficient water management, and ecosystem neglect
	Long, rich record of conflict resolution and development of resilient institutions
National	Disputes can arise between subnational political units, including provinces, ethnic or religious groups, or economic sectors
	Higher potential for violence than at international level
	Rationale for international involvement is more difficult, given national sovereignty concerns
Local (indirect)	Loss of water-based livelihoods (due to loss of irrigation water or freshwater ecosystems) can lead to politically destabilizing migrations to cities or neighboring countries
	Local instability can destabilize regions
	Poverty alleviation is implicitly tied to ameliorating security concerns

about 40 percent of the world's population, and account for approximately 60 percent of global river flow. And the number is growing: in 1978 the United Nations listed 214 international basins (in the last official count). Today there are 263, largely due to the "internationalization" of basins through political changes like the breakup of the Soviet Union and the Balkan states, as well as access to improved mapping technology.[5]

Strikingly, territory in 145 nations falls within international basins, and 33 countries are located almost entirely within these basins. The high level of interdependence is illustrated by the number of countries sharing each international basin (see Table 5–3); the dilemmas posed by basins like the Danube (shared by 17 countries) or the Nile (10 countries) can be easily imagined.[6]

The high number of shared rivers, combined with increasing water scarcity for growing populations, leads many politicians and headlines to trumpet coming "water wars." In 1995, for example, World Bank vice president Ismail Serageldin claimed that "the wars of the next century will be about water." Invariably, these warnings point to the arid and hostile Middle East, where armies have mobilized and fired shots over this scarce and precious resource. Elaborate—if misnamed—"hydraulic imperative" theories cite water as the prime motivation for military strategies and territorial conquests, particularly in the ongoing conflicts between Arabs and Israelis.[7]

The only problem with this scenario is a lack of evidence. In 1951–53 and again in 1964–66, Israel and Syria exchanged fire over the latter's project to divert the Jordan River, but the final exchange—featuring assaults by both tanks and aircraft—stopped construction and effectively ended water-related hostilities between the two states. Nevertheless, the 1967 war broke out almost a year later. Water had little—if any—impact on the military's strategic thinking in subsequent Israeli-Arab violence (including the 1967, 1973, and 1982 wars). Yet water was an underlying source of political stress and one of the most difficult topics in subsequent negotiations.

Table 5–3. Number of Countries Sharing a Basin

Number of Countries	International Basins
3	Asi (Orontes), Awash, Cavally, Cestos, Chiloango, Dnieper, Dniester, Drin, Ebro, Essequibo, Gambia, Garonne, Gash, Geba, Har Us Nur, Hari (Harirud), Helmand, Hondo, Ili (Kunes He), Incomati, Irrawaddy, Juba-Shibeli, Kemi, Lake Prespa, Lake Titicaca-Poopo System, Lempa, Maputo, Maritsa, Maroni, Moa, Neretva, Ntem, Ob, Oueme, Pasvik, Red (Song Hong), Rhone, Ruvuma, Salween, Schelde, Seine, St. John, Sulak, Torne (Tornealven), Tumen, Umbeluzi, Vardar, Volga, and Zapaleri
4	Amur, Daugava, Elbe, Indus, Komoe, Lake Turkana, Limpopo, Lotagipi Swamp, Narva, Oder (Odra), Ogooue, Okavango, Orange, Po, Pu-Lun-T'o, Senegal, and Struma
5	La Plata, Neman, and Vistula (Wista)
6	Aral Sea, Ganges-Brahmaputra-Meghna, Jordan, Kura-Araks, Mekong, Tarim, Tigris and Euphrates (Shatt al Arab), and Volta
8	Amazon and Lake Chad
9	Rhine and Zambezi
10	Nile
11	Congo and Niger
17	Danube

SOURCE: See endnote 6.

In other words, even though the wars were not fought over water, allocation disagreements were an impediment to peace.[8]

While water supplies and infrastructure have often served as military tools or targets, no states have gone to war specifically over water resources since the city-states of Lagash and Umma fought each other in the Tigris-Euphrates basin in 2500 BC. Instead, according to the U.N. Food and Agriculture Organization, more than 3,600 water treaties were signed from AD 805 to 1984. While most were related to navigation, over time a growing number addressed water management, including flood control, hydropower projects, or allocations in international basins. Since 1820, more than 400 water treaties and other water-related agreements have been signed, with more than half of these concluded in the past 50 years.[9]

Researchers at Oregon State University have compiled a dataset of every reported interaction—conflictive or cooperative—between two or more nations that was driven by water. Their analysis highlighted four key findings.[10]

First, despite the potential for dispute in international basins, the incidence of acute conflict over international water resources is overwhelmed by the rate of cooperation. The last 50 years have seen only 37 acute disputes (those involving violence), and 30 of those occurred between Israel and one of its neighbors. Non-Mideast cases account for only 5 acute events, while during the same period 157 treaties were negotiated and signed. The total number of water-related events between nations is also weighted toward cooperation: 507 conflict-related events versus 1,228 cooperative, implying

that violence over water is neither strategically rational, hydrographically effective, nor economically viable.[11]

Second, despite the fiery rhetoric of politicians—aimed more often at their own constituencies than at the enemy—most actions taken over water are mild. Of all the events, some 43 percent fall between mild verbal support and mild verbal hostility. If the next levels—official verbal support and official verbal hostility—are added in, verbal events account for 62 percent of the total. Thus almost two thirds of all events are only verbal and more than two thirds of these had no official sanction.[12]

Third, there are more examples of cooperation than of conflict. The distribution of cooperative events covers a broad spectrum, including water quantity, quality, economic development, hydropower, and joint management. In contrast, almost 90 percent of the conflict-laden events relate to quantity and infrastructure. Furthermore, almost all extensive military acts (the most extreme cases of conflict) fall within these two categories.[13]

Fourth, despite the lack of violence, water acts as both an irritant and a unifier. As an irritant, water can make good relations bad and bad relations worse. Despite the complexity, however, international waters can act as a unifier in basins with relatively strong institutions.

