CHAPTER 4

MENA Countries Can Leverage the Potential for Change by Improving External Accountability

The previous chapters showed that the region has improved water storage and services but has not been able to address some fundamental water reforms. They also suggested that some of the factors that drive water outcomes are changing in ways that could provide political space for reforms that were not politically feasible in the past. However, countries will only be able to take advantage of that potential if they have good mechanisms for external accountability. That means making sure that users have a reasonable voice in decision making and that officials and service providers are accountable for their actions.

The actions necessary to improve water management go beyond the expertise of water professionals. Indeed, the tasks extend beyond the public sector into user associations, advocacy groups, the media, academia and other parts of civil society; this is the only way that the full range of information can come to the decision-making process. Achieving this range of stakeholder input will require accountability between users and governments, between governments and service providers, and between users and service providers.

This chapter shows that improving accountability is important if water management outcomes are to improve in the Middle East and North Africa (MENA) region. It shows first how other arid countries have managed to address their water issues in a context of relatively strong external accountability and often at the same time as overall economic transformation. It then shows how improved accountability leads to better water services in MENA. Finally, the chapter discusses how lack of external accountability exacerbates the region's water problems.

Strong Economies and Accountability Mechanisms Have Helped Some Arid Countries Reform Water Management

Broad water reforms have often been undertaken by countries within a context of broad social change. Far-reaching social and economic changes, unrelated to water, have led to water management reform in several countries. Examples include constitutional reforms that allowed the creation of water markets (Chile, Mexico, Peru); social and government transformation associated with democratization and accession to the European Union that transformed river basin management (Poland); major fiscal decentralization associated with decentralization of water operations (irrigation water user associations in Mexico); reduction in the role of the state including privatization of water and sanitation utilities (England and Wales, Chile); growing awareness of ecological problems and growth in environmental activism; and user involvement in choosing services they want and are willing to pay for (widespread in developing countries) (Castro 2006; Kemper, Dinar, and Blomquist 2005).

Transformation to a more flexible, adaptive water management system has gone hand in hand with growth and economic diversification in several arid countries or regions. The transformation in Spain is described in box 4.1. An example from the United States would be the rapid-growth economies in California and the arid southwest. Massive investments in infrastructure were part of rapid economic development. In the early twentieth century, California experienced physical conflict over water allocations to urban areas. Later in the century, the governance structures changed, and the battles now take place mainly in the courts, political arenas, and the press. Environmental and social activists demand that the government enforce legislation and water users challenge the allocations of other users (Reisner 1986).

Israel has overhauled its water policy and institutions, at least in part because of relatively strong mechanisms fostering accountability. Independent of discussion about international water agreements and about preferential financing for water investments, the country recently undertook a major shift in its water sector management. Despite good technical information about water resources, strong institutional capacity, and good water policy instruments, the domestic political economy of water in Israel is associated with highly contentious politics. The country has insufficient water for its needs, given current social and economic structures, and has consistently overpumped its aquifers. A combination of factors including drought, international pressure, and an active environmental movement opened a political window for reform in the late 1980s. Although the process was and remains controversial, the country's arrangements to foster internal accountability came into play.

BOX 4.1

Transformation of the Economy and the Water Management System in Spain

Spain has to deal with unevenly distributed rainfall and large arid areas. Since 1975, demand has consistently outstripped supply and the country has seen intensive use of surface water and often unsustainable depletion of aquifers. The country has a long history of sophisticated water institutions, including a Water Court established in Valencia in 1960 and water markets in Alicante and the Canary Islands. River basin agencies, through which users contributed to the planning of hydraulic works and water allocation, were originally formed in 1926. These lost their participatory element and were dominated by the central government at the end of the century and particularly during the Franco regime, which began in 1939. National water policy in the middle of the twentieth century consisted of constructing hydraulic infrastructure to modify natural flows and to catalyze a shift from traditional to intensive agriculture. The sector was dominated by well-educated technical elites from the Civil Engineering Corps. The transition to democracy in 1976 and integration into the European Community transformed Spanish society. Deep socioeconomic reforms modernized the country and brought about rapid growth. The average Spaniard today is 75 percent richer than 30 years ago. The country decentralized government structures to regional governments.

