



Water and Conflict



This briefing paper has been commissioned by the Office of Conflict Management and Mitigation in the Bureau for Democracy, Conflict, and Humanitarian Assistance of the United States Agency for International Development (USAID) as part of a briefing series on natural resources and conflict. It emerged from a collaboration between Adelphi Research (Berlin, Germany), the Center for International Forestry Research (CIFOR) (Bogor, Indonesia), and the Woodrow Wilson International Center for Scholars (Washington, DC, USA). The aim of the briefings is twofold: (1) to raise mission employees' awareness of the links between different natural resources and conflict, and (2) to assist USAID in their program development by integrating conflict prevention and natural resource management. The project has been coordinated by Alexander Carius (Adelphi Research), Geoffrey Dabelko (Woodrow Wilson International Center for Scholars), and Doris Capistrano (CIFOR). The briefing paper has been written by Annika Kramer (Adelphi Research). The URLs provided in this paper were last updated 03/15/2004.

The project coordinators and the author wish to thank Sharon Morris, Scott Bode, and Jaidev Singh at USAID for their guidance in developing this paper and comments on earlier drafts. Our special thanks go to USAID field mission representatives and experts in several other bilateral and multilateral aid agencies who contributed their insights via telephone interviews and email. The project coordinators and the author wish to express their gratitude to Alan Nicol (Overseas Development Institute), Anthony Turton (University of Pretoria), and Aaron T. Wolf (Oregon State University) for reviewing the final draft of the paper and providing valuable comments. They also wish to thank Meaghan Parker (Woodrow Wilson International Center for Scholars) for carefully editing this paper.

Author: Annika Kramer

Editor: Meaghan Parker

Project Coordinators: Alexander Carius, Geoffrey Dabelko, and Doris Capistrano

For references: Kramer, Annika 2004: Water and conflict (Policy briefing for USAID). Berlin, Bogor, Washington, DC: Adelphi Research, Center for International Forestry Research, Woodrow Wilson International Center for Scholars.

Adelphi Research gGmbH

Caspar-Theyß-Straße 14a
D – 14193 Berlin

Phone +49-30-8900068-0

Fax +49-30-8900068-10

E-Mail office@adelphi-research.de

Internet www.adelphi-research.de

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Key Issues and Lessons Learned

1 Introduction

Ismail Serageldin, former vice president of the World Bank, echoed a then commonly-held belief when he warned in 1995 that “the wars of the next century will be about water.” Several characteristics of water could support such a gloomy prediction: first, water is a fundamental resource, indispensable to all forms of life on earth. Reliable freshwater resources are crucial to human and environmental health, as well as economic development: almost every sector of human activity depends on water resources, through agriculture, industrial production, or power generation. Second, there is no direct substitute for water, unlike other resources such as oil. And third, fresh water is becoming scarce. Even though fresh water is renewable to some extent, supplies are not infinite and its availability is diminishing due to population growth, economic development, and increasing pollution. Access to water is therefore a question of “life or death,” which easily becomes an emotionally charged debate (Ashton 2000). The fact that water also plays an important role in many traditional and religious customs deepens its emotional value.

Box 1: Water is unevenly distributed on our blue planet

Only 2.5 percent (35,029,000 km³) of the Earth’s water is fresh water. Only 13,500 km³ can be economically used.

Water resources are unevenly distributed. On a continental scale, for example, Asia supports more than half the world’s population with only 36 percent of the world’s water resources.

(Source: UNESCO-WWAP 2003, Gleick et al. 2002)

Nevertheless, with a single exception in 2500 B.C., a war has never been fought over water, and a broad majority of experts support the view that such wars are not likely. However, competing demands for water resources that cross international boundaries have led to persistent tensions and often hampered economic development (Wolf 1999). (For example, tension among Turkey, Syria, and Iraq has constrained construction of the Southeastern Anatolia Project). Water-related violence exists however, though usually such conflicts occur within states (not between them) or between local groups (Postel and Wolf 2001). By threatening political and social stability,

Box 2: Who uses fresh water?

Agriculture accounts for 70% of all water withdrawals; in low- to middle-income communities, the proportion is 82%.

The average person in the United States uses between 65 to 78 gallons of water (250 to 300 liters) per day for drinking, cooking, bathing, and watering their yard. Many people in the poorest nations survive on far less; for example, the average person in Somalia uses only 2.3 gallons (8.9 liters) of water per day.

(Source: UNESCO-WWAP 2003, Gleick et al. 2002)

incidents of interpersonal violence can become national or international concerns. If access to water is limited, people can lose their livelihoods, which poses another threat to stability, particularly if it affects young men. This briefing paper outlines how conflicting interests in and lack of access to adequate water resources can lead to political tensions and water disputes, which can contribute to instability, and ultimately increase the threat of conflict on both the intra- and interstate levels.

Box 3: Pressure on the world's freshwater resources is increasing

The renewable water supply per person has fallen almost 60 percent since 1950.

The UN estimates that, in the worst case, seven billion people in 60 countries will face a water shortage by 2050.

(Source: UNESCO-WWAP 2003, Postel and Wolf 2001)

As fresh water becomes less available, water-related conflicts are likely to become more frequent and more intense. Reasons for water scarcity can be natural (hydrological or meteorological) but more often result from increased demand or decreased quality. The amount of water used is increasing due to population growth, economic development, and rising water use per capita. Locally, pressure on water resources is heightened by migration and urbanization. Developing countries, often in arid and semi-arid regions experiencing high rates of population growth, are especially threatened by water scarcity. These countries often lack the human, institutional, and technical capacity to cope by adopting sound water management policies.

2 How is water linked to conflict?

Since fresh water is irreplaceable and indispensable to life, it is a valuable and contested resource. Water management is a complex issue with far-reaching and contentious effects. Water-related tensions emerge on different geographical scales, but a number of political, socioeconomic, and cultural factors determine whether these tensions lead to conflict. The next section will elaborate on the complex links among water resources, their management, and the threat of conflict.

Managing water resources is complex

Scarce in many regions, fresh water needs careful management to ensure that it will continue to fulfill its purposes over the long term. Certain characteristics of water make managing it difficult and often controversial. First, water moves; therefore, decisions in one place will impact (and be affected by) water use in another, possibly distant place. Second, water is an integral part of ecosystems: water managers have to consider not only the resource's relationship within the natural hydrological cycle, but also its complex interdependencies with other components of the freshwater ecosystem (e.g., soil, air, flora, and fauna). Third, water availability is highly variable and uncertain, depending on meteorology, geography, and seasonality. Fourth, water does not lend itself to international trade, as it cannot easily be transported in large quantities like other commodities. Even though it is possible to divert water from major rivers and to transfer it to distant places, such schemes are rarely economically and politically feasible. Management therefore needs to make water available in adequate quantity and quality close to where it is used.