This historical record proves that international water disputes do get resolved, even among enemies, and even as conflicts erupt over other issues. Some of the world's most vociferous enemies have negotiated water agreements or are in the process of doing so, and the institutions they have created often prove to be resilient, even when relations are strained.

The Mekong Committee, for example, established by the governments of Cambodia, Laos, Thailand, and Viet Nam as an intergovernmental agency in 1957, exchanged data and information on water resources development throughout the Viet Nam War. Israel and Jordan have held secret "picnic table" talks on managing the Jordan River since the unsuccessful Johnston negotiations of 1953–55, even though they were at war from Israel's independence in 1948 until the 1994 treaty. (See Box 5–1.) The Indus River Commission survived two major wars between India and Pakistan. And all 10 Nile Basin riparian countries are currently involved in senior government–level negotiations to develop the basin cooperatively, despite fiery "water wars" rhetoric between upstream and downstream states.[14]

The historical record proves that international water disputes do get resolved, even among enemies, and even as conflicts erupt over other issues.

In southern Africa, a number of river basin agreements were signed when the region was embroiled in a series of local wars in the 1970s and 1980s (including the "people's war" in South Africa and civil wars in Mozambique and Angola). Although negotiations were complex, the agreements were rare moments of peaceful cooperation among many of the countries. Now that most of the wars and the apartheid era have ended, water is one of the foundations for cooperation in the region. In fact, the 1995 Protocol on Shared Watercourse Systems was the first protocol signed within the Southern African Development Community. Riparians will go through tough, protracted negotiations in order to gain benefits from joint water resources development. Some researchers have therefore identified cooperation over water resources as a particularly fruitful entry

Box 5–1. Water Sharing Between Israel, Jordan, and the Palestinians

The most severe water scarcity in the world is in the Middle East. The deficit is particularly alarming in the Jordan River basin and the adjacent West Bank aquifers, where Israeli, Palestinian, and Jordanian water claims intersect. In Gaza and the West Bank, the annual availability of water is well below 100 cubic meters of renewable water per person, while Israel has less than 300 and Jordan around 100 cubic meters. A country is generally characterized as water-scarce if the availability falls below 1,000 cubic meters.

Population growth, a result both of high birth rates among Palestinians and Jordanians and of immigration to Israel, puts increasingly severe pressure on the already scarce water resources and raises the risk of water-related conflicts. Israeli settlers in the West Bank and Gaza receive a larger share of the available water than the Palestinians, further complicating the situation.

Despite fears of water-related violence, Israel has maintained basic cooperation with Jordan and the Palestinians over their shared waters. This was true even after the second *intifada* began in September 2000. Low-level water cooperation between Israel and Jordan—under U.N. auspices—extends back to the early 1950s, even though both countries were formally at war. This interaction helped build trust and a shared set of rules and norms, which were later formalized within the peace agreement between Israel and Jordan in 1994. As stipulated in that agreement, a Joint Water Committee for coordination and problem solving was established that helped resolve disagreements over allocations.

A 1995 interim agreement regulates Israeli-Palestinian water issues such as protection of water and sewage systems. The Joint Water Committee and its subcommittees have continued to meet despite the violence of the last years. For the Palestinians, the existing agreement is unsatisfactory from both a rights and an availability perspective. Talks aimed at a final agreement are part of the overall negotiating process and, given the political stalemate and ongoing violence, are not likely to be completed any time soon. Nevertheless, there is agreement between Israel and the Palestinians that cooperation over their shared water is indispensable.

Two main policy recommendations can be drawn from this case. First, water cooperation is intimately linked to politics—a highly complex process influenced by both domestic and international considerations. If donors fail to thoroughly analyze the political context, they are unlikely to understand how water is sometimes subordinate to more important political priorities and used as a political tool.

Second, donor agencies and international organizations can play an important role if they are prepared to provide long-term support for establishing cooperation over shared water. Donors typically want to see tangible results within a short time frame. Yet it is essential to understand that risks are involved, occasional setbacks will occur, and rewards are unlikely to materialize quickly. Donors will need to engage in "process financing" that supports not an ordinary development project with a cycle of 2–4 years but rather a process that can span 10–25 years. In the Israeli–Jordanian case, the U.N. Truce Supervision Organization, which worked as an "umbrella" for discussions on water coordination in spite of the absence of a peace agreement, played a critical role.

Although more conflicts of interest are likely to arise in the future over the waters in the Jordan River basin, water management—properly supported—offers a window of opportunity for broader cooperation in this troubled part of the world.

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SOURCE: See endnote 14. The views expressed are those of the author and not the Swedish Ministry for Foreign Affairs.

point for building peace. (See Chapter 8.)[15]

So, if shared water does not lead to violence between nations, what is the problem? In fact, complicating factors, such as the time lag between the start of water disputes and final agreements, can cause water issues to exacerbate tensions. Riparians often develop projects unilaterally within their own territories in an attempt to avoid the political intricacies posed by sharing resources. At some point, one of the riparians (usually the most powerful one) will begin a project that affects at least one of its neighbors.

