

Freshwater and foreign policy: new challenges

by Peter H. Gleick

Today, billions of people around the world lack water and sanitation services that many in ancient Greece and Rome took for granted—and the U.S. lacks any kind of coherent policy to address that problem.

AP/WIDE WORLD PHOTOS



Sun sets over an estuary of the Yangtze River in China. To meet its growing need for water, Beijing plans to begin diverting water from the river in 2010. Throughout the world, water is playing an increasing role in domestic and international politics.

This is a remarkable time, when understanding our dependence on the planet's freshwater resources and our demands on these resources are both at an all-time high. The connections between water policy and foreign policy are stronger than they have ever been, though the tools and practices of politics, negotiation, diplomacy and international cooperation are often inadequately applied to water problems.

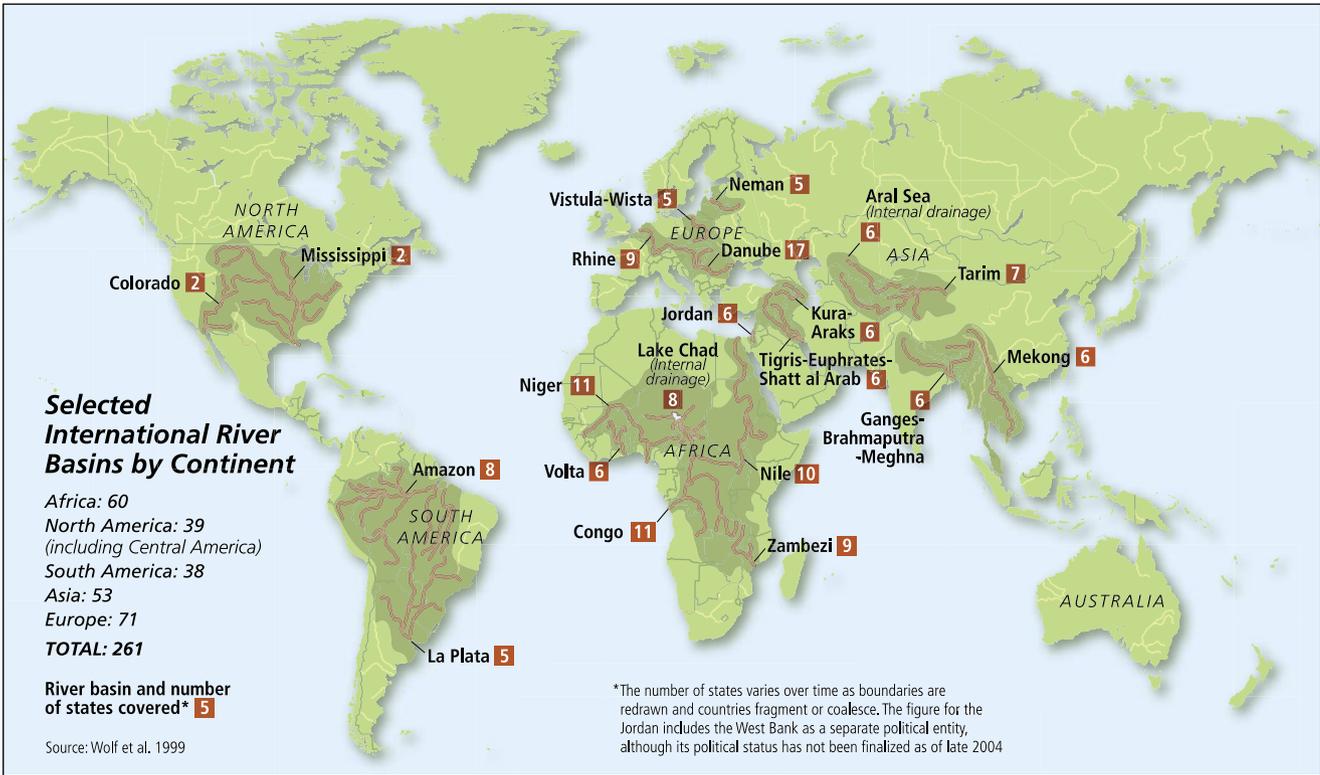
New ideas, technologies and institutional skills are needed to solve water problems in the 21st century. The bad news is that the U.S. lacks a coherent national and international water policy and shows little signs of moving toward adopting one. The good news is that innovative solutions are being tested, evaluated and applied all over the world, and there are many opportunities for the U.S. to help solve water problems while generating large amounts of goodwill.