Box 4: Use of terms

In this paper, **conflict** is defined as a situation of incompatible or adverse interests, in which one or more parties pursue, or threaten to pursue, their interests through violent means. Acute conflicts can range from sporadic violent actions to large-scale civil violence and war.

Dispute is used to describe situations in which parties pursue their interests through non-violent means, including verbal arguments and political, legal, or economic actions.

Tension describes a state of latent hostility or opposition between parties with adverse or incompatible interests.

Possibility of conflict on different geographic scales

Water resources are shared by users on the local, national, and international levels, as water flows ignore state boundaries. This is true not only of rivers, but also lakes and groundwater, which are often connected to the hydrological cycle via surface and/or subterranean flows. Therefore conflicting interests in water-related issues arise on different geographic scales and management decisions or disputes on one level can impact interests on another level. Typically, tensions arise between upstream and downstream water users as water use upstream can affect water quality, quantity, or flow downstream.

Water-related violence occurs on the local rather than international level, and the intensity of conflict appears to be inversely related to geographic scale (Wolf 1999). Controversy over water-related issues can manifest itself in many ways, ranging from civil disobedience to acts of sabotage and violent protest. If not addressed, these disputes can escalate into violent conflicts, disrupt water infrastructure or water supply projects, and undermine livelihoods. While intrastate conflicts are more amenable to negotiated resolutions, they can affect the internal stability of a nation or a region, which may in turn impact international relations. Even though water is usually not a major cause of conflicts, it is likely that water will contribute to instability in water-scarce regions as demand for water approaches the limits of supply (Ashton 2000).

Water can lead to cooperation

As mentioned earlier, no war fought over water has been reported since 2500 B.C. An analysis of more than 1,800 international water-related events over the last 50 years reveals that two-thirds were cooperative events, and the vast majority of the remaining did not involve more than verbal arguments (Postel and Wolf 2001). Why has water so rarely led to war? One argument is that prices for water are usually low, compared to other resources, and in most cases, a war

Box 5: Characteristics influencing the risk of water-related conflict

- Degree of water scarcity or changes in availability;
- Extent to which a water supply is shared by two or more social groups, regions, or states;
- Relative power relationships among water-sharing parties;
- Availability and accessibility of alternative sources or alternatives to water use;
- Economic, social, and environmental importance to its users;
- The ability of water sharing-parties to adapt to or cope with water scarcity;
- The willingness of the water-sharing parties to cooperatively manage the resource; and
- The existence of appropriate institutional/legal frameworks for water resources management.

(Partly adapted from Ashton 2000, Gleick 1998)

over water is likely to be considerably more expensive than the opportunity costs of cooperative solutions. Even if international disputes over water-related issues do not typically cause conflict, they have led to interstate tensions and significantly hampered economic development, like in Central Asia, where lack of cooperative management of the Aral Sea basin has hindered the region's economic development.

While this paper focuses on the potential for conflict over water-related issues, in some cases, water management brings together parties in conflict and forces them to cooperate. For example, in Southern Africa, a number of river basin agreements were signed in the 1970s and 80s, when the region was embroiled in a series of local wars. Although complex to negotiate, the agreements, once established, were one of the rare arenas of peaceful cooperation between countries. Now that most of the wars in the area have ended, water cooperation is one of the foundations for regional cooperation (Turton 2004). Some have identified cooperation over water resources as a particularly fruitful entry point for building peace; however, it is unclear what conditions are required for environmental cooperation to play a major role (Conca and Dabelko 2002).

A. Access to adequate water and conflict

The most direct link between water and conflict lies in disputes over access to water of adequate quantity and quality. While these disputes arise on all geographic scales, from the local to the international level, they are likely to contribute to conflict only on the local and intrastate level.

Water quantity issues and conflict

Competing claims for scarce water supplies are the most obvious cause of water-related conflict. Tensions over water allocation can increase when water is scarce, but even when the resource is not severely limited, its allocation among users and uses can be highly contested. When discussing water quantity issues, the quality of the water must be taken into account.

The coexistence of a variety of different uses and users makes the emergence of conflicting interests over water unavoidable: parties claiming their share of water often belong to different sectors, such as agriculture or industry, or to different population groups, such as different clans or ethnic groups. But conflicts also emerge within these groups, for example between subsistence and commercial producers or between rural and urban populations. As cities often withdraw water from, and release wastewater to, areas outside their administrative boundaries, thus affecting a mostly rural population (UNESCO-WWAP 2003). If competing claims for the use of a water resource are not settled in a way that is acceptable to all stakeholders, they can lead to a dispute, and even violent conflict, between the parties or with state authorities. For example, conflicting rural and urban water needs led to violent protests in the province of Shandong, China, in the downstream section of the Yellow River Basin. In July 2000, thousands of farmers clashed with police, protesting the government's plan to divert water to cities and industries from a reservoir that provided irrigation for local farmers. Several people died in the riots (Postel and Wolf 2001). In Owens Valley, California, farmers bombed a pipeline supplying water to Los Angeles in the 1920s (Wolf 2003).

Water quantity also is one of the main issues in disputes between upstream and downstream water users. Diverting water for irrigating fields or to supply drinking water to large cities can reduce the amount of water that flows downstream. For example, on the Cauvery River in India, a conflict emerged between the downstream federal 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, and violence broke out along the river, resulting in several deaths (Iyer 2002, Wolf 1999).

The timing of water flow is also important; thus, the operation of dams is also contested. For example, upstream users 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 quantity and water flow patterns are crucial to maintaining freshwater ecosystems that depend on seasonal flooding. Freshwater ecosystems perform a variety of ecological and economical functions and often play an important role in sustaining livelihoods, especially in developing countries. As awareness of environmental issues and the economic value of ecosystems increases, claims for the environment's water requirements are growing. For example, in the Okavango Basin, Botswana's claims for water to sustain the Okavango Delta and its lucrative eco-tourism industry, contributed to a dispute with upstream Namibia, which wants to use the water passing through the Caprivi Strip on its way to the delta for irrigation.

Water quality issues and conflict

Another contentious issue is water quality, which is also closely linked to water quantity. Decreasing water quality can make it inappropriate for some uses, thereby aggravating its scarcity. In turn, decreasing water quantity concentrates pollution, while excessive water quantity, such as flooding, can lead to contamination by sewage. Low water quality can pose serious threats to human and environmental health. Water quality degradation is often a source of dispute between those who cause degradation and the groups affected by it. As pollution increasingly impacts upon livelihoods and the environment, water quality issues can lead to public protests.

Box 6: The poor suffer the most

Available fresh water is reduced by pollution. The poor are the most affected—50% of the population of developing countries is exposed to polluted water sources.