The transformation also affected the water sector. In 1985, Spain passed the Water Act, which established a framework of integrated water management. It made the river basin agencies, still dominated by the central government but with broader participation than in the past, the primary institutions responsible for water planning. This act broadened the emphasis on supply augmentation to include additional goals of environmental protection, water quality improvement, and water use efficiency. In 1999, this law was amended to introduce the elements for voluntary exchanges of water rights among users— water markets. The changes are a significant improvement, although they have not "solved" the country's water problems. Water deficits are still a problem in the more arid parts of the country, and tensions between urban and agricultural water users are growing. Major interbasin transfers are under consideration, despite active opposition by environmental and other groups.

Sources: Kemper, Dinar, and Blomquist 2005; Fraile 2006.

The State Comptroller criticized the Water Commissioner, who was replaced by someone with a technical rather than an agricultural background (Feitelson 2005). Cost recovery for water services increased, allocations to agriculture were reduced, and policy makers paid increased attention to instream flows and environmental conditions.[1] In the

1990s, pressure on the Water Commissioner increased further, as domestic demand continued to rise requiring reliable supplies of good quality water and as environmental standards became stricter. Another drought in 2000 led to a general determination that the policy of "brinksmanship" with water supplies could not continue (Feitelson 2005). The government embarked on four activities: first, augmenting supply through large-scale desalination and reuse of treated wastewater; second, reducing the amount of water allocated to agriculture and limiting agriculture's consumption almost exclusively to treated wastewater; third, promoting water saving education and technologies; and fourth, changing water institutions and governance (Tal 2006). In 2002, the Israeli Parliament conducted an inquiry into the water sector, and recommended overhauling water law, institutions, and governance. The report suggested empowering and increasing the independence of the Water Commissioner by giving him or her longer tenure and including a wider array of interests in the decision-making structures of the oversight body, the Water Council (Feitelson 2005). Further changes are planned, including converting the Water Commission into a Water Authority, and unifying the regulators that currently govern different aspects of water (Tal 2006).

Economic strength and diversity have an important, and positive, impact on water management. While economic crisis often provides the political imperative for difficult reforms affecting water, a diversified economy is important for good water management. Indeed, it is just as effective as mobilizing new water in enabling a society to achieve both secure municipal and domestic water services and food security through appropriate local production and affordable imports. Economic diversification makes it much easier for countries to allocate water according to principles of economic efficiency. When the economy is strong and diverse, those who lose water or agricultural livelihoods as a result of reforms can be compensated or can find alternative employment. Users can invest in technology to reduce water use, which can allow countries to reallocate water to the environment.

Change in water management, therefore, has come about in other arid and semi-arid countries more as a result of social, political, and institutional processes than as a result of the condition of water resources or services. Transformations in the political processes of governance and citizenship took place in these cases that enabled water reforms that led to relatively flexible organizations and more sustainable outcomes. None of the systems remains problem free, and parts of each country are still at risk from droughts, floods, and other water-related events. Government planning processes and spending of public money could be improved in every case. In each case, however, water planning

and management has been transformed from a rigid, centralized, technically focused approach to one that is more participatory, flexible, and efficient.

MENA's Water Organizations Are Operating in an Environment of Inadequate Accountability to Users

MENA's relatively strong organizations are not achieving their intended benefits. As discussed in chapter 2 (figure 2.4), a global survey that evaluated the quality of policies and institutions for freshwater management judged central government water ministries in MENA to be better, on average, than those in a selection of comparator countries. However, these organizations are not generating the expected results. The multiple and persistent water problems are highlighted throughout this report and show issues with environmental management, public expenditure, service delivery, and conflict.

This report suggests that accountability is a key factor in enabling reformed water policies to bring intended benefits. Accountability can be divided into internal and external. External accountability refers to recipients of public services holding the government or service provider to account. Water supply systems are externally accountable when users receive the level of service they want and are willing to pay for, and have clear complaint mechanisms if the utility does not meet service standards. Water allocation systems are externally accountable when users know how much water they can use, experience consequences for overuse or misuse of their allocations, have a fair process through which they can contest decisions they do not agree with, and have a way to influence future allocation processes. Internal accountability means that one public agency holds another accountable. It involves public agencies motivating other agencies to perform their functions as intended, and motivating service providers, whether public or private, to serve clients well. This might include a Supreme Chamber of Audit verifying public expenditure on hydraulic infrastructure or a parliamentary inquiry investigating the actions of a public office. Governance mechanisms that affect public accountability provide the means to balance the competing demands of interest groups, and to prevent one set of interests from dominating, reducing the asymmetries of power and information between the different parties (World Bank 2003a). [2]

