

REPORT ON WATER

Water conflicts along the border have the potential to become more heated, considering the enormous demand for limited resources. The persistence of significant institutional gaps does not help the situation. For example, in the case of the All-American Canal, although a groundwater working group exists, there is no groundwater treaty and a formal agreement is unlikely. Groundwater is not highly ranked among the many issues that crowd the bilateral agenda. Unfortunately, without such a treaty, problems of transboundary resources will likely worsen. Aquifers are being over-drafted in many parts of the border, and without an agreement there is little incentive to avoid a race to the bottom.

Existing institutions have also failed to fully address problems resulting from prolonged drought. The 1944 treaty, governing both the Rio Grande and the Colorado River, was agreed upon when little was known about the long-term effects of prolonged drought. And there was no awareness of global climate change, which now threatens both the amounts and timing of precipitation and run-off in the two international rivers. Bilateral talks on this subject are necessary, as is a clear definition of drought provisions in treaties.

NATIONS ARE SELDOM WILLING TO ENGAGE IN TREATY discussions unless a situation of mutual interest and reasonable

trust exists. The enormous asymmetry of power between the United States and Mexico hinders the achievement of such a climate. As the world's sole superpower, the United States rarely focuses attention on its relationship with its far weaker and often compliant southern neighbor. Mexico, on the other hand, is acutely aware of its relative powerlessness and is hesitant to engage in treaty-making from a position of disadvantage.

In the past, Mexico has offered the U.S. State Department something in exchange for being heard on these matters. This was the case in 1944 when, during negotiations for the comprehensive water treaty, Mexico pledged its full support for the cause of the United States and the Allies during World War II. But such opportunities for leverage do not exist at this time.

Meanwhile, Washington's reluctance to deal with water issues bilaterally encourages parochial interests in California and Texas to dominate the agenda. Demand for this finite resource in towns and cities on both sides of the border continues to grow exponentially along with the population. Urban and industrial development try to keep pace with the demographic upsurge with little regard for the fragile ecological balance of most border habitats. These problems, and their political eruptions, will only worsen as water supplies are increasingly diverted to more powerful U.S. interests. ■

Mexico City's Water Crisis

by David Barkin

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MEXICO CITY'S WATER CRISIS HAS myriad faces. Many poor communities not only lack regular service, they lack access to any supply of water suitable for human consumption. Exacerbating the problem are the environmental effects of water policies that have put the whole metropolitan area at risk. These policies have impoverished the ecosystem and are threatening the precarious equilibrium that determines the rate at which the city sinks into the lakebed below. Historical neglect, political venality and ignorance have contributed to this crisis, permitting the sys-

tematic deforestation of the surrounding mountains and the construction of communities in the ravines and alongside the lakebeds through which water descends during the rainy season.

Little attention has been paid to the impending crisis. The city blithely continues to draw large volumes of water from neighboring states and discharges virtually all of its wastewater through a costly drainage system into the rivers of a nearby state, where forage and food crops are grown for the Mexico City market. Thus, the city's water management problems not only

threaten the viability of Mexico City, but also jeopardize the well-being of outlying communities and environments.

Mexico City lies surrounded by high mountains in an elevated valley, about 7,800 feet above sea level, in the center of the country. In pre-colonial times, indigenous-devised water systems in the valley's shallow lake basin serviced local urban settlements and agriculture. The valley's inhabitants lived on islands connected to each other by canals heavily trafficked by both people and goods. In the southern part of the valley, a highly productive agriculture was practiced on the floating gardens known as the *chinampas* of Xochimilco—the second largest of the five lakes. The *chinampas* were constructed from organic material dredged from the lagoons and enriched with organic waste from the crops cultivated upon them. In the eastern area, inhabitants carefully regulated the salinity of Lake Texcoco by routinely channeling out excess volumes of saline. Numerous smaller systems controlled the levels of water in the valley, protect-

ing against flooding and ensuring adequate supplies of potable water. By the mid-20th century, high rates of population growth, accelerated industrialization and the expansion of the central bureaucratic apparatus intensified the demand for water. The lakebed reservoir proved insufficient to meet the city's growing needs. Two systems were built to pump large volumes of water from outside the valley for use in the metropolitan area. Transfers from the nearby Lerma River system began in the middle of the 20th century. Some 30 years later, the Cutzamala system began transporting water from over 500 miles away, lifting it more than 3,000 feet for delivery to Mexico City. Together, the two transfer systems supply approximately a third of the area's present water needs.