Twenty-eight percent of the world's population faces a shortage of safe drinking water. Lack of clean drinking water leads to nearly 250 million cases of water-related disease each year and between 5 and 10 million deaths.

(Source: UNESCO-WWAP 2003)

One of the main reasons for decreasing water quality is pollution, e.g. through industrial and domestic wastewater or agricultural pesticides. In Tajikistan, for example, where environmental stress has been linked to civil war (1992-1997), high levels of water pollution have been identified as one of the key environmental issues threatening human development and security (Carius et al. 2003). Water pollution from the tanning industry in the Palar Basin of the Indian state of Tamil Nadu makes the water within the basin unfit for irrigation and consumption. The pollution contributed to an acute drinking water crisis, which led to protests by the local community and activist organizations, as well as to disputes and court cases between tanners and farmers.

Other water quality problems include excessive levels of salt, nutrients, or suspended solids. Salt intrusion can be caused by groundwater overuse or insufficient freshwater flows into estuaries. For example, dams in the South African part of the Incomati river basin reduced freshwater flows into the Incomati estuary in Mozambique and led to increased salt levels. This altered the estuary's ecosystem and led to the disappearance of salt-intolerant flora and fauna important for people's livelihoods (the links between loss of livelihoods and the threat of conflict are described below).

Excessive amounts of nutrients or suspended solids can result from unsustainable agricultural practices, eventually leading to erosion. Nutrients and suspended solids pose a threat to freshwater ecosystems and their use by downstream riparians, as they can cause eutrophication and siltation respectively, which, in turn, can lead to loss of fishing grounds or arable land. Suspended solids can also cause the siltation of reservoirs and harbors; 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 conflict over compensation and responsibility among the river's users. While negotiations led to a peaceful solution in this case, without such a framework for dispute resolution, siltation problems can lead to upstream/downstream disputes such as those in the Lempa River basin in Central America (Lopez 2004).

Water supply management and conflict

In addition to competing claims for natural water resources, disputes can arise over the management of drinking water supply. As drinking water is a basic commodity, access to water supply can be a matter of internal security. Disputed issues include system connections for suburban or rural areas, service liability, and pricing. In most countries, the state is responsible

for supplying water. Even if concessions for water supply systems are sold to private companies, the state usually remains responsible for the service, and thus, disputes over water supply management usually arise between communities and state authorities. Issues of water supply management can even lead to violent conflict, as in Cochabamba, Bolivia's third largest city. After privatizing the city's water supply system, tariffs for drinking water doubled and tripled; some households were paying up to half of their monthly income for water. Users responded with strikes, roadblocks, and other forms of civil protest that shut the city down for four days. The protest spread to other parts of Bolivia, and months of civil unrest came to a head in April 2000. Soldiers were sent into Cochabamba, kicking off several days of violence and leaving more than a hundred people injured and one person dead (Public Citizen 2001, Postel and Wolf 2001).

B. Indirect links between water and conflict

Indirect links between water and conflict stem from water's importance in sustaining livelihoods. In turn, livelihood loss (along with lack of water, sudden droughts and floods, infrastructure construction, or pollution disasters) can force people to migrate.

Water, livelihoods, and conflict

Water plays an important role in the maintaining livelihoods because water is a basic resource for agriculture, directly in the form of irrigation and indirectly as a vital component of fertile ecosystems. Agriculture has traditionally been the single largest source of livelihoods; this is especially true for developing countries, where large parts of the population depend on subsistence farming. If this livelihood is no longer available, people are often forced to migrate or turn to other, often illicit, ways to make their living. Rural populations are often forced to move to cities in search of job opportunities, increasing pressure on water resources and exacerbating the other tensions linked to rapid urbanization. Also, lack of agricultural employment can make young men more likely to take part in criminal acts (Ohlsson 2000, Soysa and Gleditsch 1999).

Poverty, due to livelihood loss has been identified as the common denominator of the varied causes of conflict in most of the civil wars that emerged in Africa, South Asia, and Latin America during the last decade (Ohlsson 2000). There is growing conviction that water scarcity is one of the major reasons for the loss of livelihoods and thus fuels livelihood-related conflicts. For example, Ohlsson has argued that the loss of livelihoods due to lack of arable land and water was one of the factors that enabled the mobilization of population to participate in Rwanda's genocide (2000).

Water, migration, and conflict

Water—its lack or its abundance—has always been a reason for migration. Major development projects, such as dam construction, water diversion, and floodplain drainage, can cause or aggravate floods and water scarcity, and also often directly induce migration. Migration can produce tensions between local and incoming communities, especially when it increases pressure on already scarce resources. Migrants crossing national borders can also contribute to interstate tensions. In the Awash Valley in Ethiopia, development programs supported hydropower plants and large-scale irrigated agriculture, which forced pastoralists to change their grazing patterns, bringing them into conflict with neighboring communities and leading to several violent incidents (Nicol et al. 2000).

As mentioned above, dam operations affect the maintenance of river ecosystems and dependent livelihoods. Dams also play an important role in flood control. Thus, how they are operated during floods is very contentious, especially between upstream and downstream riparians. When major dams are constructed and their reservoirs filled, people living in the area are dislocated, and arable land and cultural sites are lost. This displacement often leads to disputes between the state and civil society groups, and could also lead to tensions between resettled people and

host communities. Other effects of dam construction include the disruption of fish migration or rising groundwater levels around reservoirs. These effects can deprive the local population of the natural resources crucial for their livelihoods and thus force them to migrate to other areas. Establishment of watershed protection areas, which prohibit certain activities, like agriculture, can also dislocate people or force them to migrate.

C. Structural sources of water-related conflicts

In most cases, it is not the lack of water that leads to conflict but the way it is governed and managed. There are several reasons why water management fails, including lack of adequate water institutions, inadequate administrative capacity, lack of transparency, ambiguous jurisdictions, overlapping functions, and fragmented institutional structures. Water management is also complicated by the lack of infrastructure to make water available to all those that need it.

Limited institutional and social capacity

Water resources management is highly complex and extremely political. Balancing competing interests over water allocation and managing water scarcity requires strong institutions. In developing countries, water management institutions often lack the human and administrative capacity necessary to develop adequate, comprehensive management plans and implement them. If water resources are not managed properly, tensions over water access are likely to arise and can contribute to conflict without an institutional framework for settling disputes. Managing water is even more complicated when it is scarce, while scarcity is often due to previous mismanagement. Lack of institutional and social capacity to adapt to water scarcity (known as adaptive capacity) can lead to environmental and, consequently, economic collapse, producing social instability (Turton 2000).