MENA has a "governance gap" compared to other parts of the world; external accountability is particularly weak. A World Bank report on governance in the MENA region (World Bank 2003a) constructed a worldwide index of governance quality, based on 22 indicators of com-

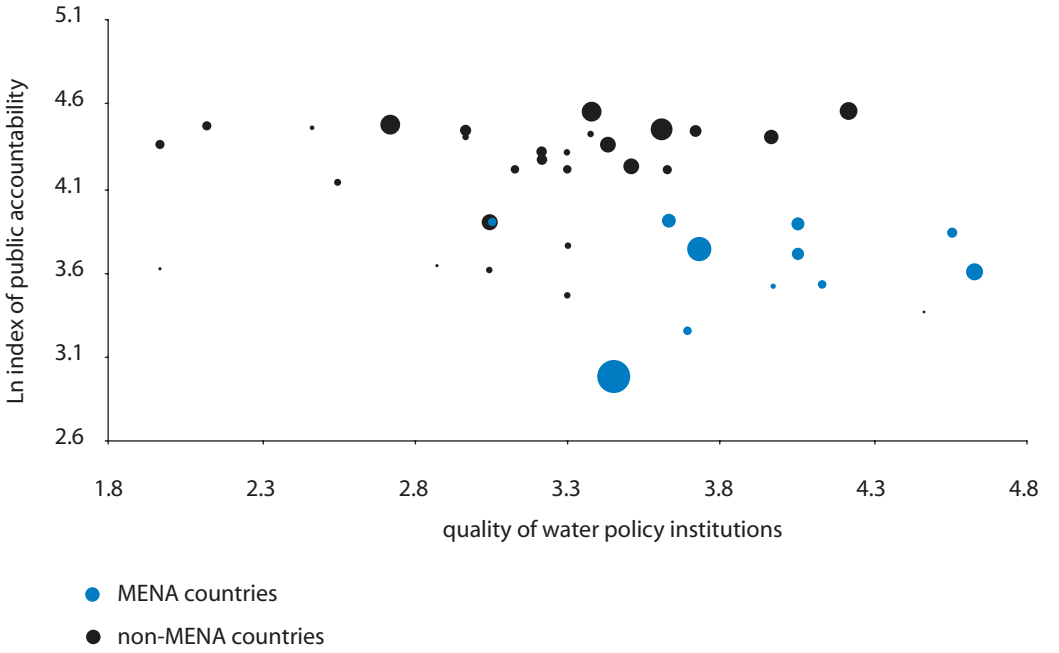
parable data. According to this index, MENA on average has lower governance scores than other regions. The indexes can be separated to measure internal and external accountability.[3] In most MENA countries, internal accountability mechanisms within the government administration are generally comparable with those of other countries with similar incomes. However, external accountability—contestability for public officials in the form of regular, fair, competitive processes of renewing mandates and of placing no one above the law—is lower than in other regions.

The region's relatively strong water organizations therefore are operating in an environment of weak external accountability. Therefore, as shown in figure 4.1, this report suggests that this discrepancy is a key factor behind the persistent water problems: without implementing rules that provide voice to users, equal access to information, and justice, even relatively strong organizations cannot perform their functions adequately.

How does accountability affect water management? There are no consistent, internationally comparable measures of water resource man-

FIGURE 4.1

Water Policies and Institutions Are Stronger but Accountability Weaker in MENA Than in 27 Comparator Countries



Sources: World Bank 2003a; World Bank Country Policy and Institutional Assessment database.

Note: Size of bubble is proportional to GNI per capita.