Even today, rainfall would probably satisfy all the city's water needs if provisions were made to store some of the water behind dams and to inject the remainder into the lakebed for use during the long dry season. Unfortunately, the haphazard pattern of urban development foreclosed these options. The "reclamation" of swampy lands and the paving of city streets reduced the areas capable of naturally replenishing the aquifers. Aggravating the problem was the inability of successive administrations to enforce the few zoning and environmental regulations designed to limit settlement in the hillsides, ravines and high forests where water might easily have been stored. Often, local administrators actually aided and abetted squatter movements in

return for political support, thereby hastening environmental destruction. These "irregular" settlements transformed new communities into sites of "natural" disasters, while the clearing of nearby wooded areas for

Lacking a reliable source of potable water in the municipality of Huitzilucan near Mexico City, residents are forced to collect water in potentially toxic oil drums.



ing against flooding and ensuring adequate supplies of potable water. The water was transported by aqueduct from the numerous springs in the surrounding hills to service the booming population. The abundant rains that fell during the summer months naturally replenished these water systems and networks.

For centuries, colonial administrations in Mexico City simply exploited local lakes to meet the city's water needs, rather than maintain the complex hydrological systems that earlier indigenous civilizations developed. The situation did not change with Independence or the

infrastructure and housing further diminished nature's ability to recharge the aquifers.

The consequences are apparent in the environmental morass that has enveloped Mexico City in recent decades. Solid waste and sewage water were literally swept aside as the population and industrial production burgeoned. More water has been extracted from the aquifers on which the city still sits than was injected back into the subsoil to maintain the hydraulic balance. The most dramatic evidence of these excessive withdrawals of water is the gradual sinking of important

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landmarks, such as the Palace of Fine Arts and the National Cathedral. Despite numerous attempts to bolster their foundations with creative engineering projects designed to slow the subsidence and correct the structural damage, the sinking process continues. The damage has not been limited to these national monuments.



A rural community outside Mexico City blockades a main highway to demand access to potable water.

Buildings throughout the Central Valley are slowly descending as the water level drops. The lake continues to exert its influence, while the authorities seem impotent to reverse the process.

HISTORICALLY, WATER MANAGEMENT IN MEXICO CITY has been entrusted to a municipal water department that reports directly to the mayor. Given the city government's prevailing culture of inefficiency, it is remarkable that, so far, the water system has been maintained well enough to avoid massive shortfalls and widespread flooding. Even so, within the city, differences in the availability and quality of service are extreme. Many wealthier neighborhoods and industrial zones are well supplied, while many poorer districts remain bereft of service. Official figures report that 97% of the valley's population has potable water piped into their homes. In reality, however, many poor communities only receive water from tanker trucks that deposit it in 55-gallon drums previously used for shipping chemicals or other hazardous products.¹

The city's complex and aging hydraulic infrastructure suffers from numerous failings. Twenty-nine water treatment plants are supposed to assure the suitability of water for normal use, but some 40% of the processed water is lost either to leakage in the primary and secondary networks or to people who do not pay for it. The city has only one industrial-sized wastewater treatment

plant, and although more than 94% of households in Mexico City are connected to sewage lines, little of the wastewater is treated.² The 21 small sewage-processing plants only effectively handle about a tenth of the total discharge. Most of the wastewater is carried out of the city through a drainage system to the Mezquital Valley east of the capital, where it is supposedly dedicated to forage crops and animal use. But an alarming volume of the untreated water is used to irrigate fruits and vegetables that are then shipped to city markets.

Unlike those in most other urban areas in Mexico, water fees for domestic users in the capital are based on a progressive rate that rises as water use increases. This system, introduced in 1994, was supposed to reduce subsidies and encourage a culture of economy in water use. In absolute terms, however, water rates in Mexico City and throughout the Central Valley are scandalously low. When compared to 13 other large metropolitan areas in Mexico, residential consumers in the capital pay only 72% of the resulting average. Users of the base amount pay only a flat administrative fee of about US\$1.00 for the service.