Without relations or institutions conducive to conflict resolution, unilateral action can heighten tensions and regional instability, requiring years or decades to resolve: the Indus treaty took 10 years of negotiations; the Ganges, 30; and the Jordan, 40. Water was the last—and most contentious—issue negotiated in a 1994 peace treaty between Israel and Jordan, and was relegated to "final status" negotiations between Israel and the Palestinians, along with difficult issues like refugees and the status of Jerusalem. During this long process, water quality and quantity can degrade until the health of dependent populations and ecosystems is damaged or destroyed. The problem worsens as the dispute intensifies; the ecosystems of the lower Nile, the lower Jordan, and the tributaries of the Aral Sea have effectively been written off by some as unfortunate products of human intractability.[16]

When unilateral development initiatives produce international tensions, it becomes more difficult to support cooperative behavior. As mistrust between riparians grows, threats and disputes rage across boundaries, as seen in India and Pakistan or Canada and the United States. Mistrust and tensions (even if they do not lead to open conflict) can hamper regional development by impeding joint projects and mutually beneficial infrastructure. One of the most important sources of water for both Israelis and Palestinians, the Mountain Aquifer, is threatened by pollution from untreated sewage. The existing conflict has impeded donor initiatives to build wastewater treatment plants in Palestine, setting the stage for a vicious circle as groundwater pollution increases regional water scarcity and, in turn, exacerbates the Israeli-Palestinian conflict.[17]

Disputes within Nations

The literature on transboundary waters often treats political entities as homogeneous monoliths: "Canada feels…" or "Jordan wants…." Recently, analysts have identified the pitfalls of this approach, showing how subsets of national actors have different values and priorities for water management. In fact, the history of water-related violence includes incidents between tribes, water use sectors, rural and urban populations, and states or provinces. Some research even suggests that as the geographic scale drops, the likelihood and intensity of violence increases. Throughout the world, local water issues revolve around core values that often date back generations. Irrigators, indigenous populations, and environmentalists, for example, all may view water as tied to their way of life, which is increasingly threatened by new demands for cities and hydropower.[18]

Unilateral action can heighten tensions and regional instability, requiring years or decades to resolve.

Internal water conflicts have led to fighting between downstream and upstream users along the Cauvery River in India and between Native Americans and European settlers. In 1934, the landlocked state of

Arizona commissioned a navy (it consisted of one ferryboat) and sent its state militia to stop a dam and diversion project on the Colorado River. Water-related disputes can also engender civil disobedience, acts of sabotage, and violent protest. In the Chinese province of Shandong, thousands of farmers clashed with police in July 2000 because the government planned to divert agricultural irrigation water to cities and industries. Several people died in the riots. And from 1907 to 1913 in California's Owens Valley, farmers repeatedly bombed a pipeline diverting water to Los Angeles.[19]

National instability can also be provoked by poor or inequitable water services management. Disputes arise over system connections for suburban or rural areas, service liability, and especially prices. In most countries, the state is responsible for providing drinking water; even if concessions are transferred to private companies, the state usually remains responsible for service. Disputes over water supply management therefore usually arise between communities and state authorities. (See Box 5–2.) Protests are particularly likely when the public suspects that water services are managed in a corrupt manner or that public resources are diverted for private gain.[20]

Local Impacts

As water quality degrades or quantity diminishes, it can affect people's health and destroy livelihoods that depend on water. Agriculture uses two thirds of the world's water and is the greatest source of livelihoods, especially in developing countries, where a large portion of the population depends on subsistence farming. Sandra Postel's list of countries that rely heavily on declining water supplies for irrigation includes eight that currently concern the security community: Bangladesh, China, Egypt, India, Iran, Iraq, Pakistan, and Uzbekistan. When access to irrigation water is cut off, groups of unemployed, disgruntled men may be forced out of the countryside and into the city—an established contributor to political instability. Migration can cause tensions between communities, especially when it increases pressure on already scarce resources, and cross-boundary migration can contribute to interstate tensions. (See Chapter 2.)[21]

Thus, water problems can contribute to local instability, which in turn can destabilize a nation or an entire region. In this indirect way, water contributes to international and national disputes, even though the parties are not fighting explicitly about water. During the 30 years that Israel occupied the Gaza Strip, for example, water quality deteriorated steadily, saltwater intruded into local wells, and water-related diseases took a toll on the residents. In 1987, the second *intifada* began in the Gaza Strip, and the uprising quickly spread throughout the West Bank. While it would be simplistic to claim that deteriorating water quality caused the violence, it undoubtedly exacerbated an already tenuous situation by damaging health and livelihoods.[22]

An examination of relations between India and Bangladesh demonstrates that local instabilities can spring from international water disputes and exacerbate international tensions. In the 1960s, India built a dam at Farakka, diverting a portion of the Ganges from Bangladesh to flush silt from Calcutta's seaport, some 100 miles to the south. In Bangladesh, the reduced flow depleted surface water and groundwater, impeded navigation, increased salinity, degraded fisheries, and endangered water supplies and public health, leading some Bangladeshis to migrate—many, ironically, to India.[23]

So, while no "water wars" have occurred, the lack of clean fresh water or the competi-

Box 5–2. Conflict over Water Services Management: The Case of Cochabamba

Issues of water supply management can lead to violent conflict, as demonstrated by the confrontations that erupted in 2000 in Cochabamba, Bolivia's third largest city, following the privatization of the city's water utility. Cochabamba had long suffered from water scarcity and insufficient, irregular provision of water services. Hoping for improved services and higher connection rates, in September 1999 the Bolivian government signed a 40-year concession contract with the international private water consortium Aguas del Tunari (AdT).