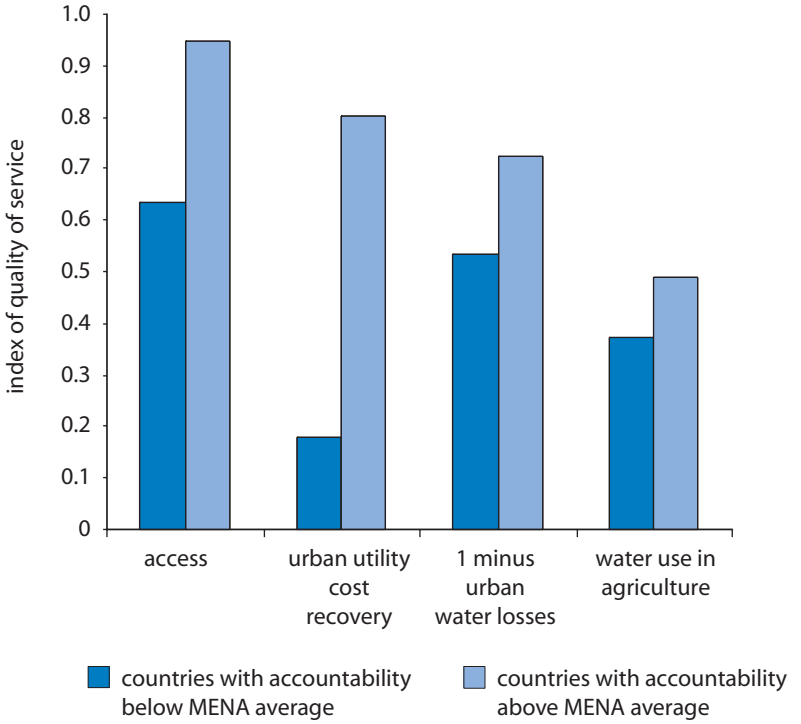
agement that can be useful in this context. This report, therefore, uses water services, which capture a part of the water management challenge, and for which there are four measures. The first measure is a combination of rates of access to water supply, access to sanitation, and hours of service in major cities.[4] The higher the score, the better the access and the more likely a country is to meet the applicable Millennium Development Goal. The second measure—utility cost recovery—calculates the share of operating costs that are covered in the capital cities and all cities with a population larger than 1 million, if applicable. The norm adopted in water utilities worldwide is for tariff income to cover at least operations and maintenance costs, although international good practice is for utilities also to recover investment costs from charges levied on users. The third measure covers the amount of unaccounted for water in major utilities across the region—the share of water that is produced but for which bills are not collected. It has been reversed so that its direction is consistent with that of the other indicators. The fourth measures efficiency of water use in agriculture: the ratio of the actual quantity of water required for irrigation in a particular year to the actual quantity of water used for irrigation.[5] All of these have been converted into an index between 0 and 1 and a higher score is "better" for all measures. The individual country scores and the sources of the information are presented in tables A2.1 through A2.4 in appendix 2.

External accountability in *resource management* usually occurs when water management is devolved to the lowest appropriate level and when the public has a say in key decisions. The process of allocating water between competing uses is still controlled by the central government in MENA countries. Even where basin agencies have been established (as in Morocco and Algeria), key decisions on investments and allocations among sectors are made by national ministries. An indicator of the absence of external accountability is the growth of conflict between water users, within basins and between various parts of the country. Evidence from case studies prepared for this report suggests a growing trend in conflicts at all levels. Another indicator of the absence of external accountability is the efficiency of public spending discussed earlier.

External accountability in *water services* tends to be better when users are involved in decision making and can communicate with service providers. A country's overall level of external accountability, independent of water, appears to affect the quality of water services provided. MENA countries can be divided into those with higher and lower than average external accountability scores. The countries in the higher than average group perform better against each indicator of water services, as shown in figure 4.2. The next section gives details of how accountability affects water services and water management.

FIGURE 4.2

Quality of Services in MENA Countries, by Relative Level of Accountability



Source: See appendix 2 for details and sources.

Note: These are all measures of service quality (three for urban water and sanitation and one for irrigation). A higher score is better for each indicator. See appendix 2 for details and sources. Accountability above MENA average: Algeria, Djibouti, Iran, Jordan, Lebanon, Morocco. Accountability below MENA average: Egypt, Saudi Arabia, Syria, Tunisia, Yemen .

How Does External Accountability Relate to Water Outcomes?