Lack of data and information sharing

A reliable database, including meteorological, hydrological, and socioeconomic data, is a fundamental tool for deliberate and farsighted management of water resources. Yet, reliable information is often difficult to obtain, especially in developing countries. The lack of a common database can cause tensions between water-sharing parties, as different assumptions regarding the characteristics of a resource can lead to controversial management decisions.

Sharing information and data becomes more important and increasingly difficult as the scope of the water management unit grows and the number of parties sharing water increases. Downstream water managers need hydrological and meteorological data collected upstream to plan water use and development. Information on emergencies, such as floods and contamination, is crucial to protect human and environmental health. Tensions between states can therefore emerge when data and information are not shared. Further, disparities among riparians' capacity to generate, interpret, and legitimize data can lead to mistrust and thus hinder cooperative action.

Fragmented responsibilities and contradictory management systems

Water management in many countries is characterized by duplicate responsibilities. Water management decisions are frequently made at institutions responsible for agriculture, fisheries, water supply, regional development, tourism, transportation, conservation, and environment. This disaggregated decision-making often produces divergent management approaches serving contradictory objectives and leads to competing claims from different sectors. Contradictions between formal and customary management practices can also produce competing claims. Competing claims are even more likely to contribute to disputes in countries where there is no formal system of water use permits, or where enforcement and monitoring are inadequate. This

is frequently the case in developing countries, and can enable more powerful water users to supercede the customary water use rights of local communities.

Insufficient transparency and public participation

Controversy often arises when management decisions are formulated without sufficient participation by local communities and water users, and therefore fail to take into account local rights and practices. Members of the public have increasingly expressed the need to be involved in decisions that affect their lives and livelihoods; failure to provide opportunities for sufficient public participation has led to several instances where the general public has rejected proposals for water infrastructure projects. Public protest is especially likely when water allocations are suspected to result in the diversion of public resources for private gain or when water use rights are assigned in a secretive and possibly corrupt manner. In this context, the media can help disseminate information and increase transparency, but it can also serve political interests by sensationalizing water-related problems and disputes.

Unequal distribution of water resources and benefits

The risk of public protest and conflict over water allocation increases when access to and control over water is considered unjust; this can be exacerbated when the control over clean water gives a social group a major political or economic advantage (Turton 2000). In South Africa, the apartheid regime allocated water mainly to the white minority. This “ecological marginalization” heightened the black population’s grievances and contributed to social instability (Percival and Homer-Dixon 1998). The costs and benefits deriving from water’s use can also be unequally distributed. Revenues from major water infrastructure projects, for example, usually benefit only a small elite, while local communities have to cope with the resulting environmental and social impacts, often without any compensation.

3 Lessons Learned

As described above, there are many links between water and conflict, and conflicting interests seem to be inherent to water management. Still, even if the negotiation progress is lengthy, most disputes are resolved peacefully and cooperatively. Several development initiatives provide lessons for tackling water-related conflicts and fostering cooperation. Establishing an equitable and sustainable water management policy has proven very effective. Guidelines for this have been formulated in the Integrated Water Resources Management framework, which is promoted by international water professionals in the Global Water Partnership network. It includes demand-side management, stakeholder participation, basin-level analysis, and transparent decision-making. Effectively implementing these principles can help prevent and mitigate conflict. As conflicting interests are inherent in water resources management, conflict resolution mechanisms should be integrated into any water-related development project.

Improving transparency and information of stakeholders

Informing stakeholders and increasing transparency of decisions can help prevent conflict over water-related issues. If all stakeholders are informed about water management policies or infrastructure projects and receive the opportunity to express their opinion, it is ensured that a variety of perspectives are revealed. The process of identifying all relevant stakeholders and their positions is a crucial step in estimating, and consequently managing, the risks of conflict linked to water projects. Explicitly consulting (not just informing) stakeholders increases the benefits of this process. Guidelines for ensuring transparency of private sector involvement in water supply management are currently being developed by a [Swiss working group](#).

Excluding stakeholders can induce resistance to a project and hamper implementation, even when there is originally little opposition, if they feel shut out of the process. However, if stakeholders can understand the objectives of a management decision, they are more likely to support it and to accept limits on their own water use.

Strengthening institutional and legal frameworks for water resources management

Many countries need stronger policies to regulate water use and to enable equal and sustainable management of water resources. Water management decisions made in international or community-based cooperative processes must be backed by adequate legal and institutional frameworks to ensure implementation. Formulating policies and laws, as well as designing appropriate institutions, is a crucial step towards preventing conflict.

Many development initiatives have successfully fostered cooperation in international river basins by supporting river basin commissions and joint riparian agreements (as for example the World Bank initiative in the Nile Basin). International water law, such as the UN Convention on the Law of the Non-Navigational Uses of International Watercourses (1997), can provide guidance for transboundary water agreements. However, ensuring implementation on the national level requires more assistance on the local level, where the water is actually used. Establishing water management institutions on the catchment and sub-catchment level has been recognized as an adequate approach for integrated water resources management, adopted for example by the Swiss initiative in the [Ferghana Valley](#). These institutions need legal recognition and financial and human resources in order to regulate water use. Institutionalizing community-based cooperative management mechanisms or establishing water user associations can support this effort; they can help prevent conflict if they allow all stakeholders to participate and accommodate customary management approaches.

Building capacity for integrated water resources management and conflict prevention

There are several ways in which capacity-building, through staff training, technical assistance, and institutional support can help to prevent or mitigate water-related conflicts. First, developing the human and technical capacity to generate and analyze data is necessary to enable water management institutions to formulate water management plans. Building technical infrastructure to manage water use in some cases can contribute to conflict resolution, provided that costs and benefits are equally distributed. Second, building human and administrative capacity to develop sustainable water management plans and to provide for their implementation, is necessary to prevent water-related disputes in the long term. Third, capacity-building in conflict management techniques (such as mediation and facilitation) and in stakeholder participation, helps to prevent dispute and mitigate emerging conflicts. Capacity building in conflict management should target groups such as water management institutions, local non-governmental organizations, water user associations, or religious groups, each of which could play a specific role in mitigating water-related conflicts. One example is the [FORWARD](#) project by USAID.

Capacity is also needed to negotiate contested water issues. On the local level, strengthening the capacity of excluded, marginalized, or weaker groups to articulate and negotiate their interests helps prevent them from developing grievances. This approach was applied in the [Every River Has Its People Project](#) in the Okavango Basin. On the international level, disparities in capacity and knowledge have often led to mistrust between riparian countries and hindered cooperative action. Strengthening negotiating skills of less powerful riparians is therefore conducive to prevention of conflict, as is strengthening their capacities to generate and authorize relevant data (Turton 2003).