Humans have been manipulating the hydrologic cycle and using freshwater in many ways since the beginning of recorded history. The

earliest agricultural communities learned how to capture rain and divert streams and springs to grow food. Engineering advances permitted simple dams and irrigation canals that helped farmers to grow more food, more reliably. The growth of towns and cities eventually required the development of organizations and technologies capable of bringing water to those who needed it and removing wastes.

During the industrial revolution and population explosion of the 19th and 20th centuries, the demand for water rose dramatically and today, thousands of monumental engineering projects control floods, protect clean water supplies and provide water for irrigation or hydropower. Water-related diseases such as cholera and typhoid, once endemic throughout the world, have largely been conquered in the industrialized nations. Huge aqueducts bring water to cities from hundreds and even thousands of kilometers away. Small family farms and huge centralized irrigation systems now produce enough food to meet

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the needs of more than 6 billion people. Nearly one fifth of all the electricity generated worldwide is produced by hydroelectric turbines.

Along with these great benefits, however, have come unexpected and adverse impacts. Millions of people have been displaced from their homes, often without compensation, by flooding caused by the construction of dams. Aquatic ecosystems around the world are stressed by loss of water or deteriorating water quality. Mismanagement of agricultural water is leading to soil salinization, groundwater contamination and overdraft, and conflicts over water allocations. Billions of people still lack water and sanitation services comparable to those available to citizens of ancient Greece and Rome. And water plays an increasing role in domestic and international politics and the foreign affairs of nations.

Water and foreign affairs

In the past decade, new debates have sprung up over the connections between water and foreign affairs. The legal and ethical implications of a "human right to water" have been taken up

by the United Nations, national governments and nongovernmental organizations. Major international conferences focusing on water are growing in scope and influence. And nations and regions fight, politically and diplomatically, over water resources. As these issues take on new importance, policymakers and the public need to better understand and act on all issues related to water, from the ecological to the political.

Unlike oil, there are no "substitutes" for water for health, cooking, agriculture, and even drinking. Most experts believe water use will grow in the future, as populations and economies grow, thus putting more pressure on a finite and vital resource. Political borders and boundaries rarely coincide with borders of watersheds, ensuring that politics inevitably intrudes on water policy. Indeed, over 260 river basins are shared by two or more nations. These factors make water a fundamental element of environmental security and give water a special place in political calculations.

Environmental security has been debated now for two decades, with a focus on the connections between the envi-

ronment and international politics. This debate has now shifted from "whether" there is a connection to "when," "where" and "how" environmental and resource problems will affect regional and international security. There is a long way to go before nations or regions agree upon a common agenda or set of initiatives that reduce the risk of resource issues becoming regional and national conflicts. Nevertheless, there are efforts under way to apply new tools, set new priorities and organize responses to a range of environmental threats to peace and security.

This framework is particularly well developed in the area of water resources. In the past several years there has been considerable progress in both understanding the connections between water resources and conflict and in evaluating regional cases where such connections may be particularly strong. There has also been progress in identifying policies and principles that can reduce the chance that freshwater disputes will lead to conflict. Efforts have begun to better understand mechanisms that can promote cooperation and collaboration over shared freshwater resources.

Progress has been more than academic. In October 1994, for example, Israel and Jordan signed a peace treaty that explicitly addressed water allocations, sharing water information and joint management policies for the Jordan River Basin. In 1996, India and Bangladesh signed a formal treaty that moved toward resolving their long-standing dispute over the Faraka Barrage and flows in the Ganges/Brahmaputra system. The International Law Commission, after nearly three decades, finalized the Convention on the Law of the Non-Navigational Uses of International Watercourses, which was approved by the General Assembly in May 1997. And individual countries are incorporating mechanisms and principles for resolving conflicts over shared waters in new water laws.

Water and conflict

Just as states have fought over oil, water has played a role in international conflicts. Water resources have been military and political goals. Water resources have been used as weapons of war. Water systems and infrastructure, such as dams and supply canals, have been targets of war. And inequities in the distribution, use and consequences of water management and use have been a source of tension and dispute.

Such conflicts can occur at local, subnational and international lev-



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els—indeed, one of the most important changes in the nature of conflicts over the past several decades has been the growing severity and intensity of local and subnational conflicts and the relative de-emphasis of conflicts at the international level. A growing number of disputes over allocations of water across local borders, ethnic boundaries, or between economic groups have led to conflict.

It is also important to note that water disputes are generally resolved diplomatically, and that shared water resources can be a source of cooperation and negotiation. Serious challenges remain, however, in improving the ability of current international law

and multilateral frameworks to reduce disputes over water.