By January 2000, drinking water tariffs increased sharply; some households had to pay a significant share of their monthly income for water services. Consumers felt they were simply paying more for the same poor services and responded with strikes, roadblocks, and other forms of civil protest that shut the city down for four days in February 2000.

While increased water bills triggered the protests, some people also opposed a law threatening public control of rural water systems. Long-standing water scarcity had encouraged the development of well-established alternative sources of supply. In rural municipalities surrounding Cochabamba, farmer cooperatives drilled their own wells and used an informal market for water based on an ancient system of property rights. Under the concession contract, AdT was granted the exclusive use of water resources in Cochabamba, as well as any future sources needed to supply city consumers. It was also granted the exclusive right to provide water services and to require potential consumers to connect to its system. The rural population feared they would lose their traditional water rights and AdT would charge them for water from their own wells.

Farmers from surrounding municipalities joined the protest in Cochabamba, which spread to other parts of Bolivia. Months of civil unrest came to a head in April 2000, when the government declared a state of siege for the whole country and sent soldiers into Cochabamba. Several days of violence left more than a hundred people injured and one person dead. The protests eased only after the government agreed to revoke AdT's concession and return the utility's management to the municipality.

Performance continues to be unsatisfactory, however. Many neighborhoods have only occasional service, and the valley's groundwater table continues to sink. Although many view the concession's cancellation as a victory for the people, it did not solve their water problems. Meanwhile, AdT filed a complaint against the Bolivian government in the World Bank's trade court, the International Centre for Settlement of Investment Disputes, in Washington, D.C. According to the *San Francisco Chronicle*, the consortium is demanding $25 million in compensation for the canceled contract. The case is still pending.

SOURCE: See endnote 20.

tion over access to water resources has occasionally led to intense political instability that resulted in acute violence, albeit on a small scale. Insufficient access to water is a major cause of lost livelihoods and thus fuels livelihood-related conflicts. Environmental protection, peace, and stability are unlikely to be realized in a world in which so many suffer from poverty.[24]

Institutional Capacity: The Heart of Water Conflict and Cooperation

Many analysts who write about water politics, especially those who explicitly address the issue of water conflicts, assume that scarcity of such a critical resource drives people to

conflict. It seems intuitive: the less water there is, the more dearly it is held and the more likely it is that people will fight over it. Recent research on indicators for transboundary water conflict, however, did not find any statistically significant physical parameters—arid climates were no more conflict-prone than humid ones, and international cooperation actually increased during droughts. In fact, no single variable proved causal: democracies were as susceptible to conflict as autocracies, rich countries as poor ones, densely populated countries as sparsely populated ones, and large countries as small ones.[25]

When Oregon State University researchers looked closely at water management practices in arid countries, they found institutional capacity was the key to success. Naturally arid countries cooperate on water: to live in a water-scarce environment, people develop institutional strategies—formal treaties, informal working groups, or generally warm relations—for adapting to it. The researchers also found that the likelihood of conflict increases significantly if two factors come into play. First, conflict is more likely if the basin's physical or political setting undergoes a large or rapid change, such as the construction of a dam, an irrigation scheme, or territorial realignment. Second, conflict is more likely if existing institutions are unable to absorb and effectively manage that change.[26]

Water resource management institutions have to be strong to balance competing interests and to manage water scarcity (which is often the result of previous mismanagement), and they can even become a matter of dispute themselves. In international river basins, water management institutions typically fail to manage conflicts when there is no treaty spelling out each nation's rights and responsibilities nor any implicit agreements or cooperative arrangements.[27]

Similarly, at the national and local level it is not the lack of water that leads to conflict but the way it is governed and managed. Many countries need stronger policies to regulate water use and enable equitable and sustainable management. Especially in developing countries, water management institutions often lack the human, technical, and financial resources to develop comprehensive management plans and ensure their implementation.

Moreover, in many countries decision-making authority is spread among different institutions responsible for agriculture, fisheries, water supply, regional development, tourism, transport, or conservation and environment, so that different management approaches serve contradictory objectives. Formal and customary management practices can also be contradictory, as demonstrated in Cochabamba, where formal provisions of the 1999 Bolivian Water Services Law conflicted with customary groundwater use by farmers' associations.[28]

In countries without a formal system of water use permits or adequate enforcement and monitoring, more powerful water users can override the customary rights of local communities. If institutions allocate water inequitably between social groups, the risk of public protest and conflict increases. In South Africa, the apartheid regime allocated water to favor the white minority. This "ecological marginalization" heightened the black population's grievances and contributed to social instability, which ultimately led to the end of the regime.[29]

Institutions can also distribute costs and benefits unequally: revenues from major water infrastructure projects, such as large dams or irrigation schemes, usually benefit only a small elite, leaving local communities to cope with the resulting environmental

and social impacts, often with little compensation. (See Box 5–3.)[30]