Although larger water users do pay more for their water, the rich spend a substantially smaller proportion of their incomes for the service than do the poor. Because poorer families tend to be larger and several households often draw their water from a single water meter, their usage exceeds the minimum, so they are charged more than the corresponding flat rate. Consequently, these groups incur much higher real costs than do upper-income groups who usually do not consume more than the allotted minimum. Commercial water users—including industrial plants and service providers—pay up to 600% more for small volumes of water, but once their consumption reaches the highest rate bracket they pay virtually the same rate as households. Ironically, those without regular service are dependent on tanker trucks for delivery and end up paying substantially more, both in absolute terms—cost per gallon—and in relation to income.

SURPRISINGLY, MANY RESIDENTS OF THE CAPITAL are unaware that significant parts of the city's water system were transferred to private operators more than a decade ago. This ignorance may explain the lack of resistance to the municipality's decision to award management contracts to some of the largest international water companies for them to administer the payment system and conduct minor repairs. This remained the case even after

the center-left Revolutionary Democratic Party (PRD) assumed control of the local government, and is in sharp contrast to the situation in other countries where privatization schemes became highly contentious.

The initiative for soliciting private participation in water management in Mexico City originated with the National Water Commission (CNA), created in 1992 under the new "Law of National Waters." This law encouraged private participation "in the use and exploitation of water, as well as in its distribution and control." Both the new law and the CNA's privatization agenda stemmed from World Bank and Inter-American Development Bank pressure. The newly-formed CNA focused on the impending water supply crisis in the metropolitan area and on creating a strong institutional structure to support its mandate to promote decentralization.³ Its most serious concern was the high cost of operating the system and the exceedingly large volume of water being consumed in the valley. At the time, average consumption levels in large urban areas in other countries was about 50 gallons a day per inhabitant; in Mexico City each person was using 95 gallons a day.⁴

Another strong motivation for enlisting private administrators was the irrational rate structure and the municipality's inability to collect payments. When the

The city lacks the capacity to re-use significant volumes of water for industrial and agricultural production within the valley, a practice that would alleviate the demand for freshwater.

structural changes were being considered, water charges were based on a flat fee for each user regardless of the volume consumed. The system was recuperating less than 40% of its operating costs through fees. The resulting deficits severely limited the city's ability to expand coverage to areas of new population growth.

Unlike in many other cities in Mexico and elsewhere, the terms of private participation for Mexico City

were defined as "service contracts" rather than concessions. This turned out to be a felicitous arrangement because it avoided the problem of raising rates to pay for the full operation of the water system. About 50% of costs are presently covered by service charges and the city's general budget foots the remaining bill.

To define the scope of operation for each of the foreign corporations—the French companies Suez and Vivendi, and the U.K.-based United Utilities and Severn

Trent—and their Mexican partners, the city was divided into administrative quadrants.⁵ Planners envisioned a multi-stage process in which management partnerships were to create a reliable list of rate payers, introduce a system for collecting payments and develop an information system to accurately map the underground supply and disposal networks. They were also to establish an efficient system for installing, repairing and maintaining water meters as well as for installing new service. The private contractors assumed responsibility for operating the system and delivering potable water to consumers. The contractors were also assigned responsibility for maintaining and repairing leaks in the secondary water and sewage networks that service their respective regions. The city's Water Commission was to continue providing service to the primary networks that deliver water to local districts and take their sewage to the main discharge system. The city also was charged with expanding the service systems for both potable water and sewage.⁶

Most people who have studied this arrangement agree that, during their first ten years, the concessions successfully achieved their objectives. The companies reduced water leakage in the distribution system from 37% to 30% between 1997 and 2001. The new systems are largely self-financing and have generated attractive profits for the companies, while liberating local government from covering the operational costs of the secondary network. During the first seven years under company administration, the numbers of ratepayers increased six-fold and water fee collections almost doubled. Of course, this dramatic increase in revenues had a direct effect on the population, which frequently organized to express its displeasure with the new rates. Since rates are fixed by the local legislature and the public office bears the seal of the city and the Water Commission, the public's ire has been directed at politicians rather than the foreign companies, about which most people remain unaware.