Generating and sharing data and information

A hydrological database acceptable to all stakeholders is essential for any joint water resources management efforts. It not only enables water-sharing parties to make decisions based on the same understanding of the existing hydrological situation, it also helps build trust. Reliable data protects stakeholders from being defrauded. In addition, jointly generating common data sets fosters confidence between participating parties and can lead to greater cooperation as for example in the [Regional Water Data Banks Project](#) in the Middle East. Water management simulation tools can aid cooperative decision-making, as they demonstrate the consequences of decisions for other stakeholders. When it is difficult for users to assess a stakeholder's effect on the amount or quality of water—or the benefits of a conservation intervention—conflict is more likely.

Adopting measures to transform disputes and increase confidence

On any scale of water management, if the level of dispute is too high and disparities are too great, conflicting parties are not likely to reach consensus and might even refuse to participate in cooperative management activities. If comprehensive cooperative management mechanisms cannot be established, interventions designed to manage disputes, transform conflicts, or increase confidence between conflicting parties can be adopted. Such interventions are also conducive as precursory or supportive measures to established cooperative mechanisms. While confidence and consensus-building measures, such as joint training or joint fact-finding, will support the process of cooperative decision-making, conflict transformation measures involving a neutral third party, such as mediation, facilitation, or arbitration, are helpful in cases where open disputes over water resources management do already exist.

Establishing cooperative water management mechanisms

In focusing on the potential for collaboration, cooperative management approaches can anticipate conflict and solve smoldering disputes if all stakeholders are included in the decision-making process. To guarantee equal participation, even when power is unevenly distributed, inferior negotiation partners must be given the means (information, trained staff, and financial support) to act as an equal partner.

Given sustained and equal stakeholder participation, joint management mechanisms can reduce conflict potential in several ways:

- By providing a forum for joint negotiations, it ensures that all existing (and potentially conflicting) interests are taken into account in the decision-making process;
- Considering different aspects and interests can reveal new management options and offer win-win solutions;
- Collaboration and joint fact-finding during the management process are effective ways to build trust and confidence between conflicting parties; and
- Management decisions that are adopted through a joint decision-making process are much more likely to be accepted by all stakeholders, even if consensus cannot be reached.

On the local level, traditional community-based water management approaches and conflict resolution mechanisms offer good opportunities for cooperative management, as they are already adapted to specific local conditions and are more easily adopted by the community. Examples of such traditional mechanisms include the “Chaffa”, [the traditional water management institution of the Boran people in the Horn of Africa](#), or the “Arvari Parliament,” an informal decision-making and conflict-resolution body based on traditional customs developed by the

users of the small Arvari River in Rajasthan, India (Iyer 2002). On the international level, river basin commissions that include representatives from all riparian states have been successfully involved in joint riparian water resources management. Especially in transboundary basins, achieving cooperation has been a drawn-out and costly process. Therefore, donors must commit for the long term and coordinate efforts with other donors in the basin. Recognizing this, the World Bank garnered support for the Nile Basin Initiative from a number of donor agencies and made a twenty-year commitment to facilitate the negotiation process.

In any case, cooperative water management is a challenging issue that requires time and commitment from all those involved. Extensive stakeholder participation might not be feasible in every case; and in some cases of acute conflict may not even be advisable. If it is not possible to get conflicting parties together, related parties, such as elders, women, or water experts, have successfully been involved in initiating cooperation. For example, the women involved in the Wajir Peace Initiative helped reduce violent conflict between pastoralists in Kenya, where access to water was one issue in the conflict (Nation 1999). In some cases of transboundary water dispute, an “Elite-Model” aimed at reaching consensus between high-level representatives of the riparian states, before establishing management processes with broader participation, has been adopted as means to initiate cooperation (as for example in the Okavango Basin).

Box 7: Circumstances making broad participation advisable

Within the framework of the Ramsar Convention on Wetlands a set of conditions was identified under which involvement of local and indigenous people in resources management is advisable. It includes the following:

- Stakeholders’ active commitment and collaboration are essential to effectively manage the water (e.g., the basin area under consideration is inhabited or the water is privately owned);
- Water access is essential for local livelihoods and cultural activities;
- Local stakeholders have historically enjoyed customary or legal rights to the water;
- Local interests are strongly affected by how the water is managed;
- Decisions to be taken are complex and controversial;
- The existing management regime has failed to encourage wise use;
- Stakeholders are ready to collaborate and request to do so; and
- There is enough time to negotiate among stakeholders before management decisions must be made.

(Adopted from de Sherbinin and Claridge 2000)

Integrating conflict impact assessments and water resources assessments

Development programs and projects offer significant opportunities to address water-related conflicts. However, the same programs and projects can serve as the source or arena of conflict, especially if not all of the stakeholders are equally involved or if benefits are unevenly distributed. Cooperation projects can negatively impact conflicts by supporting a specific type of water use or by excluding groups of water users. Involving all stakeholders and equally distributing assistance prevents some groups from feeling underprivileged and ensures that not just a few well-positioned individuals benefit from the development project. Conflict impact assessments connected with comprehensive assessments of water resources and their uses (at basin level, considering interconnectedness of ecosystems, and all different resource users) can help identify potential negative impacts. Integrated in iterative project planning, a thorough

analysis of a project's effects on ongoing or imminent conflicts, can monitor impacts during project implementation. Unfortunately, comprehensive frameworks for conflict impact assessments of water-related projects have rarely been developed. However, the [Swiss Agency for Development and Cooperation \(SDC\) and Saferworld's](#) respective assessments of the impact of development cooperation projects on water-related conflicts in Central Asia and the Horn of Africa offer good examples.

For Further Reading:

- Leif Ohlsson analyzes how water is linked to conflict and points out the importance of tools used to manage water scarcity in Chapter 6 ("Water, conflict, and social resources scarcity: The concept on trial") of his 1999 book *Environment, Scarcity, and Conflict*. Available at <http://www.padrigu.gu.se/ohlsson/files/ESC.html>.
- Tony Allan and Alan Nicol present a useful typology of levels of water conflict and analyze the impacts of development policy in 1998's *Water Resources, Prevention of Conflict and the Coherence of EU Policies in the Horn of Africa*. An executive summary is available at <http://www.saferworld.co.uk/pubwater.htm>.
- Daniel Buckles gives an overview of issues, lessons learned, and case studies regarding conflict over natural resources, such as land, water, and forests, in *Cultivating Peace: Conflict and Collaboration in Natural Resource Management*. A new on-line edition is available at http://web.idrc.ca/en/ev-28105-201-1-DO_TOPIC.html.
- The final report of the international research project on Environmental Conflict Management (ECOMAN) includes an analysis of approaches to transforming water management conflicts. See *Transformation of Conflicts: Approach and Instruments*, edited by Guenther Baechler, Kurt Spillmann, and Mohamed Suliman.
- *Scarcity and Surfeit*, edited by Jeremy Lind and Kathryn Sturman, discusses the environmental aspects of political conflicts in various African countries. It is available at <http://www.iss.co.za/pubs/Books/ScarcitySurfeit/Main.html>.