Water resources as goals

Where water is scarce, competition for limited supplies can lead communities, economic groups and even nations to see access to water as a matter of political concern. Conflict can easily arise because political borders rarely coincide with watershed boundaries. But even countries with few or no internationally shared rivers or aquifers often have internal water disputes.

Water has been a particularly volatile issue in the Middle East and other areas where the supply is scarce. Disputes over control of scarce water resources

SOME BASIC WATER FACTS

- More than 1.1 billion people lack safe drinking water.
- 2.6 billion people lack adequate sanitation services.
- Between 2 million and 5 million people die annually from water-related diseases.
- Approximately 670 million acres of land are irrigated worldwide, producing 40% of the world's food.
- More than 260 major rivers cross international borders.
- 137 billion quarts of bottled water were sold in 2002.
- More than 20% of freshwater fish species in North America are at risk of extinction.
- Per capita water withdrawals in the U.S., for all purposes, were 2,000 cubic meters (about 528,000 gallons) in the year 2000. This is 25% below the peak use per person in 1978.
- Around 60% of the populations of India and Pakistan rely on groundwater.
- 21 million people in Bangladesh are at risk of arsenic contamination in their water supplies.

Sources: *The World's Water 2004–2005* (Island Press, Washington).



U.S. troops in Iraq August 2003 inspect a water pipe damaged when an explosion tore a hole in it. Water systems have continued to be the targets of insurgents fighting the U.S. invasion.

extend back as far as 4,500 years ago to the ancient city-states of Umma and Lagash in Mesopotamia (now Iraq) and as recently as the past few years when new conflicts have erupted over the control and management of the Jordan River, shared by Jordan, Syria, Lebanon, Israel and the Palestinians, and the Tigris and Euphrates rivers, shared by Turkey, Syria and Iraq.

The usual tools and instruments of war are military weapons. However, the use of resources, especially water, as both offensive and defensive weapons also has a long history, extending back thousands of years. In the last decade, there has been evidence that both

Turkey and North Korea considered the use of dams as political and military weapons in disputes with downstream neighbors. Other examples are available from the Middle East and recent conflicts in Africa (see the Water Conflict Chronology at www.worldwater.org/conflict.htm).

Where water and water-supply systems have economic, political or military importance, they become targets during wars or conflicts. In modern times, dams, water-supply pipelines and hydroelectric facilities have been bombed as strategic targets. The U.S. targeted irrigation levees in North Vietnam in the 1960s. Syria tried to destroy

Israel's National Water Carrier while it was under construction in the 1950s. During the first Persian Gulf war in 1991, the Iraqis intentionally destroyed water desalination plants in Kuwait and in turn suffered from the destruction of their water-supply systems by the allied forces assembled to liberate Kuwait. Even through 2004, such systems continue to be the targets of terrorism in Iraq, with insurgents bombing Baghdad's water-supply pipeline.

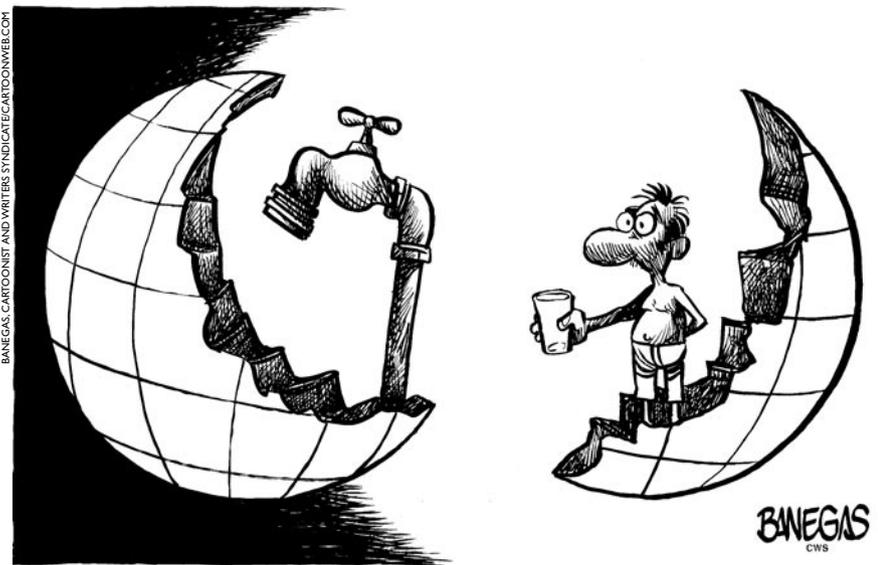
Diplomatic intervention

As conflicts and tensions over shared freshwater resources continue to grow outside the U.S., the need for effective diplomatic interventions also grows. At the moment, no independent organization consistently plays this role, though various groups have intervened in specific regions. For example, the World Bank helped resolve the dispute between India and Pakistan over the Indus River in the 1960s. The ongoing Nile River Basin Initiative—an effort to reach an agreement with all 10 Nile Basin countries—is supported by the African Development Bank, the Canadian International Development Agency, the UN Development Program and the World Bank.