Several factors inherent to the nature of water complicate efforts to improve external accountability. These factors make it difficult for policy makers to develop unambiguous rules about how best to establish policies, and leave political leaders considerable scope to make decisions based on nontechnical criteria. They include the following:

- *The distinction between public and private benefits.* Water itself and the services derived from physical investment in water management bring a combination of public benefits (ecological systems, flood protection, public health) and benefits that accrue only to an individual (agricultural production, individual consumption, individual health). In prin-

ciple, users should pay for the cost of services that provide private benefits, but not directly for the services that provide public benefits. However, some public investments support both functions—dams store water used for drought and flood protection but also generate electricity and provide water for private irrigation. Separating the costs between the different classes of benefits is difficult, and complicates sector financing and management strategies.

- *The common-pool nature of many of the resources and the service areas.* Aquifers, watersheds, and irrigation schemes are common-pool resources. It is difficult to exclude potential beneficiaries from exploiting the resource where there are incentives to overuse or neglect maintenance of the resource, unless rules are carefully crafted and enforced.

- *Uncertainty about the quality and quantity of the resource.* The natural processes associated with aquifers, watersheds, wetlands, and other water processes are difficult to measure. Rainfall itself is highly variable. How much pollution can the river absorb? How should instream flows be managed in a dammed river? What is a safe yield from the aquifer? How will urban solid waste affect aquifer quality? How much of the population needs to be connected to the sewer system and how much wastewater needs to be treated to protect public health? Uncertainty about balancing present consumption with preservation of resources (aquifers, ecosystems) for the future further complicates the picture. Setting abstraction and wastewater disposal rules in these circumstances is difficult.

- *Interaction between traditional, cultural, and official practices.* Beliefs and practices governing water abstraction, use, and disposal have been built up over centuries and interact in complex ways with rules associated with government-financed infrastructure. Different sets of rules may be inconsistent or may not cover individual circumstances. No one can be accountable when the rules are unclear.

In circumstances where the path that maximizes the public good is unclear, leaders have considerable room to make a number of different policy choices and the public does not have a clear basis on which to judge decisions and outcomes. In these circumstances, public accountability becomes all the more important in the iterative process of bringing the range of choices as close as possible to the public good, by feeding as much information as possible into decision-making. Increased information, widely available, will increase the possibility that the needs of a wide a spectrum of interests are met. Factors such as low levels of corruption, freedom to associate, free media consequences for good and

bad performance, and fair dispute resolution processes all help improve governance of water as they do in other areas of the economy.

In practice, MENA's relatively weak public accountability does have a negative effect on water outcomes. The accountability problems that affect water fall into two broad groups:

- *Problems associated with lack of balance between competing interests*. As mentioned above, policy makers are influenced by particular interest groups that all give reasons to influence policy outcomes in their favor. When a subset of these interests dominates, a risk arises that policy decisions do not best serve the public interest. Interests can be unbalanced at the level of society, institutions, or individuals.
- *Problems that stem from stakeholders not knowing the full extent of the costs*. When costs are hard to measure, spread across a large number of actors, or spread over time (or all three), it can be very difficult to evaluate the consequences of a course of action. This problem is compounded when affected groups have limited voice in decision making.

Insufficient Balance Between Competing Interests

At the societal level, the interests of particular groups may be underrepresented. When particular groups have different levels of access to resources, information, and dispute resolution mechanisms, those with less access can suffer many consequences of poor water management. These consequences include involuntary resettlement associated with infrastructure construction and the effects of ecological damage and of unsustainable extraction of groundwater. On a very large scale, a powerful group may seek to impoverish or even disperse another group, as took place with the draining of the marshes in southern Iraq. These marshes once covered an area of 20,000 square kilometers and were home to the mostly Shi'a Muslim Ma'dan, or Marsh Arabs, for over 5,000 years. Plans to drain the marshlands for irrigation and drainage purposes were devised as early as the 1950s, but implementation really took off when the Ma'dan participated in an abortive antigovernment rebellion following the first Gulf War. A series of dams, dikes, and canals was built to prevent water flowing from the Euphrates and Tigris Rivers into the marshlands: the inauguration of the Saddam river in 1992 was followed by the construction of at least four more drainage canals, the al-Qadisiya River, the Umm al-Ma'arik (Mother of All Battles) River, the al-'Izz (Prosperity) River, and the Taj al-Ma'arik (Crown of All Battles) River (Human Rights Watch 2003). In the last three decades, over 90 percent of the marshes have dried up (World Bank 2005c) and, of an estimated total population of 250,000 in 1991, it is believed that only 40,000 Marsh

Arabs remained by 2005. More than 200,000 people were displaced, 40,000 of whom fled to Iran as refugees (Human Rights Watch 2003). This also resulted in ecological damage, destroying the habitats of many animal and plant species.