ALTHOUGH PRIVATIZATION HAS IMPROVED THE efficiency of some aspects of the water system in Mexico City over the past decade, it has not effectively confronted the basic challenges facing the region. The underlying imbalance between demand and supply has not been addressed, in part because the progressive rate structure has not made consumption costly enough to limit waste. Aggravating the situation, substantial sectors of the population in the poorest areas of the eastern part of the city still receive water of unacceptable quality and suffer the inconven-

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ience of rotating schedules for water deliveries, whether through the water network or from tanker trucks.

There are numerous other fundamental tasks that await municipal attention throughout Mexico. Perhaps the most serious is the need to implement wastewater treatment more broadly. In Mexico City, a plan to build four treatment plants during the 1990s floundered for lack of financing, and no serious proposals have been made since. As a result, the city still lacks the capacity to re-use significant volumes of water for industrial and agricultural production within the valley, a practice that would alleviate the demand for freshwater. To address this, the CNA is imposing penalties for effluent discharges that exceed the amount permitted by law. Large industrial users have responded well to the new system, and have acted on incentives to economize on water use in production by installing treatment facilities in their plants. Nevertheless, the existing rate structure, together with the institutional framework that permits some to

Perhaps the most important challenge facing Mexico City and the nation as a whole is the need to create a new culture of water.

draw unlimited volumes of water from the common aquifer in the valley, continues to hinder any improvement in water conservation.⁷

The harvesting of rainwater has only recently emerged as an important strategy. Mexico City's government recently announced a substantial investment in new wells that

would inject rainwater back into the lakebed. This would help the city to slow the sinking process caused by the lake's depletion, and would permit the storage of water for seasonal needs. As is true of many other such announcements, however, it remains to be seen if the resources for this project will be made available and if the wells will effectively achieve the intended goals. More significant is the question of whether the next administration will be inclined to make the same long-term commitment required to assure the effectiveness of such an investment.

Perhaps the most important challenge facing Mexico City and the nation as a whole is the need to create a "new culture of water."⁸ Without a significant and effective campaign to change habits of water use, the underlying pressure of an inexorably growing demand will overwhelm other measures, even those that effectively improve supply management. For example, local and national regulations require the removal of toilets with large tanks, which are to be replaced by models that con-

sume less water. Nevertheless, a large part of the housing stock retains the older, more wasteful models. Similar regulatory initiatives are widely disregarded in the United States, too. Also, the importance of installing flow restrictors on showers and faucets is not generally appreciated, and educational campaigns to introduce "leak detectors" are virtually non-existent.

Constructive responses to Mexico City's impending water crisis are unlikely to come from the complacent metropolitan consumer. They are more likely to result from a new wave of activism in the regions from which present supplies of water are drawn. The impact of these transfers on the people and ecosystems in the river basins from which the water originates has been disastrous. Agriculture has been severely restricted and productive systems disrupted, forcing basic changes in the lives of the people in these regions. The availability and quality of drinking water in some areas has deteriorated to such a degree that local communities, most notably the indigenous Mazahua, who live in the neighboring state of Mexico, are now demanding a reduction in the transfers and greater compensation for what they consider to be their water. In early 2004, they dramatized their demands by protesting and closing down a pumping station for one day.

These demands are being supported by the state government, controlled by the Institutional Revolutionary Party (PRI), which opportunistically sees the water transfer issue as a means of negotiating concessions from the "all-powerful" giant that is Mexico City, controlled by the oppositional PRD. This dispute is now being aired in the Supreme Court. Already there is a political consensus that the national government can no longer simply exercise its executive fiat to quench the capital's thirst, as it has done historically. And while the aggrieved have demanded compensation for water extracted in the past, it is unlikely that any government will ever seriously make amends for the social and economic losses suffered by source communities.