The various parties to water conflicts often have differing perceptions of legal rights, the technical nature of the problem, the cost of solving it, and the allocation of costs among stakeholders. Reliable sources of information acceptable to all stakeholders are therefore essential for any joint efforts. This not only enables water-sharing parties to make decisions based on a shared understanding, it also helps build trust.[31]

A reliable database, including meteorological, hydrological, and socioeconomic data, is a fundamental tool for deliberate and farsighted water management. Hydrological and meteorological data collected upstream are crucial for decisionmaking downstream. And in emergencies such as floods, this information is required to protect human and environmental health. Tensions between different water users can emerge when information is not exchanged. Disparities in stakeholders' capacity to generate, interpret, and legitimize data can lead to mistrust of those with better information and support systems. In the Incomati and Maputo River basins, the South African monopoly over data generation created such discomfort in downstream Mozambique that the basins' Piggs Peak Agreement broke down, and Mozambique used this negotiation impasse to start developing its own data.[32]

Moving Toward Cooperative Water Management

Although there are many links between water and conflict, and competing interests are inherent to water management, most disputes are resolved peacefully and cooperatively, even if the negotiation process is lengthy. Cooperative water management mechanisms—probably the most advanced approach—can anticipate conflict and solve smoldering disputes, provided that all stakeholders are included in the decisionmaking process and given the means (information, trained staff, and financial support) to act as equal partners. Cooperative management mechanisms can reduce conflict potential by:

- providing a forum for joint negotiations, thus ensuring that all existing and potentially conflicting interests are taken into account during decisionmaking;
- considering different perspectives and interests to reveal new management options and offer win-win solutions;
- building trust and confidence through collaboration and joint fact-finding; and
- making decisions that are much more likely to be accepted by all stakeholders, even if consensus cannot be reached.[33]

In international river basins, water management institutions typically fail to manage conflicts when there is no treaty spelling out each nation's rights and responsibilities nor any implicit agreements.

On the local level, traditional community-based mechanisms are already well suited to specific local conditions and are thus more easily adopted by the community. Examples include the *chaffa* committee, a traditional water management institution of the Boran people in the Horn of Africa, or the Arvari Parliament, an informal decisionmaking and conflict-resolution body based on traditional customs of the small Arvari River in Rajasthan, India. On the international level, river basin commissions with representatives from all riparian states have been successfully involved in joint riparian water resources management. Especially in transboundary basins, achieving

Box 5–3. Harnessing Wild Rivers: Who Pays the Price?

Since World War II, some 45,000 large dams have been built, generating an estimated 20 percent of the world's electricity and providing irrigation to fields that produce some 10 percent of the world's food. Yet for the 40–80 million people whose lives and livelihoods were rooted in the banks and valleys of wild rivers, dam development has profoundly altered the health, economy, and culture of communities and entire nations.

Because dams are generally situated near the ancient homes of indigenous nations, it is ultimately rural and ethnic minorities far from the central corridors of power who are typically forced to pay the price. Ill-considered development plans, forced evictions, and resettlement with inadequate compensation generate conditions and conflicts that threaten the security of individual and group rights to culture, self-determination, livelihood, and life itself.

These dynamics are illustrated in the case of the Chixoy Dam in Guatemala, which provides 80 percent of that nation's electricity. It was planned and developed by INDE (the National Institute for Electrification) and largely financed with loans from the Inter-American Development Bank and the World Bank. Designs were approved and construction was begun without notifying the local population, conducting a comprehensive survey of affected villages, or addressing compensation and resettlement for the 3,400 mostly Mayan residents. The military dictatorship of Lucas Garcia declared the Chixoy Dam site and surrounding region a militarized zone in 1978.

Some villagers accepted resettlement offers but found poorer quality housing, smaller acreage, and infertile land. Others refused to move and instead attempted to negotiate more equitable terms. Tensions escalated as the government declared remaining villagers subversive, seized community records of resettlement promises and land documents, and killed community leaders. Following a second military coup in March 1982, General Rios Montt initiated a "scorched earth" policy against Guatemala's Mayan population. As construction on the dam was completed and floodwaters began to rise, villages were emptied at gunpoint and homes and fields burned. Massacres ensued, including in villages that provided refuge to survivors. In the village of Rio Negro, for instance, 487 people—half the population—had been murdered by September 1982.

Following the 1994 Oslo Peace Accords ending Guatemala's civil war, a series of investigations broke the silence over the massacres. In 1999 a United Nations–sponsored commission concluded that more than 200,000 Mayan civilians had been killed, that acts of genocide were committed against specific Mayan communities, and that the government of Guatemala was responsible for 93 percent of the human rights violations and acts of violence against civilians.

Today, the issue is far from settled. The failure to provide farm and household land of equivalent size and quality for those resettled has produced severe poverty, widespread hunger, and high malnutrition rates. Communities that were excluded from the resettlement program also struggle with an array of problems. Dam releases occur with no warning, and the ensuing flashfloods destroy crops, drown livestock, and sometimes kill people. Most inhabitants of former fishing villages, their livelihoods destroyed, have turned to migrant labor. Upstream communities saw part of their agricultural land flooded, and access to land, roads, and regional markets was cut off. No mechanism exists for affected people to complain or negotiate assistance.

Chixoy Dam–affected communities have met to discuss common problems and strategies, testified before truth commissions, and, with help from national and international advocates, are working to document the dam's impact. In September 2004, some 500 Mayan farmers seized the dam, threatening to cut

Box 5–3. (continued)

power supplies unless they were compensated for land and lives lost.