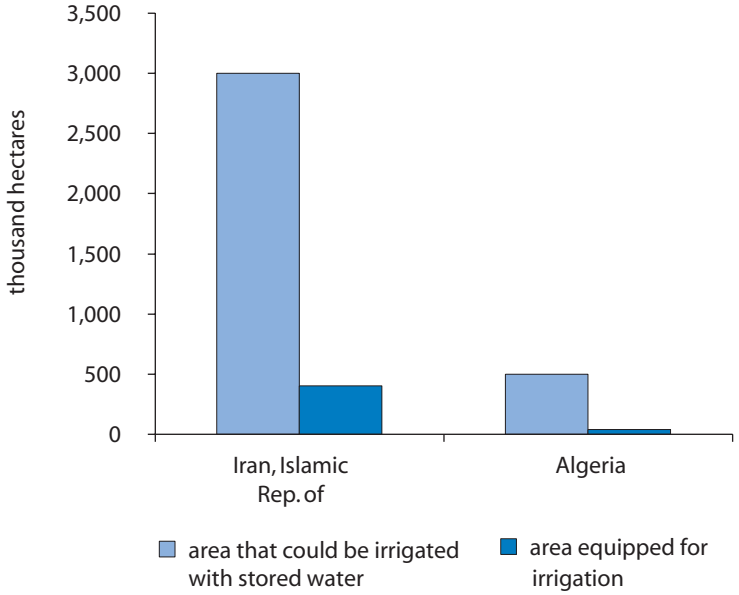
On a smaller scale, in circumstances of unequal power relations and little recourse for aggrieved parties, individuals who control the water may end up using it to bring benefits to themselves or their group at the expense of others. For example, when the government of Yemen banned imports of fruit in 1985, banana prices shot up and powerful farmers upstream in Wadi Zabid changed crops, expanded production, and took more water than they were entitled to. Poor farmers downstream lost even their base flows, and, with no formal recourse, had no option other than violence. In the end, they had to sell their land and become sharecroppers. In another case in Yemen, in al Dumayd, a trader established a 10 hectare citrus orchard with eight pumps. As a result, a number of wells in the vicinity dried up and the adjacent smaller farms were abandoned (Lichtenthaler 2003).

Conflict situations can arise when investments take place without adequate consideration of the needs of potentially affected groups. Across the world, water planning processes often involve demonstrations and other forms of protest by those opposed to a policy, price increase, or scheme. Good accountability mechanisms provide formal channels for hearing the claims of groups that oppose the change, for evaluating them, and for acting accordingly. Without those mechanisms, projects that do not serve the public good may proceed and conflict may emerge between opponents and proponents of the change (CEDARE 2006).

At the institutional level, lack of accountability distorts investment programs. Institutional incentives caused the governments of Algeria and Iran to continue building new dams even when they had not fully exploited existing ones. Iran has 85 operating dams and plans to build another 171. The dams currently constructed store enough water to irrigate 3 million hectares, yet only 400,000 hectares are actually being irrigated. Thus, irrigation infrastructure covers only 13 percent of the area that could potentially be served. At the institutional level, lack of accountability can disrupt investment programs. In Algeria, only 8 percent of the area that could be served is actually being irrigated (figure 4.3). These countries, therefore, are seeing little benefit from the investments they have made in water storage. Institutional incentives within the government drive these circumstances. Government departments dealing with dams have strong technical expertise—Iranians lead the world on technical issues concerning dam construction in seismic zones. They command large budgets and political support and thus gain momentum

FIGURE 4.3

Command Area of Dams and Irrigation Infrastructure in Iran and Algeria



Source: Department of Water Affairs, Ministry of Energy, Iran; Ministry of Agriculture, Algeria.

for continuing on the path that has been perceived as successful, even if the policy is, in fact, unbalanced when judged by criteria of economic and environmental efficiency.[6] The inefficiency might be reduced with greater public scrutiny of government spending practices and public hearings about planned investments, and if authorities were more directly accountable for responding to public questions.