Program Options

Improving transparency and information of stakeholders

Code of conduct for private sector participation in water management. Private sector involvement in water supply management can lead to conflict, for example if it takes place in an intransparent manner. Together with a reinsurance company (SwissRe) and Switzerland's Secretariat for Economic Affairs (seco), the Swiss Agency for Development and Cooperation (SDC) has formed a working group to develop a code of conduct and guidelines to help govern the participation of the private sector in water management. Such guidelines and a code should be worked out in an approach that includes all interested parties - a so-called "multi-stakeholder process". The cooperation of SwissRe (private sector), seco (representation of national economic interests), and SDC (representation of the poor) promises much in this regard. Further, experts on practical aspects of water management, including representatives from government, the private sector, and NGOs, are included in the process.

For more information see: <http://www.pspwater.org> (under construction) or http://www.deza.admin.ch/ressources/deza_product_e_601.pdf (page 26).

Strengthening institutional and legal frameworks for water resources management

The **Water Resources Management Project in the Fergana Valley**, funded by SDC, seeks to create new institutional and technical structures to enable groups of people with different interests to peacefully agree on and coordinate actions on water use. To implement the project, SDC selected the International Water Management Institute (IWMI) and the Scientific Information Center of the Interstate Commission on Water Coordination (SIC-ICWC), which support water management institutions at all levels – such as river commission, provinces, communities, enterprises –with advise and transfer of know-how. The project also establishes and supports water user associations. In addition to this water management project, SDC endeavored to prevent violence and promote development in the Fergana Valley by supporting local NGOs that offer continuing education courses for local mediators.

For more information see http://www.iwrm.icwc-aral.uz/index/i_en.htm

The **Institutional Strengthening Grants Management project** (ISGM), targets civil society organizations helping people in the greater Horn of Africa region achieve food security and establish a system for conflict early warning, prevention, and response. ISGM is designed and administered by USAID's Regional Economic Development and Support Office/Eastern and Southern Africa (REDSO/ESA). The five-year, \$10 million project supports regional initiatives by distributing grants and strengthening institutions. During 2002, five grantees (five local NGOs) supported more than 50 local community efforts to develop peace-building capacity. For example, along the Kenyan-Ethiopian border, communities created environmental management committees to handle the resource-based conflicts common among pastoral border groups. One of the local NGOs supported them by sponsoring training in conflict resolution and land-use management skills. Another NGO identified 15 traditional peace committees on each side of the border and trained them to manage and prevent cross-border conflicts relating to land, pasture, and water. For more information see

http://www.pactworld.org/programs/global_regional/isgm/index_isgm.htm

Building capacity for integrated water resources management and conflict prevention

The **Every River Has Its People Project** in the Okavango Delta, funded by the Swedish International Development Agency (SIDA), is a coordinated set of activities aimed at promoting the sustainable co-management of the Okavango River Basin by facilitating effective stakeholder participation in basin planning and management. The project's objectives are to increase participation by communities and other local stakeholders in decision-making and basin

management. The project is being implemented by a number of NGOs in Namibia and Botswana in three phases:

1. Exchange information and increase understanding between Okavango riparian communities and project staff;
2. Develop educational materials based on the information gathered and lessons learned in Phase One; and
3. Build capacity and initiate mechanism for participation using the materials and approach developed in Phase Two.

For more information see <http://www.everyriver.net>

Fostering Resolution of Water Resource Disputes Project (FORWARD). Recognizing that the lack of effective mechanisms for resolving water disputes is a key reason for many environmental, economic, and social problems across Asia and the Near East (ANE), USAID's ANE Bureau launched the FORWARD project in 1996. The project helps governments and key stakeholders in ANE agree on equitable and sustainable strategies, policies, and plans for managing scarce water resources. FORWARD's design offers a unique approach to water dispute resolution by integrating mediation with the resolution of technical problems. FORWARD seeks to achieve its objective in four ways:

- Assisting local officials with resolving specific problems, employing dispute resolution specialists using collaborative problem-solving approaches;
- Improving methods of dealing with local water issues and approaches to collaborative problem solving and consensus building;
- Conducting dispute resolution training for those who handle water problems; and
- Developing a group of professional mediation experts in the region by identifying and training third-party professionals

For more information see http://www.dec.org/pdf_docs/PDABS305.pdf, and http://www.dec.org/pdf_docs/PNACH836.pdf

Generating and sharing data and information

The **Regional Water Data Banks Project (WDBP)** was launched in 1995 to enable the exchange of consistent, compatible, and reliable water data and information among Israel, Jordan, and Palestine to support decision-making at both local and regional levels. The project is managed and coordinated by an Executive Action Team (EXACT) composed of two representatives from each of the three countries, as well as from the donor countries (United States, European Union, Canada, France, and the Netherlands). The project supports activities that seek to improve the availability and applicability of water data and information within the region, including training water managers and field technicians, improving monitoring networks and field-data collection techniques, developing standard regional analytical manuals, and developing joint databases and common support systems. Confidence-building measures, effective teamwork, and donor facilitation and support have built capacity on a regional scale.

For more information see <http://www.exact-me.org>

The **Good Water Makes Good Neighbors** project was initiated in 2001 by the NGO Friends of the Earth Middle East. The lack of drinking water in Palestinian and Jordanian areas, compared to Israel's regular supply, has led to anger and frustration among neighboring communities on both sides. Pollution is also an obstacle to better relationships between neighboring communities. The project fosters information exchange, dialogue, and cooperation among people to protect the equitable and sustainable use of water and other environmental resources in Jordan, Palestine, and Israel. Based on a Partnering Communities Program—a cooperative work program between neighboring communities on different sides of the border—the project seeks to ease member communities' water stress, and encourage users to treat sewage and save and reuse water. For more information see <http://www.foeme.org>

Adopting measures to transform disputes and increase confidence

The **Kaltok Conflict Prevention and Resolution Project** was designed by Oxfam to meet the needs of communities in the Kaltok district in North Sudan: access to clean water and assistance in managing conflict. Oxfam provided training to water and conflict management committees and pump operators. As part of their practical training in pump repair and maintenance, the operators traveled to land occupied by neighboring tribes and repaired hand pumps that had fallen into disrepair, which built bridges between two conflicting communities. Oxfam also helped organize community meetings and collected community stories about conflict, its causes, and local strategies for dealing with it. Community leaders, Oxfam, and government field staff accompanied this approach with workshops on conflict analysis. For more information see http://www.caa.org.au/oxfamnews/may_2003/sudan.html