An emerging public consciousness seeks new solutions to old problems, and some local agencies are now undertaking campaigns to economize on water use and create the much-needed new culture of water. Unfortunately, a well-entrenched oligarchy continues to abuse its political and economic power, often in opposition to local government. Mexico City's water crisis will likely become much worse before a political climate emerges that is conducive to achieving an environmental and social balance in the management of this crucial resource. ■

The Struggle for Latin America's Water

1. Marq de Villiers, *Water* (Toronto: Stoddart Publishing, 1999).
2. Armando Chávez, "Latin America: Poor Distribution of Water and Even Worse Use," in 2004 Express, <<http://www.barcelona2004.org/eng/actualidad/publicaciones/focus/html/f041366.htm>>, citing the Economic Commission for Latin America and Caribbean.
3. *World Resources, 1998-99* (New York: Oxford University Press, 1998).
4. Mario Osava, "Mega Cities Squander Water Resources," Inter Press Service, March 19, 2004, citing the Global Environment Outlook study by the UN.
5. Press Release, Pan American Health Organization, October 3, 2002.
6. *World Resources, 1998-99* (New York: Oxford University Press, 1998).
7. "The Water Barons," Center for Public Integrity, 2003, <<http://www.icij.org/water/default.aspx>>.
8. Maude Barlow and Tony Clarke, *Blue Gold: The Fight to Stop the Corporate Theft of the World's Water* (New York: New Press, 2002).
9. The following paragraphs on PROMAGUA in Mexico are based on research conducted by Alejandra Peña of the National Autonomous University of Mexico (UNAM) while on a study assignment at the Polaris Institute in Canada, 2003-2004.

Conflict in the Borderlands

1. John Hernandez, "Long Term Climate and Streamflow Records on the Rio Grande." Paper presented to the Binational Conference, Coping with Scarcity in the Rio Grande/Rio Bravo Drainage Basin: Lessons to be Learned from the Droughts of 1900-1996, Cuernavaca, Mexico, October 1997.
2. T.W. Anderson et. al., "Geohydrology and Water Resources of Alluvial Basins in South-Central Arizona and Parts of Adjoining States" (U.S. Geological Survey Professional Paper 1406-B, 1972).
3. Jason Morrison, Sandra Postel and Peter Gleick, *Sustainable Use of Water in the Colorado River Basin* (San Francisco: The Pacific Institute, 1996).
4. Testimony by Maureen Stapleton, General Manager, San Diego County Water Authority, at Oversight Hearing on "Implementation of the California Plan for the Colorado River," U.S. House of Representatives: Subcommittee on Water and Power, December 10, 2001, p. 1.
5. Luis Villa, "Acaparan ganaderos el agua en Guaymas, miles de campesinos en las miserias por la sequía," *El Financiero*, May 14, 1998, p.6.
6. As a sample of the wide array of border water issues, see the articles included in *Natural Resources Journal*, Spring 2000, Vol. 40, No. 2.
7. Octavio E. Chávez, "Mining of Internationally Shared Aquifers: the El Paso-Juárez Case," *Natural Resources Journal*, Spring 2000, Vol. 40, No. 2, p. 247.
8. For a recent update, see "Obstacle Removed for a Major New Plant," *San Diego Union-Tribune*, February 29, 2004, p. G-2.
9. Much of this section is based on research by Stephen P. Mumme, particularly his "Institutional Framework for Transboundary Inland Water Management in North America: Mexico, Canada, the United States and their Binational Agencies," report submitted to the Commission on Environmental Cooperation, Montreal, Canada, December 1996.
10. Pamela Doughman and María Rosa García, "Visiones contrastantes del agua y su impacto en el manejo del agua, la equidad social, y la cooperación transfronteriza," in Alfonso Cortez Lara (ed.), *Seguridad, agua y desarrollo en el futuro de la frontera México-Estados Unidos* (Tijuana: El Colegio de la Frontera Norte, forthcoming).
11. For a discussion on the impact in Mexico of lining the All-American Canal, see Vicente Sánchez (ed.), *El revestimiento del Canal Todo Americano: competencia o cooperación por el agua en la frontera México-Estados Unidos* (México: El Colegio de la Frontera Norte/Plaza Jones, forthcoming).
12. Stephen P. Mumme, *Apportioning Groundwater Beneath the U.S.-Mexico Border* (La Jolla, California: Center for U.S.-Mexican Studies, University of California, San Diego, 1988).
13. See U.S. Congress Public Law 100-675, 1988, <<http://thomas.loc.gov/cgi-bin/query.html>>.
14. Albert E. Utton, "Mexican International Waters" in Robert Beck (ed.), *Waters and Water Rights, Vol. 5* (Charlottesville, Virginia: Michie Co., 1991).
15. All surface water of the Colorado River had been allocated through the U.S.-Mexico Water Treaty of 1944, by which Mexico was entitled to receive 1.5 mil-