At the family level, water plays into and exacerbates unequal power relations within the household. Because women feed and maintain the household and care for the sick, the impacts of inadequate water supply and sanitation fall disproportionately on them. The burden of bringing water from other sources falls predominantly on women and girls, adding to their already heavy workload. Where water supply service is lacking, girls often miss school to fetch and carry water for the household, thus further entrenching gender inequity. As a result, expanding access to service has disproportionate benefits for women and girls. In Morocco, women and girls reduced the time they spent carrying water by between 50 and 90 percent as a result of investment in rural water supply and sanitation. Primary school enrollment increased by an average of 40 percent between 1997–8 and 2000–1 after the investment was

undertaken. Girls' enrollment rose much faster—by 70 percent over the same period. Projects in Egypt, Tunisia, and Yemen show similar, though less clearly quantified, results (Abu-Ata 2005). Because women are responsible for caring for sick members of the household, illness resulting from poor water and sanitation access and hygiene practices adds to their work burden. A survey in two villages in rural Djibouti revealed that women and girls consistently spend more time on household chores (including fetching water) than men and boys—girls do eight times more domestic work than boys in one village (Doumani, Bjerde, and Kirchner 2005).

Difficulties Assessing the Full Costs of the Problems

Difficulties estimating the costs of environmental degradation. Some water management practices damage the environment, yet such damage tends not to be fully considered in the policy-making process. Environmental issues are not always considered fully for two reasons related to governance: (a) environmental costs are multifaceted and hard to measure, so policy makers are often not aware of the extent of the problems; and (b) environmental organizations that can advocate for improved environmental policies are weak in MENA.

Current practices are destabilizing the hydrological cycle. Most countries have mobilized a large share of available surface water (see table 2.1). In addition, water diversions have reduced some of the region's major rivers to such an extent that they do not reach the sea at certain times of the year (except through drainage canals, in some cases) (Pearce 2004). Dams and water abstraction reduce the natural flow of rivers, affecting seasonal flows, the size and frequency of floods, and aquifer recharge, and can affect the ecological and hydrological services that water ecosystems provide.

Disrupted hydrological cycles also change sedimentation and siltation patterns. When dams block the natural flow of sediment down a river, long-term effects on downstream soil fertility and coastal land patterns can result, and the lifespan of dams can be reduced. Changing sedimentation patterns are altering Egypt's coastline. In Morocco, dam sedimentation reduces water storage capacity by about 50 million m^3 per year, which was 0.5 percent of total capacity in 2000. The potential value of lost electricity and municipal water supply associated with this reduced storage volume is estimated to be US$180 million or 0.03 percent of GDP in 2000 (World Bank 2003b).

Increased diversions of water for agriculture and urban use, and the associated return flows, have aggravated pollution. Expanded access to piped water supply at subsidized prices increases consumption and

wastage (through unaccounted for water). The volume of wastewater generated is also significant, with consequences for public health (discussed below), as well as for surface water quality, ecosystems, and coastal zones. The heavy reliance on desalination in the Gulf countries and elsewhere has brought its own environmental problems. Discharge of hot brine, residual chlorine, trace metals, volatile hydrocarbons, and antifoaming and anti-scaling agents are having an impact on the near-shore marine environment in the Gulf (AWC 2006). Runoff of chemical fertilizers and pesticides from farms to Egyptian drainage canals affect downstream water quality. Egypt formally reuses 5 billion m^3 of agricultural drainage water every year, or one-tenth of the Nile's flow, and informally reuses much more. These flows have increased pollution in drainage water and required drainage water to be mixed with ever larger quantities of freshwater for downstream irrigation (AWC 2006).

Environmental problems in coastal zones can have an economic cost through lost tourism. In Lebanon, for example, degraded ecosystems, increased coastal pollution, and depleted marine resources have reduced local and international tourism along the beaches around Beirut (Sarraf, Björn, and Owaygen 2004). The value of those lost visitors is estimated as an incremental travel cost of approximately US$11 million in 2002. Similarly, the net present value of the damage resulting from the degradation of about 23,000 hectares of wetlands per year amounts to US$350 million or 0.3 percent of Iran's GDP in 2002 (World Bank 2005e).