In a growing number of instances, the efforts by dam-affected peoples to document experiences and protest injury, damage, and loss have succeeded in producing some measure of remedy. In Thailand, where the Pak Mun Dam destroyed fisheries and the livelihood of tens of thousands, a decade of protests prompted the government to decommission the dam temporarily. Affected villagers conducted research on the impact of the dam on their lives and the Mun River ecosystem, documenting the return of 156 fish species to the river after floodgates were opened and the subsequent revitalization of the fishing economy and village life. These assessments played a key role in the decision to operate the dam on a seasonal basis.

At a second dam on the Mun River, the Rasi Salai, displaced people established a protest village in 1999, refusing to leave while the reservoir waters submerged their encampment. Their nonviolent protest and their willingness to face imminent drowning struck a chord in the nation. In July 2000, the Rasi Salai floodgates were opened to allow environmental recovery and impact assessments, and they remain open to this day.

In documenting the many failures to address rights and resources properly, dam-affected communities have taken the lead in challenging the assumptions that drive development decisionmaking and in demanding institutional accountability. Their demands for "reparations" are much more than cries for compensation. They are demands for meaningful remedy, which means that free, prior, and informed consent of residents is obtained before financing is approved and dam construction initiated, that scientific assessments and plans are developed with the equitable participation of members of the affected community, that governments and financiers respect the rights of indigenous peoples to self-determination—including the right to say no, and that new projects are not funded until any remaining problems from past projects are addressed.

—Barbara Rose Johnston, Center for Political Ecology, Santa Cruz, California

SOURCE: See endnote 30.

cooperation has been a drawn-out and costly process. Recognizing this, the World Bank agreed to facilitate the Nile Basin Initiative negotiation process for 20 years.[34]

Capacity building—to generate and analyze data, develop sustainable water management plans, use conflict resolution techniques, or encourage stakeholder participation—should target water management institutions, local nongovernmental organizations, water users' associations, or religious groups. On the international level, strengthening less powerful riparians' negotiating skills can help prevent conflict. On the local level, strengthening the capacity of excluded, marginalized, or weaker groups to articulate and negotiate their interests helps involve them in cooperative water management. The Every River Has Its People Project in the Okavango River basin, for instance, aims to increase participation by communities and other local stakeholders in decisionmaking and basin management through educational and training activities.[35]

Preventing severe conflicts requires informing or explicitly consulting all stakeholders, such as downstream states or societies, before making management decisions. The process of identifying all relevant stakeholders and their positions is crucial to estimating, and consequently managing, the risks of conflict. Without extensive and regular public partic-

ipation, the general public might reject infrastructure project proposals. For example, the decision to build the Hainburg Dam on the Danube River was announced in 1983 after only limited public participation. Environmental groups and other civil society organizations, supported by the general public, occupied the project site and managed to stop the dam's construction. Subsequently, the site became a national park.[36]

The crux of water disputes is still about little more than opening a diversion gate or garbage floating downstream.

Cooperative water management is a challenging issue that requires time and commitment. Extensive stakeholder participation might not always be feasible; in some cases, it may not even be advisable. On any scale of water management, if the level of dispute is too high and the disparities are too great, conflicting parties are not likely to reach consensus and might even refuse to participate in cooperative management activities. In such cases, confidence and consensus-building measures, such as joint training or joint fact-finding, will support cooperative decisionmaking.

Conflict transformation measures involving a neutral third party, such as mediation, facilitation, or arbitration, are helpful in cases with open disputes over water resources management. Related parties, such as elders, women, or water experts, have successfully initiated cooperation when the conflicting groups could not meet. The women-led Wajir Peace Initiative, for example, helped reduce violent conflict between pastoralists in Kenya, where access to water was one issue in the conflict. In certain highly contentious cases, such as the Nile Basin, an "elite model" that seeks consensus between high-level representatives before encouraging broader participation has enjoyed some success in developing a shared vision for basin management. Effectively integrating public participation is now the key challenge for long-term implementation of elite-negotiated efforts.[37]

Water management is, by definition, conflict management. For all the twenty-first century wizardry—dynamic modeling, remote sensing, geographic information systems, desalination, biotechnology, or demand management—and the new-found concern with globalization and privatization, the crux of water disputes is still about little more than opening a diversion gate or garbage floating downstream. Yet anyone attempting to manage water-related conflicts must keep in mind that rather than being simply another environmental input, water is regularly treated as a security issue, a gift of nature, or a focal point for local society. Disputes, therefore, are more than "simply" fights over a quantity of a resource; they are arguments over conflicting attitudes, meanings, and contexts.

Obviously, there are no guarantees that the future will look like the past; the worlds of water and conflict are undergoing slow but steady changes. An unprecedented number of people lack access to a safe, stable supply of water. As exploitation of the world's water supplies increases, quality is becoming a more serious problem than quantity, and water use is shifting to less traditional sources like deep fossil aquifers, wastewater reclamation, and interbasin transfers. Conflict, too, is becoming less traditional, driven increasingly by internal or local pressures or, more subtly, by poverty and instability. These changes suggest that tomorrow's water disputes may look very different from today's.