- lion acre-feet of this water annually. Stephen P. Mumme, "Revising the 1944 Water Treaty: Reflections on the Rio Grande Drought Crises and Other Matters," *Journal of the Southwest*, Vol. 45, No. 4: Winter 2003, p. 649.
16. Lisa Snedeker, "Interior Secretary Announces Plan for the Colorado River Water," Associated Press, December 14, 2000, pp. 1-2.
17. SDCWA, "Four Agencies Sign Historic Colorado River Deal," News Release, 10/10/2003 <<http://www.sdcwa.org/news/101003AgenciesSignQSA.phtml>>; José Luis Jiménez, "County Water Authority Approves Imperial Deal," *Los Angeles Times*, September 26, 2003, pp. B2-B3. See also the 1998 California legislation that allocated funds for the lining of the All-American Canal (SB 1765), <<http://www.leginfo.ca.gov>>.
18. Robert W. Gee, "Dry Fields Threaten Way of Life for Valley Farmers," *Cox News Service*, March 17, 2002, p. 1; Robert W. Gee and Susan Ferriss, "U.S., Mexico Share an Urgent Thirst," *Cox News Service*, March 17, 2002, p. 1.
19. Ismael Aguilar-Barajas, Mitch Mathis and Jurgen Schmandt, "Water Security and Economic Development in the Binational Lower Rio Grande/Rio Bravo Basin," paper presented at the Stockholm International Water Institute Seminar, Stockholm Water Symposium, Stockholm, Sweden, August 18, 2001.
20. Susan Ferriss, "Fox Vague on Water Deliveries Owed U.S." *Cox News Service*, June 24, 2002, pp.1-2.
21. Ferriss, "Fox Vague on Water Deliveries Owed U.S."
22. Chuck Lindell, "Texas at Odds with Mexico over Water Crisis," *Cox News Service*, October 2, 2002, pp. 1-2.
23. Lindell, "Texas at Odds with Mexico Over Water Crisis"; Mary Jordan and Paul Duggan, "Water Dispute Divides Texas and Mexico," *The Washington Post*, May 25, 2002, p. A-3.
24. Asher Price, "U.S. Gets Annual Payment of Water. But Fox says Mexico doesn't Have Enough Reserves to Tackle Backlog," *The Austin American Statesman*, March 10, 2004, p. B1.
25. Ferriss, "Fox Vague on Water Deliveries Owed U.S."; Susan Ferriss, "U.S., Mexico Reach Pact to Release Reservoir Water," *The Washington Post*, June 30, 2002, p. A17.

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1. This often involves carrying water from central delivery points to homes, sometimes at a considerable distance. These tasks are generally considered to be women's work.
2. Much of the material in this section is drawn from a recent study commissioned by the Legislative Assembly of the Federal District to the University Program for Urban Studies at the National Autonomous University of Mexico (UNAM) in Mexico City, *Gestión del Agua en el Distrito Federal: Retos y propuestas* (Mexico City: UNAM, 2004). Although much of the information on water management in Mexico City is widely available, it has been conveniently assembled in this book.
3. This is a subject of great importance at present, in light of the unhappy experiences that have led to violent confrontations in other countries of the Third World, like Bolivia, Argentina and the Philippines. For continuing information on this struggle, I recommend consulting the listservs that are documenting this process and pointing participants to analytical materials to better understand the process. See, for example, the "Right to Water" and the "U.S. Water Networks" administered by the Institute for Agriculture and Trade Policy <<http://www.iatp.org>>.
4. *Gestión del Agua en el Distrito Federal: Retos y propuestas* (Mexico City: UNAM, 2004).
5. The consortium for each quadrant is required to have a majority control (51%) by Mexican capital. The Mexican partners are among the country's largest construction and banking groups.
6. This division of responsibilities has become an area of serious conflict because of certain jurisdictional ambiguities and because the arrangement has not been explained to the population. There is also ongoing conflict between the City Water Commission and those district (*delegación*) authorities who must act in cases of emergency to repair the primary distribution network.
7. Many of these issues are discussed at length in David Barkin, *Innovaciones Mexicanas en el manejo del agua* (Mexico City: Universidad Autónoma Metropolitana-Xochimilco, 2001).
8. This expression was popularized by a grassroots water movement in Spain led by