Peace workers supporting sanitation and irrigation projects in Zimbabwe. The German Development Service (Deutscher Entwicklungsdienst, or DED) and the Zimbabwean NGO Southern Alliance for Indigenous Resources (SAFIRE) combined two approaches to mitigate water-related conflicts in the village of Nyamazura: first, a DED peace worker assists SAFIRE improve communication and cooperation by organizing visits between new settlers and incumbent communities, and by training decision-makers, authority figures, and SAFIRE staff in civilian conflict transformation techniques. Second, DED and SAFIRE seek to improve living conditions by supplying households with fresh water and improving agricultural irrigation. For more information, see http://www.ded.de/cgi-bin/ded/lib/all/lob/return_download.cgi/fachheft_zfd_eng.pdf?ticket=q_u_e_s_t&bid=137&no_mimetype=0

Establishing cooperative water management mechanisms

Revitalizing traditional pastoralists' institutions for water management. The NGO Friends of Nomads International (FONI) is working with pastoral communities to revitalize traditional institutions and arrangements for water distribution. For example, since the 1970s the Boran, who live in north-central Kenya and inhabit the lower part of the Ewaso river, have faced water scarcity due to the development of irrigation agriculture, ranching, and flower production in the river basin. This has led to considerable conflicts with Somali pastoralists, as well as among the Boran themselves. By organizing meetings between community elders, government officials, women group leaders, and NGOs, FONI seeks to mediate conflicts over the use of water from the Ewaso Ng'iro floodplains. FONI tries to solve conflicts by restoring and strengthening the "Chaffa," the institution that traditionally supervised the use of critical floodplain areas and distributed water during dry spells. For more information see http://www.bothends.org/encycl/cases/viewcase.php?cat=2&id=13&id_language=1

Integrating conflict impact assessments and water resources assessments

Peace and Conflict Impact Assessment (PCIA) of water-related projects in Central Asia. Over the last decade, the SDC has emerged as an important actor in Central Asia and its water sector. A team of international and local experts conducted a PCIA of SDC's water-related projects in Central Asia to enhance the peace-building potential of the Swiss water sector strategy and to assess the PCIA methodology as a program management tool. The PCIA focused on local and intrastate water conflicts, and concentrated on the Fergana Valley, the main geographic area for Switzerland's current water projects. On the operational level, the PCIA looked at three projects currently financed by SDC. For more information, contact Guenther Baechler at copret@deza.admin.ch.

Saferworld developed a framework for resource development and conflict analysis, which places resource-based conflicts in the broader context of socioeconomic, political, and cultural inequalities in Ethiopia's Awash Valley. In this region, donors have tended to support large-scale,

domestic development programs, which have often increased the risk of conflict between local communities. To include conflict prevention objectives, an indicator-based analytical framework is used to define the overall objectives of engagement, prioritize focal areas, and identify risks inherent in engagement.

For more information see <http://www.international-alert.org/pdf/pubdev/develop.pdf> and <http://www.saferworld.co.uk/pubawash.htm>

Other initiatives (improving livelihoods in conflict-prone areas)

Canadian International Development Agency's (CIDA) concept for its **Environmental Sustainable Livelihood Governance Program** in Indonesia seeks to improve the well-being of communities facing major environmental problems or conflicts over renewable resources in selected watersheds. It intends to invest up to \$50 million over a seven-year period. By supporting sustainable livelihood initiatives, optimizing use of local capacity, and emphasizing local ownership, local participation, and donor coordination, the program hopes to achieve the following goals:

1. Increase levels of environmental awareness and capacity for all stakeholder groups on key issues affecting communities within the selected watersheds;
2. Achieve greater equity and social cohesion among stakeholders utilizing conflict resolution processes and negotiated solutions over access to and management of natural resources; and
3. Increase sustainable livelihood opportunities for rural poor in selected watersheds, particularly the marginalized groups including indigenous peoples, women, and youth.

For more information see http://www.acdi-cida.gc.ca/cida_ind.nsf/0/5b9cd087767a5dc285256d01004eb22d?OpenDocument

Reconstruction Assistance for East Timor. Seeking to return life in East Timor back to normal as soon as possible and meet the population's basic needs, the German Technical Cooperation (GTZ) has been focusing its development efforts in East Timor on securing water supply. In facilitating resolution of emerging conflicts of interests, such as between water users and people living in the headwater areas, the project performs long-term peace-building work. Within GTZ's reconstruction project, seven communities are provided not only with plants and equipment, but also with water technicians and experts. For more information see <http://www.gtz.de/laender/ebene3.asp?Thema=10&ProjectId=310&Reihenfolge=3&spr=1> (in German only) or contact Mr. Rolf Sülzer at gtz-indonesien@id.gtz.de

Survey Instruments

This section lists key questions that evaluate the risk of conflict related to water. These questions should help development agencies effectively integrate water management and conflict prevention/mitigation into their programs and projects. Not all questions will be relevant to each case or region due to natural, historical, and cultural differences.

Five basic questions address the likelihood of water-related conflict:

- Do two or more parties hold competing claims on a water resource? Does an unequal power relationship exist between the parties?
- Do water sharing parties belong to different groups of society? Do other than water-related tensions exist between these groups?
- Are water management mechanisms effective, enforced, and perceived as fair?
- Are lack of water, flooding, or water resources development depriving people of their livelihood or forcing them to migrate?
- Do water management institutions and population have the capacity to adapt to situations of water scarcity?

Can all groups with legitimate claims access water in sufficient quality and quantity and in a timely and affordable manner?

- Are one party's changes in water quality, quantity, or flow inhibiting water use by another party? Has man-made water scarcity or degraded water quality decreased its availability, and increased the impact on the environment or human health?
- Are water users highly dependent on the particular water resource in question or can their needs be fulfilled by other means?
- Is any party directly or indirectly denied access to water or water supply in sufficient quality and quantity? If so, do affected social groups perceive this limitation to be a deliberate manifestation of a discriminatory policy?

Are water-related issues depriving people of their livelihood or forcing them to migrate?

- Are there mechanisms to assess environmental and social impacts and to develop mitigation and compensation plans?
- Does migration increase the pressure on host communities' water resources?
- Are livelihoods diversified or are people economically dependent on water resources or wetlands?
- Do people depending on water and wetlands for their livelihood have legal rights to water?

Is water managed in a transparent, fair, and equitable way?

- Are water allocation mechanisms and systems of water permits enforced? Are they perceived as fair and transparent?
- Do institutions equitably mediate competing claims for water access, social and environmental impacts, and benefit sharing?
- Are there international mechanisms to enhance governance of transboundary water resources? Are such mechanisms adopted, implemented, and enforced?
- Do national and local water management institutions have sufficient human and technical capacity to develop and enforce comprehensive water management plans?