In the past, the U.S. has played an important role in diplomatic interventions in water-related disputes. Perhaps the best example was the role the U.S. played in the multilateral peace talks in the Middle East in the 1990s, which led to the 1994 treaty signed by Jordan and Israel. The U.S. has not been as involved in recent years, but U.S. diplomatic initiatives should be encouraged in this area, given our ability to bring scientific, hydrologic, financial and legal expertise to the table.

Water and poverty

Perhaps the greatest failure of international economic development efforts of the 20th century was the failure to meet basic human needs for water for the entire population of the planet. Billions still lack access to safe drinking water and adequate sanitation. The best estimate of the World Health Organization (WHO) in 2004 was that more than a





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A Sudanese boy in a refugee camp carries drinking water. More than a billion of the world's people lack reliable access to safe drinking water.

billion people lacked reliable access to safe drinking water and over 2.6 billion lacked access to sanitation.

Inequities in access to water lead to poverty, shortened lives and misery, creating tension and unrest. In recent years, conflicts have arisen over efforts to privatize water systems, contamination of downstream water supplies or groundwater aquifers, dislocation of people because of dam construction and the destruction of fisheries that support local populations. Local governments may experience unrest and controversy over equity-related issues. In February 2000, one person was killed and over 30 hospitalized in Bolivia during public protests over water privatization and increases in the costs of water service. Understanding these connections is critical to understanding and developing methods of reducing the risks of conflict over water resources.

An increasing number of nations, international water conferences and aid organizations have announced efforts to improve global access to these fundamental water services. For example, the ministerial statement from the Sec-

ond World Water Forum in 2000 in The Hague called for efforts to guarantee "that every person has access to enough safe water at an affordable cost to lead a healthy and productive life and that the vulnerable are protected from the risks of water-related hazards."

In August of the same year, WHO and UN Children's Fund issued a report entitled the *Millennium Development Goals*, including one for water. The objective is to halve by 2015 the proportion of people without sustainable access to safe drinking water.

In Aug.-Sept. 2002 at the second Earth Summit in Johannesburg, South Africa, the international community added a new goal of halving by the year 2015 the proportion of people without access to basic sanitation.

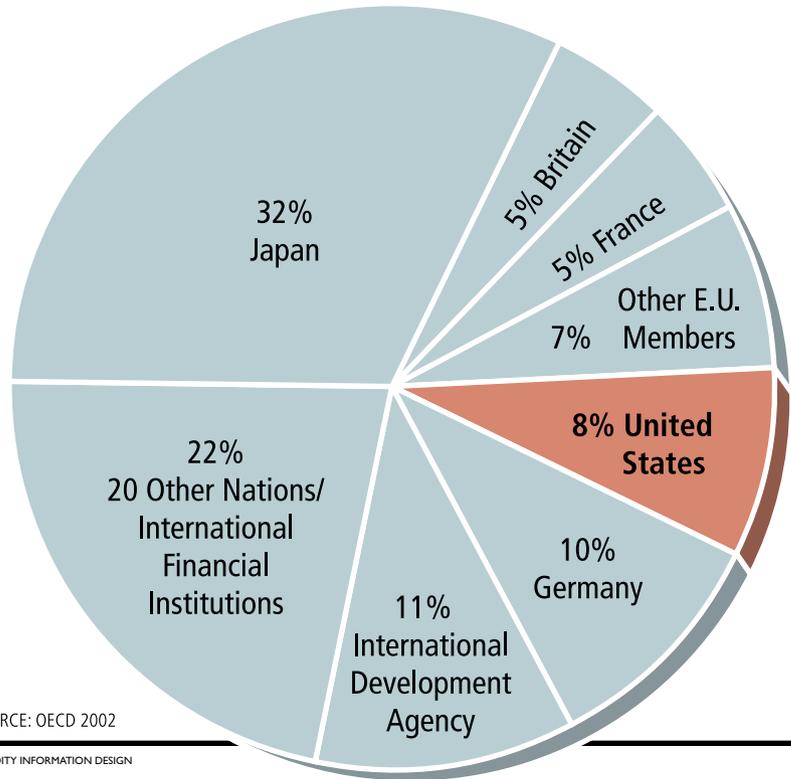
Achieving goals for water

Despite growing awareness of water issues and the adoption of official water targets such as those for the Millennium Development Goals, international economic support for water projects of all kinds is marginal and declining. Of-