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Pedro Arrojo. The movement successfully opposed a grandiose scheme of the central government, which proposed inter-basin water transfers to sustain a program of intensive commercial agriculture and tourism development in the country's driest regions. Arrojo was awarded the 2003 Goldman Environmental Prize for Europe for his effective leadership of this struggle.

Running Water: Participatory Management in Brazil

1. Most of the information contained in this article was collected by participants in the Watermark Project (Projeto Marca d'Água), a multidisciplinary study of the development of decentralized water management institutions in 20 Brazilian river basins over five to ten years. For more information on the project, see: <<http://www.marcadagua.org.br>>.
2. At 4,309 cubic miles per year, they far outstrip those of second-place Russia, with 2,789 cubic miles. See Peter H. Gleik, *The World's Water 2000-2001* (Washington, DC: Island Press, 2000), p. 197.
3. The conference, a preparatory event for the June 1992 UNCED, included government-designated experts from over 100 countries and representatives of 80 international, intergovernmental and nongovernmental organizations. "The Dublin Statement on Water and Sustainable Development," <<http://www.wmo.ch/web/homs/documents/english/icwedece.html>>.
4. Janine Haase, "Bacia do Rio dos Sinos," and Ricardo Gutierrez, "Bacia do Rio Gravataí," <<http://www.marcadagua.org.br>>.
5. Paula Duarte Lopes, "Bacia do Rio Piracicaba," in Rosa Maria Formiga Johnsson and Paula Duarte Lopes, *Projeto Marca d'Água: seguindo as mudanças na gestão das bacias hidrográficas do Brasil: caderno 1: retratos 3X4 das bacias pesquisadas* (Brasília: FINATEC, 2003).
6. The São Paulo water districts are not all river basins. The Tietê, for example, is divided into districts for management of the upper, middle and lower reaches of the river, each part of which has distinct characteristics.
7. Interview, Ana Lúcia Magyar, FUNDAP, São Paulo, May 25, 1999. See also Margaret E. Keck, "'Water, Water Everywhere, Nor Any Drop to Drink': Land Use and Water Policy in São Paulo, Brazil," in Peter Evans (ed.), *Livable Cities? Urban Struggles for Livelihood and Sustainability* (Berkeley: University of California Press, 2001), pp. 162-194.
8. Margaret Keck and Pedro Jacobi, "Bacia do Alto Tietê," <<http://www.marcadagua.org.br>>.
9. See Ivanir Mais, "Bacia do Rio Itajaí," <<http://www.marcadagua.org.br>>; Beate Frank and Noema Bohn, "A Bacia Hidrográfica do Rio Itajaí e o processo de criação do Comitê de Bacia," in Theis, Tomio and Mattedi (eds.), *Novos Olhares sobre Blumenau* (Blumenau: EdFURB, 2000).
10. Rosana Garjullil, et al., "Bacia do Rio Jaguaribe," <<http://www.marcadagua.org.br>>. Studies of other examples can also be obtained at this same Web site and in Rosa Maria Formiga Johnsson and Paula Duarte Lopes, *Projeto Marca d'Água: seguindo as mudanças na gestão das bacias hidrográficas do Brasil: caderno 1: retratos 3X4 das bacias pesquisadas*.