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- Does a reliable database exist and is it accepted by all water-sharing parties? Is information shared among water-using parties?
 - Are contradictory decisions in water-related issues made by different institutions (agriculture, fishery, regional development, etc.) or on different levels (local to regional)?
 - Have all groups (including local communities and indigenous groups) with legitimate interests, facing serious impacts, or holding formal and informal access rights, been identified and recognized?
 - Are these groups able to participate in management and development policy? Has the negotiation capacity of weaker groups been strengthened?
 - Are resources perceived to be allocated according to political motivations or patronage?
 - Do benefits from development accrue to a particular identity group, economic class, or region? Have stakeholders been appropriately consulted and compensated?

Contacts

For more information on research relevant to the water and conflict debate:

AWIRU - African Water Issues Research Unit
University of Pretoria
Pretoria 0002, Republic of South Africa
Contact: Anthony Turton, Head of Unit
Email: art@icon.co.za
Phone: +27-12-420 4486
Fax: +27-12-842 7735
www.up.ac.za/academic/libarts/polsci/awiru

Transboundary Freshwater Dispute Database

Oregon State University
104 Wilkinson Hall
Corvallis, OR 97331-5506, USA
Contact: Aaron T. Wolf, Project Director
Email: wolfa@geo.oregonstate.edu
Phone: +1-541-737 2722
Fax: +1-541-737 1200
www.transboundarywaters.orst.edu

Overseas Development Institute

Rural Policy and Environment Group
111 Westminster Bridge Road
London, SE1 7JD, UK
Contact: Alan Nicol, Research Fellow
Email: ANicol@odi.org.uk
Phone: +44-207-922 0300
Fax: +44-207-922 0399
www.odi.org.uk

Department of Peace and Development Research

University of Göteborg
Box 700, 405 30 Göteborg, Sweden
Contact: Leif Ohlsson, Researcher
Email: Leif.Ohlsson@padrigu.gu.se
Phone: +46-31-773 1408
Fax: +46-31-773 4910
www.padrigu.gu.se

SwissPeace

Sonnenbergstrasse 17
Postfach, 3000 Bern 7, Switzerland
Contact: Eva Ludi, Project Coordinator
Email: ludi@swisspeace.unibe.ch
Phone: +41-31-330 1212
Fax: +41-31-330 1213
www.swisspeace.org

School of Oriental and African Studies (SOAS), Water Issues Group,

Thornhaugh Street, Russell Square
London WC1H 0XG, UK
Contact: Prof. Tony Allan
Email: tony.allan@soas.ac.uk
Phone: +44-20-7637 2388
Fax: +44-20-7436 3844
<http://mercury.soas.ac.uk/Geography/WaterIssues/Home.html>

For more information on development organizations addressing conflict and water:

German Development Service (DED)

Deutscher Entwicklungsdienst gGmbH
Tulpenfeld 7
53113 Bonn, Germany
Contact: Lothar Rast, Head of Unit
Email: lothar.rast@ded.de
Phone: +49-228-2434 210
Fax: +49-228-2434 209
www.ded.de

Swiss Agency for Development and Cooperation (SDC)

Conflict Prevention + Transformation
Freiburgstrasse 130
3003 Bern, Switzerland
Contact: Guenther Baechler, Manager
Email: copret@deza.admin.ch
Phone: +41-31-32 21068
Fax: +41-31-32 30849
www.deza.admin.ch/index.php?userhash=4489111&navID=153&l=e

Swedish International Development Agency (SIDA)

105 25 Stockholm, Sweden
Email: info@sida.se
Phone: +46-8-698 5000
Fax: +46-8-20 66 64
www.sida.se

USAID Water Team

Office of Environment and Natural Resources
Global Environmental Center
Ronald Reagan Building, Room 3.08
Washington, DC 20523-3800, USA
Contact: Alan Hurdus, Team Leader
Email: alhurdus@usaid.gov
Phone: +1-202-712-0218
Fax: +1-202-712-3174
www.usaidwater.org

USAID REDSO

Regional Economic Development & Services
Office (REDSO/ESA)
P.O. Box 30261
Nairobi, Kenya
Contact: Walter I. Knausenberger
Supervisory Environment Officer
Email: waknausenberger@usaid.gov
Phone: +254-2-8624 00/ 02, ext. 2267
Fax: +254-2-860949
www.usaid.gov/democracy/afr/redsoesa.html

Canadian International Development Agency (CIDA)

200 Promenade du Portage
Gatineau, Quebec, K1A 0G4, Canada
Email: info@acdi-cida.gc.ca
Phone: +1-819-997 5006
Fax: +1-819-953 6088
www.acdi-cida.gc.ca

German Development Cooperation (GTZ)

Dag-Hammarskjöld-Weg 1-5
65760 Eschborn, Germany
Phone: +49-6196-79 0
Fax: +49-6196-79 1115
www.gtz.de

Program Transwater
Contact: Thomas Schild
Program Manager and Coordinator
Email Thomas.Schild@gtz.de
Phone: +49-6196-79 1930
Fax: +49-6196-79 807175
www.gtz.de/transwater/

For more information on other international initiatives:**Global Water Partnership**

(promoting integrated water resources management)
www.gwpforum.org

UNESCO: From Potential Conflict to Co-operation Potential (PC → CP)
Division of Water Sciences
1, rue Miollis
75015 Paris, France
Contact: Léna Salamé, Project Coordinator
Email: L.salame@unesco.org
Phone: +33-1-4568 4180
Fax: +33-1-4568 5811
www.unesco.org/water/wwap/pccp/

Green Cross International

Programme Water Conflict Prevention
160a, rte de Florissant
1231 Conches/Geneva, Switzerland
Contact: Fiona Curtin, Program Coordinator
Email: fiona.curtin@gci.ch
Phone: +41-22-789 1662
Fax: +41-22-789 1695
www.greencrossinternational.net/GreenCrossPrograms/waterres/waterresource.html

Saferworld (think tank working to prevent armed conflict)

28 Charles Square
London N1 6HT, UK
Email: general@saferworld.org.uk
Phone: +44-20-7324 4646
Fax: +44-20-7324 4647
www.saferworld.co.uk

The Worldbank

The Water Resources Management Group
1818 H Street, NW
Washington, DC 20433, USA
Contact: David R. C. Grey
Senior Water Adviser
Email: eadvisor@worldbank.org
Phone: +1-202-473-4125
Fax: +1-202-473-8301
<http://lnweb18.worldbank.org/ESSD/ardext.nsf/18ByDocName/AboutUs>

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