ficial development assistance (ODA) for water supply and sanitation projects from countries of the 30-member Organization for Economic Cooperation and Development (OECD) and the major international financial institutions has actually declined over the past few years from \$3.4 billion per year (average from 1996 to 1998) to \$3.0 billion per year (average from 1999 to 2001). According to the OECD, those most in need receive the smallest amount of aid. Ten countries received around half of all water-related aid, while countries where less than 60% of the population has access to an improved water source received only 12% of the money. Unless there are serious new commitments of funding and effort by the international community, the goals for water are unlikely to be achieved.

The U.S. could be a leader in efforts to help meet basic human needs for water for all, but current U.S. financial contributions are small (see chart below). While no recent U.S. Administration has played a particularly active or effective role in this area, the

U.S. share of total official overseas development assistance for water supply and sanitation, 1999-2001



SOURCE: OECD 2002

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opportunities to do so are large, and the risks of failing to do so are growing. Some politicians have taken notice. In a November 2004 speech on the Senate floor, U.S. Senate Majority Leader Bill Frist (Rep.-Tenn.) decried the terrible human and political costs of failing to meet water needs in developing countries and urged greater efforts on the part of nations and nongovernmental organizations. "Unsafe water poses a clear security threat," Frist said. "Water basins do not follow national borders, and conflict over them will escalate as safe water becomes even scarcer. These conflicts may come to threaten our own national security. Modest, pragmatic, clean water projects that yield real measurable benefits will make things better."

Global water-health initiative

International health initiatives must give far more attention to an integrated water and health initiative. Between 2 million and 5 million people—mostly small children—die every year from preventable water-related diseases.

This toll is comparable to that from AIDS and far easier to reduce. An initiative to prevent such illness would include education on the links between safe water and improved health, funding of hygiene education programs and the construction of community infrastructure, and medical research on tools for prevention and treatment of a wide range of parasitic, bacterial and chemical water contaminants.

Human right to water

Related to the question of meeting basic needs for water is the foreign policy debate over whether access to basic water services is a fundamental human right. A growing number of scientific, legal and diplomatic scholars believe it is. In November 2002, the UN Economic and Social Council passed General Comment No. 15, which explicitly acknowledges the "human right to water" as "indispensable for leading a life in human dignity" and "a prerequisite for the realization of other human rights." It concludes, "States parties have to adopt effective measures to realize,

without discrimination, the right to water." This is the strongest and clearest official statement yet of the legal basis for a human right to water.

At the same time, most governments continue to do little to formally address the issue. With a few notable exceptions, politicians have shown themselves to be reluctant to acknowledge explicit human rights that may impose additional requirements or obligations on them. Similarly, the international water community, after issuing several breakthrough statements on water and human rights at international meetings in the 1970s and 1980s, has more recently found itself unable to move forward on this issue. At major water conferences (such as the Second World Water Conference in The Hague in 2000, the International Conference on Freshwater in Bonn in 2001, and the Third World Water Forum in Kyoto in 2003), the issue has been put on the agenda by legal scholars, academics, nongovernmental organizations, and community groups and then taken off again by some government delegations, including the U.S. ●

A U.S. national and international water policy

The U.S. currently has no consistent or comprehensive water policy, and its reputation, effectiveness and influence are diminished as a result. While many water problems are purely local, some very difficult challenges require government intervention and participation at both the federal and international level. The U.S. could be a powerful, effective and influential voice for sustainable water management and use and for helping to manage water disputes around the world. Applying these tools would benefit its economy, human health and foreign affairs. The opportunities include vast improvements in human health, economic gains that can expand markets for U.S. goods and services and increased global goodwill.

Moreover, a strong and clear U.S. water policy could set an example for other national water policies and smooth a path for stronger international action on water problems.

National water policy

State and local governments rightly have major responsibility for water management, planning, and decisions. This responsibility has increased over the past few years as the federal role in subsidizing new water development has diminished. Yet there remain several critical areas where federal involvement and responsibility are key to effective and efficient water policy. A new national water commission of independent nonpartisan individuals

should be created to lay out a national water agenda and to help the many, uncoordinated federal agencies with water responsibilities and interests.