On the other hand, water is a productive pathway for confidence building, cooperation, and arguably conflict prevention, even in particularly contentious basins. In some

cases, water offers one of the few paths for dialogue to navigate an otherwise heated bilateral conflict. In politically unsettled regions, water is often essential to regional development negotiations that serve as de facto conflict-prevention strategies. Environmental cooperation—especially cooperation in water resources management—has been identified as a potential catalyst for peacemaking. (See Chapter 8.)[38]

So far, attempts to translate the findings from the environment and conflict debate into a positive, practical policy framework for environmental cooperation and sustainable peace show some signs of promise but have not been widely discussed or practiced. More research could elucidate how water—being international, indispensible, and emotional—can serve as a cornerstone for confidence building and a potential entry point for peace. Once the conditions determining whether water contributes to conflict or to cooperation are better understood, mutually beneficial integration and cooperation around water resources could be used more effectively to head off conflict and to support sustainable peace among states and groups within societies.

Resource Wealth and Conflict

Abundant natural resources—such as oil, minerals, metals, diamonds, timber, and agricultural commodities, including drug crops—have fueled a large number of violent conflicts. Resource exploitation played a role in about a quarter of the roughly 50 wars and armed conflicts of recent years. More than 5 million people were killed in resource-related conflicts during the 1990s. Close to 6 million fled to neighboring countries, and anywhere from 11–15 million people were displaced inside their own countries.[1]

The money derived from the often illicit resource exploitation in war zones has secured an ample supply of arms for various armed factions and enriched a handful of people—warlords, corrupt government officials, and unscrupulous corporate leaders. But for the vast majority of the local people, these conflicts have brought a torrent of human rights violations, humanitarian disasters, and environmental destruction, helping to push these countries to the bottom of most measures of human development.[2]

In places like Afghanistan, Angola, Cambodia, Colombia, and Sudan, the pillaging of resources allowed violent conflicts to continue that were initially driven by grievances or secessionist and ideological struggles. Revenues from resource exploitation replaced the support extended to governments and rebel groups by superpower patrons that largely evaporated with the cold war's end. Elsewhere, such as in Sierra Leone or the Democratic Republic of the Congo, predatory groups initiated violence not necessarily to gain control of government, but as a way to seize control of a coveted resource.[3]

Commercial resource extraction can also be a source of conflict where governance is undemocratic and corrupt. The economic benefits accrue only to a small domestic elite and to multinational companies, while the local population shoulders an array of social, health, and environmental burdens. All over the world, indigenous communities confront oil, mining, and logging firms. Violent conflict has occurred in places like Nigeria (more than 1,000 people were killed there in 2004), Colombia, Papua New Guinea's Bougainville island, and Indonesia's Aceh province.[4]

Finally, tensions and disputes arise as major consumers of natural resources jockey for access and control. The history of oil, in particular, is one of military interventions and other forms of foreign meddling, of which the Iraq invasion is but the latest chapter. As demand for oil becomes more intense, a new set of big-power rivalries is now emerging.[5]

The United States, Russia, and China are backing competing pipeline plans for Caspian resources, and China and Japan are pushing mutually exclusive export routes in their struggle for access to Siberian oil. In Africa, France and the United States are maneuvering for influence by deepening military ties with undemocratic regimes in Congo-Brazzaville, Gabon, and Angola. China is seeking a greater role for its oil companies, particularly in Sudan, and working to increase its political clout in Africa and the Middle East. U.S. soldiers patrol the oil-rich, violence-soaked Niger Delta with their Nigerian counterparts and help protect a Colombian export pipeline against rebel attacks.[6]

Resource-rich countries often fail to invest adequately in critical social areas or public infrastructure. But resource royalties help their leaders maintain power even in the absence of popular legitimacy—by funding a system of patronage and by beefing up an internal security apparatus to suppress challenges to their power.[7]

A number of conflicts—in Sierra Leone,

L. Lartigue/USAID

Diamond miners, Sierra Leone

Liberia, and Angola—have finally come to an end, but others burn on. In the Democratic Republic of the Congo, foreign forces that invaded in 1998 have withdrawn, yet fighting among various domestic armed factions continues, and elaborate illegal networks and proxy forces have been set up that continue to exploit natural resources.[8]

The enormous expansion of global trade and financial networks has made access to key markets relatively easy for warring groups. They have little difficulty in establishing international smuggling networks and sidestepping international embargoes, given a degree of complicity among certain companies and often lax customs controls in importing nations.[9]

Over the past five years or so, awareness of the close links between resource extraction, underdevelopment, and armed conflict has grown rapidly. Campaigns by civil society groups and investigative reports by U.N. expert panels have shed light on these connections, making it at least somewhat more difficult for "conflict resources," such as diamonds, to be sold on world markets. To discourage illicit deals, revenue flows associated with resource extraction need to become more transparent, but governments, companies, and financial institutions often still shirk their responsibilities.[10]

Commodity-tracking regimes are equally important. In the diamond industry, national certification schemes and a standardized global certification scheme have been established. But the resulting set of rules still suffers from a lack of independent monitoring and too much reliance on voluntary measures. Efforts are also under way by the European Union to establish a certification system for its tropical timber imports—up to half of which are connected to armed conflict or organized crime.[11]

Natural resources will continue to fuel deadly conflicts as long as consumer societies import materials with little regard for their origin or the conditions under which they were produced. Some civil society groups have sought to increase consumer awareness and to compel companies to do business more ethically through investigative reports and by "naming and shaming" specific corporations. Consumer electronics companies, for instance, were pressured to scrutinize their supplies of coltan, a key ingredient of circuit boards, and to ask processing firms to stop purchasing illegally mined coltan.[12]

Promoting democratization, justice, and greater respect for human rights are key tasks, along with efforts to reduce the impunity with which some governments and rebel groups engage in extreme violence. Another goal is to facilitate the diversification of the economy away from a strong dependence on primary commodities to a broader mix of activities. A more diversified economy, greater investments in human development, and help for local communities to become strong guardians of the natural resource base would lessen the likelihood that commodities become pawns in a struggle among ruthless contenders for wealth and power.