Water Privatization in Buenos Aires

1. Daniel Azpiazú, et al., "Menem's Great Swindle: Convertibility, Inequality and the Neoliberal Shock," *NACLA Report on the Americas*, Vol. 31, No. 6, May/June 1998.
2. Eduardo Basualdo, *Concentración y centralización de capital en la Argentina durante la década noventa*, (Buenos Aires: FLACSO, 2000); Marisa Duarte, "Los efectos de las privatizaciones sobre la ocupación en las empresas de servicios públicos," *Realidad Económica*, Vol. 182, August/September 2001.
3. Cited in Alex Loftus and David MacDonald, "Lessons from Argentina: The Buenos Aires Water Concession," Municipal Services Project, Queens University, Occasional Papers Series, No. 2, 2001, p. 19.
4. "Suez: A Corporate Profile," A special report by Public Citizen's Water for All Program (Washington, D.C., August 2003).
5. Daniel Santoro, "The 'Aguas' Tango: Cashing in on Buenos Aires' Privatization," in *Cholera and the Age of the Water Barons* (Washington: Center for Public Integrity, February 2003).
6. Daniel Artana, et al., Regulation and Contractual Adaptation in Public Utilities: The Case of Argentina (Inter-American Development Bank, 1999), p. 211; Victoria

Murillo, "Union Politics, Market-Oriented Reforms, and the Reshaping of Argentine Corporatism," in D. Chalmers, Carlos M. Vilas, et al. (eds.), *The New Politics of Inequality* (New York: Oxford University Press, 1997).

7. Alex Loftus and David MacDonald, "Lessons from Argentina: The Buenos Aires Water Concession," p. 27.
8. Daniel Azpiazú, *Las privatizaciones en Argentina* (Buenos Aires: CIEPP/Fundación OSDE, 2002); Daniel Azpiazú and Martín Schorr, *Crónica de una sumisión anunciada* (Buenos Aires: IDEP/Siglo XXI/FLACSO, 2003); Emilio Lentini, "La regulación de la concesión de Buenos Aires: Diagnostic et Propositions," in G. Schneier and B. De Gouvello (eds.), *Eux et Réseaux. Les défis de la mondialisation* (Paris: IHEAL/CREDLA, 2003); Daniel Santoro, "The 'Aguas' Tango: Cashing in on Buenos Aires' Privatization."
9. ETOSS (the Tripartite Agency for Sanitation Works and Services) is the federally mandated government organ that regulates the AASA concession. The national government, the provincial government of the province of Buenos Aires—which includes the 17 municipalities of Greater Buenos Aires—and the city government of Buenos Aires decide its directorate.
10. Daniel Azpiazú, *Las privatizaciones en Argentina*, p. 143.
11. See Américo García, "La renegociación del contrato de Aguas Argentina S.A. (o cómo transformar los incumplimientos en mayores ganancias)," *Realidad Económica*, Vol. 159, October/November 1998.
12. Daniel Santoro, "The 'Aguas' Tango: Cashing in on Buenos Aires' Privatization."
13. The rate hike for 2003 was suspended pending further renegotiation, still underway. The annual collection of rates for AASA amounts to some \$600 million pesos, which until 2002 equaled the same amount in U.S. dollars.
14. See Nana Bevillaqua, "El servicio de aguas y cloacas. Un Estado que actúa a favor de las multinacionales. Aguas Argentinas, gran negocio de la empresa a expensas de los usuarios," *Le Monde Diplomatique* (edición Cono Sur), August 26, 2001.
15. Daniel Azpiazú and Karina Forcinito, *Historia de un fracaso: la privatización del sistema de agua y saneamiento en el área metropolitana de Buenos Aires* (Buenos Aires: FLACSO, 2003), unpublished manuscript.
16. Alex Loftus and David MacDonald, "Lessons from Argentina: The Buenos Aires Water Concession."
17. "Suez: A Corporate Profile," A special report by Public Citizen's Water for All Program (Washington, D.C., August 2003); Corporate Europe Observatory, "European Water TNCs: Towards Global Domination?" available at: <<http://www.corporateeurope.org/water/infobrief1.htm>>; Daniel Santoro, "The 'Aguas' Tango: Cashing in on Buenos Aires' Privatization."

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