Work for water agreements

Every major watershed in the U.S. spans two or more states, and many cross our borders with Mexico and Canada. The federal role in negotiating compacts and agreements that address navigation, trade, water allocation and water quality remains enshrined in constitutional principles but should become more active. The recent effort of federal agencies in helping alleviate water disputes between the states that share the Colorado River shows the

importance of a federal role. Similarly, only federal involvement can help resolve disputes over Native American water rights. And the lack of serious federal attention to festering water problems with both Canada, over the Great Lakes, and Mexico, over the Rio Grande and the Colorado River, is a source of concern to all parties.

National water standards

Certain aspects of water management require regulation at the federal level, especially the design, maintenance and enforcement of standards protecting water quality and governing industrial production. In 1948, Congress enacted the Federal Water Pollution Control Act, which in the early 1970s became the Clean Water Act. This legislation declared all discharges into the nation's waters to be unlawful, unless authorized by permit, and set ambitious objectives to restore and maintain the physical, biological, and chemical integrity of the nation's waters.

In 1974, Congress passed the Safe Drinking Water Act, which established national standards and treatment requirements for public water supplies, controls on underground injection of waste, protections for drinking water sources and provisions for financing infrastructure.

These federal laws are cherished by the public and have improved environmental and human health. They have served as models for national water laws in other countries. Enforcement and monitoring of these laws is a major federal responsibility that cannot be devolved to the states, local governments, or private corporations.

Phase out harmful subsidies

In the 20th century, the U.S. government heavily subsidized the construction and operation of massive infrastructure for flood protection, irrigation and hydroelectricity production. U.S. taxpayer dollars built hundreds of major dams, aqueducts, water treatment facilities and pipelines. These facilities brought great benefits to many but

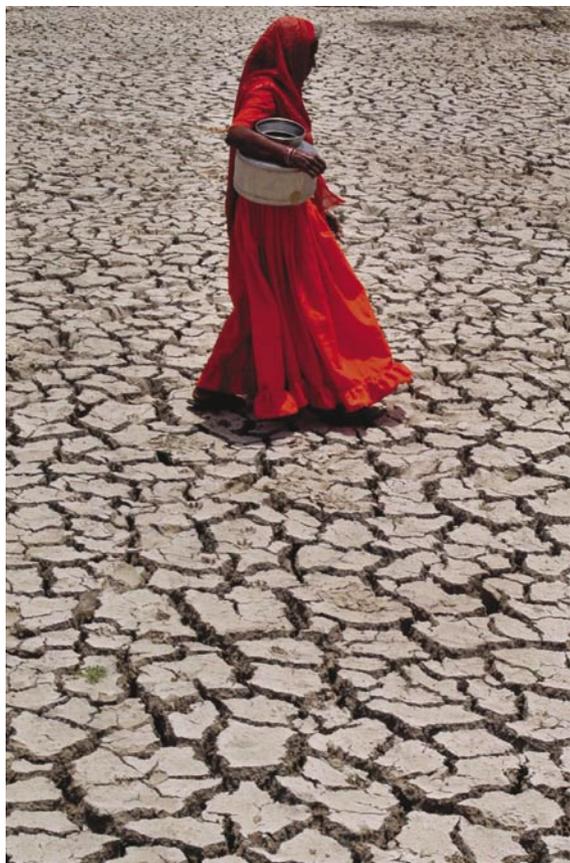
at a high economic, environmental and social cost. Such federal largesse is justifiably rare today, but a number of anachronistic subsidies remain that harm our national economy, international reputation and local environment. Among these are agricultural subsidies that encourage inefficient use of water and violate international trade agreements and direct subsidies to some users of water from certain federal projects.

For example, in April 2004, the World Trade Organization (GATT successor with power to enforce trade rules) made a preliminary ruling that U.S. cotton subsidies are illegal, distorting trade and suppressing prices. Such subsidies encourage growth of cotton, which otherwise might not be economical. And this, in turn, affects water use. For example, in

California, cotton consumes 9% of all agricultural water while producing less than 3% of income to farmers. Even modest reductions in cotton production would free up substantial amounts of water for other growers. Overall, direct irrigation subsidies in the western U.S. alone amounted to around \$4.4 billion per year in the mid-1990s, excluding the secondary economic and environmental costs of those subsidies, according to an analysis by Norman Myers, a renowned environmental scientist, and Jennifer Kent, an environmental researcher. Such subsidies should be carefully evaluated and those most damaging to national water resources should be phased out.