—Michael Renner

The Private Sector

In an address to the United Nations Security Council in April 2004, U.N. Secretary-General Kofi Annan highlighted the important role that private companies can play—good or bad—in the world's most conflict-prone countries: "Their decisions—on investment and employment, on relations with local communities, on protection for local environments, on their own security arrangements—can help a country turn its back on conflict, or exacerbate the tensions that fuelled the conflict in the first place."[1]

In recent years, grassroots campaigners and U.N. panels have documented the alleged complicity of multinational companies in a wide range of conflict situations—from human rights abuses in oil-rich Sudan and Nigeria, to the trafficking of diamonds and timber from the Congo and Sierra Leone, to the misuse of financial services for arms purchases and terrorist acts. In light of these reports, corporations are increasingly aware that in addition to fueling violence, investments in a conflict situation can seriously taint a company's reputation, and may even become a legal liability.[2]

In one prominent case, the Canadian petroleum company Talisman Energy was forced to sell its oil interests in Sudan following accusations that it had contributed to the 20-year-long civil war. Beginning with the completion of an export pipeline in 1999, crude oil produced by the Talisman-led consortium contributed as much as $500 million a year to government revenues. These payments were alleged to have contributed to a doubling of the government's defense budget in the same period and thus to the "scorched earth" campaign to clear people out of the country's oil fields. In at least one reported instance, helicopter gunships and other military aircraft used the consortium's landing strip as a staging point for attacks on civilians.[3]

In March 2003, having been targeted in a class action suit in New York, Talisman sold its share in the oil consortium to the Indian energy firm ONGC Videsh. Yet even as this initiated a boom in Talisman's share value, the company's retreat from Sudan posed a complex dilemma. On the one hand, it demonstrated to the oil industry that questionable investments or activities could affect a company's reputation and lower its stock value (by up to 15 percent in Talisman's case). On the other hand, the withdrawal of top multinational investments from unstable countries could ultimately reduce international scrutiny of these places, lessening pressure on remaining firms to adhere to minimum social and environmental standards.[4]

There are also instances where the private sector has been instrumental in helping bring hostilities to a close. In Sri Lanka, an attack on the international airport in July 2001 marked a turning point in the decades-long conflict between the Sinhalese majority and separatist Tamils. Prominent business leaders from both sides formed Sri Lanka First to build grassroots support against the war. The group helped coordinate a million-person demonstration in September, and during the subsequent election it campaigned on behalf of legislators who favored a negotiated settlement. These actions helped move the Tamil separatists and the government toward a cease-fire in early 2002.[5]

Companies should play a role in reducing conflict rather than contributing to it. To do so, however, they will need to develop guidelines for managing social risks, strengthening transparency and accountability, and forging collaborative relationships—thus enabling managers to navigate difficult

Esso Photo

Building the Chad-Cameroon pipeline

situations more responsibly.

First and foremost, the consequences of business and development projects must be better understood. By analyzing the likely impacts of conflict on company operations, as well as the impacts of corporate activities on local communities and the broader social fabric, companies would have the opportunity to refocus their core business operations, social investment activities, and public policy strategies on the goal of minimizing harm. To spur their adoption, governments could require export credit agencies (ECAs) and other lenders to conflict-prone areas to make such assessments a condition for preferential access to finance. Similarly, the World Bank's private-sector lending arms and the ECAs could establish guidelines for the assessments, similar to those they use for the environment.[6]

Increasing the transparency of corporate actions will also be essential. The nongovernmental Publish What You Pay initiative seeks to ensure transparency of extractive project royalties and other payments to governments. And the U.K. government–led Extractive Industries Transparency Initiative calls on host governments to be more transparent about the use of these revenue streams. Boosting the capacity of civil society in host countries to hold governments accountable for how these funds are spent is the other necessary building block.[7]

Clear and internationally agreed norms of legal accountability for corporate complicity in gross human rights violations, war crimes, and violations of U.N. sanctions are needed. Corporate accountability could be upheld through the International Criminal Court or through domestic civil courts using mechanisms like the Alien Tort Claims Act in the United States. While voluntary codes of conduct that address human rights and corruption—such as the U.N. Global Compact—are valuable starting points, a degree of enforceability based on internationally agreed minimum standards is critical.[8]

Private-sector actors can also form valuable partnerships with governments, development agencies, and civil society organizations in areas of ongoing or potential conflict. These can enhance corporate sensitivity and legitimacy while reducing risk, thus increasing overall investment. Multistakeholder assurance groups set up under the supervision of the World Bank, for example, have strengthened the accountability of governments and project operators for delivery of social programs and mitigation of project impacts in the case of the Chad-Cameroon and Baku-Tblisi-Ceyhan pipelines.[9]

The price of getting private-sector investments wrong has reached unprecedented heights. Corruption, patronage, and war profiteering are destabilizing countries and causing unjustified human suffering. But if ethics, regulation, and incentives support the shift, responsible business can become a leading force for peace.

—Jason Switzer, International Institute for Sustainable Development

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Chapter 5. Managing Water Conflict and Cooperation

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