Improve water policy

The natural hydrologic cycle produces extreme events—both floods and droughts—that kill people and damage crops and property. The federal government has always played an impor-



In May 2004, a woman in Ahmadabad, India, crosses the dry Sabarmati riverbed to fetch water. The UN has said the right to water is "indispensable for leading a life in human dignity."

tant role in disaster relief, weather and climate forecasting, and drought and flood mitigation and control. In recent years, the need for these activities has increased, as a series of unusually severe events has stretched local resources to the limit and as the evidence that humans are dramatically modifying the global climate has solidified.

The U.S. government has a long-standing commitment to collecting information on the availability and quality of water. National surveys of water resources began in the 1800s—indeed, one of the rationales for the Lewis and Clark expedition (1803–06) was to investigate the water conditions in the new territories, including supply and navigation potential.

These data have indicated an unexpected change in the trend of water use in the country. Economists and water planners are trained to assume that water use will grow with population and the economy, and indeed, it did for

SHAMIL ZHUMATOV/REUTERSLANDOV



The area of the Aral Sea in Central Asia has been shrinking for decades as water inflows from the Amu Darya and Syr Darya rivers have been taken for cotton production, leaving fishing boats high and dry. Since the 1960s, the Sea has lost 60% of its surface area and 80% of its total volume.

much of the 20th century. But this relationship has been broken. The table above shows total U.S. gross national product (GNP) and water withdrawals from 1900 to 2000. Withdrawals grew exponentially with GNP until the mid-to late-1970s. Water withdrawals then began to level off and even decline—a change not recognized by water managers or policymakers until the 1990s. This decline is even more apparent when per capita use is measured. Since 1980, per capita withdrawals have decreased by more than 20% and now are at levels comparable to those of the mid-1960s. Yet U.S. population has grown since 1960.

These trends should have a dramatic effect on water planning and policy. In particular, they challenge the long-held assumption that economic and population growth lead inevitably to growth in water withdrawals and so require an expansion of supply. And they support the idea that improvements in efficiency and shifts in economic structure can reduce resource use, even in an expanding economy.

These kinds of critical trends cannot be identified without consistent and reliable data. The National Research Council of the National Academy of Sciences has consistently recommended that federal programs

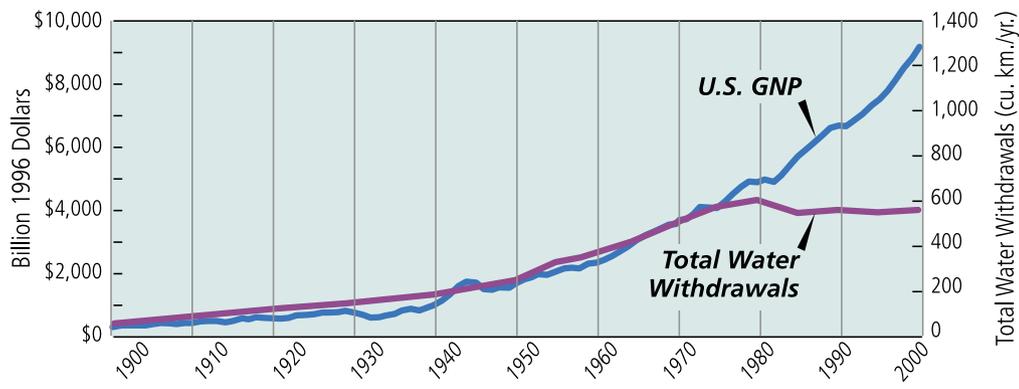
to collect water data be strengthened and expanded even in this era of federal deficits and constricting budgets for science.

New, smart technology

While economic, political, social, cultural and environmental factors must be addressed to find solutions to water problems, technology also has an important role to play. The large-scale, centralized systems that helped provide basic water services in industrialized countries will continue to play a vital role worldwide, but new small-scale technologies are increasingly needed to help monitor water quality, to deliver water at the community scale and to make sure it is safe. Technological innovation in the U.S. can play an important role.

Natural and industrial chemicals contaminate large volumes of water worldwide, and are often undetected because of inadequate or faulty monitoring. Improvements in rapid water-quality monitoring would reduce disease. Recent efforts to devel-

U.S. GNP (in 1996 Dollars) and Total Water Withdrawals



SOURCES: U.S. Dept. of Commerce, Bureau of the Census, Historical National Population Estimates & Resident Population Estimates of the U.S.

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op such monitors to help protect U.S. water systems from chemical or biological attack may have wide application worldwide.

Such monitoring, however, needs to be combined with approaches for cleaning contaminated water once it is detected. Again, large central water treatment systems, while effective for sprawling urban areas, are less useful and most costly in small rural communities. As a result, there has been growing interest in smaller-scale systems that operate on a village—or even household—scale. Community-scale systems that use advanced filtration or ultraviolet treatment, such as new filters for eliminating naturally occurring fluoride or arsenic, are being tested and deployed in many regions. “Point-of-use,” or family systems used within the household, with oxidants such as hypochlorite, chlorine dioxide or ozone, which can be produced locally have been investigated by the Centers for Disease Control. Some large multinational corporations, like the Proctor & Gamble Co., have explored producing point-of-use water treatment products to sell commercially. Such systems should be considered for emergency or secondary use, after reliable community systems are developed, or as an interim solution.

Finally, smaller-scale water delivery systems, particularly for irrigation, must be developed and produced commercially. Less than 20% of the world’s cropland is irrigated, yet that land produces over 40% of the food supply. Population growth makes it increasingly difficult to find new land to cultivate for food. As a result, the focus of attention has now shifted to finding ways to improve the productivity of the land and water available, particularly in developing countries, where even small increases in food production can have a dramatic impact on reducing poverty.

Two new technologies exemplify the tremendous effect smart technological development can have on a local scale. The “treadle pump” is a low-lift, high-capacity, human-powered



A typical treadle pump. These pumps are cheaper and simpler than motorized devices and have helped millions of farmers around the world boost the amount of water they can give their crops.

pump designed to help farmers boost the amount of water they can apply to their fields. They are far cheaper and much simpler than motorized pumps. More than a million such pumps have been built and deployed in southern Asia, and similar programs are now spreading to sub-Saharan Africa.

Low-cost drip irrigation systems permit farms to boost productivity without increasing water needs. Small farmers can then sell this produce in local markets, increasing family income and quality of life. Such drip systems are now being built and deployed.

Conclusion

Water is vital to every aspect of human life. It is no surprise, therefore, that it has become a factor in both local and international politics. Indeed, the history of political involvement in water policy is long and storied, from conflicts in ancient Mesopotamia to today’s headlines. As global populations grow, pressures on the Earth’s limited and finite freshwater resources also grow, leading to tensions among users and between the countries and regions that share this precious resource.

Politics will never be removed

from water—indeed, taking salt out is far easier. As a result, the world must learn to better apply the tools of diplomacy, negotiation and cooperation to reduce the risks of water-related conflicts. These tools, combined with innovative efforts to manage water more sustainably using new (and old) technology, smarter economic policies and open processes can make the foreign policy aspects of water less volatile. The U.S. has a special role to play, given our economic, political, military and technological advantages. Helping to meet basic human needs for water for all, protecting ecosystems from degradation, developing new water-efficient technologies and practices, providing educational and financial assistance where needed, and leading by example would all help reduce water problems here and abroad. The benefits of doing this are enormous; the costs of failing to do so are even larger. ●



QUESTIONS

1. Should water play a more important role in U.S. foreign policy initiatives? And if so, what forms should such water-related efforts take?
2. Annually, \$200 million to \$300 million in U.S. overseas development aid flows to water supply and sanitation projects, in a limited number of countries—mostly reflecting U.S. political objectives in the Middle East. Less than \$20 million goes to all of Africa. Should this aid be increased? Should the distribution be changed? Should such aid be considered

- a tool to support U.S. foreign policy objectives or be distributed on the basis of humanitarian need?
3. Some have proposed a new national water commission to explore the U.S. role in both national and international activities related to water. What would be the advantages and disadvantages of such a commission? What would be an appropriate format, structure and charge?
 4. What should the U.S. role be in addressing international disputes over water resources?
 5. How should the U.S. balance the economic and commercial aspects of water with its social and cultural characteristics? Should the U.S. do more or less to foster private participation in addressing water problems? In what ways?

READINGS & RESOURCES

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Oregon State University, Transboundary Water Program. This program maintains extensive information on water disputes, international water treaties and the Registry of International River Basins. www.transboundarywaters.orst.edu

The Pacific Institute, 654 13th St., Oakland, CA 94612; (510) 251-1600; Fax (510) 251-2203; The institute is a leading center for analysis and information on freshwater resources in the U.S. and internationally. It publishes reports on a wide range of water issues and produces **The World’s Water: The Biennial Report on Freshwater Resources**. www.pacinst.org.

www.who.int/whr/2002/annex/en The World Health Organization (WHO) Global Health Report. WHO maintains extensive information on human health, including water-related diseases. Data on the extent and severity of these diseases provide useful information on critical issues, where interventions are most needed and trends.

www.worldwater.org This Web site has extensive data on global water issues and the Water Conflict Chronology—a regularly updated historical summary of water and conflict by region, date and type of conflict.



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