Poor environmental quality has an impact on public health. Water-related health problems result from a combination of interrelated factors: (a) lack of or inefficient water supply services; (b) lack of or inefficient wastewater collection and treatment facilities; (c) unhygienic behavior; and (d) poor interagency coordination. Physical resource scarcity and intermittent supply may be contributing to poor hygiene practices; studies show that in many countries, limited quantities of available water may contribute to poor hand-washing practices (Esrey 1996). About 75 percent of the burden of water-related diseases in MENA is felt in rural areas and the burden falls disproportionately on children under five and women (Doumani, Bjerde, and Kirchner 2005).

Diarrhea is one of the four leading causes of communicable diseases in MENA countries (excluding Gulf countries Libya and Israel) in 2002 (WHO 2003). It caused 22 deaths per 100,000 population in these countries—a far higher rate than in the Latin America and Caribbean (LAC) region (6 deaths per 100,000 population), even though LAC has similar income and service levels. Indeed, the MENA region is closer to the global average of 27 deaths per 100,000, which includes outcomes from very poor countries in Asia and Sub-Saharan Africa. MENA also has a high burden of disease from acute lower res-

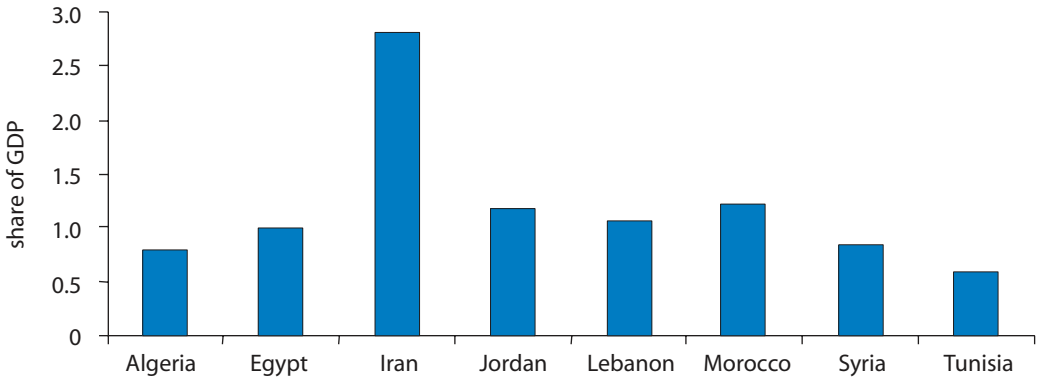
piratory infection, to which poor hygiene practices relating to water are a contributing factor, compared with the LAC region (Cairncross 2003). The relationships between health outcomes and water services are hard to quantify because the outcomes are also affected by a number of other factors.

Environmental problems relating to water are difficult to measure but have significant costs in the region, as illustrated in figure 4.4. Health damage from poor water supply and sanitation, increased utility costs from having to switch to unpolluted water sources, reduced fish catch (particularly important with sturgeon in Iran), reduced wetland services, salinization of agricultural land, and other factors are valued between 0.5 and 2.5 percent of GDP every year. Specifically in Morocco, for example, the lack of access to water supply and sanitation is estimated to cost society 1.0 to1.5 percent of GDP every year. This estimate takes into account child mortality from diarrhea (6,000 deaths of children under age five each year), child sickness from diarrhea, and time spent by caregivers (Sarraf 2004). These environmental problems actually reduce current welfare, although mitigating measures may increase GDP. These estimates do not imply that it is necessarily worthwhile to reduce those environmental impacts, because they do not include estimates of the cost or operational feasibility of doing so.

In part because of measurement difficulties, environmental problems are not adequately considered in the policy-making process. Because they are spread over time periods and geographic location, and because they are subject to considerable uncertainty, environmental advocates in the region (as elsewhere) have had problems estimating and combining

FIGURE 4.4

Annual Cost of Environmental Degradation of Water



Sources: République Algérienne Democratique et Populaire 2002; Sarraf, Björn, and Owaygen 2004; Owaygen, Sarraf, and Larsen 2005; World Bank 2002a, 2005e, 2003b, 2004h.

the costs. This dilemma has been compounded by the relatively weak voice of environmental advocates (see chapter 2).

Hidden costs of utility mismanagement. As discussed in chapter 2, water supply and sanitation utilities in the region are often not run independently of the government. Utilities that do not operate under hard budget constraints may find political goals determining some of their operational practices. Hiring and salary decisions and pricing of services are commonly subject to political interference. As a result, the utilities face problems such as overstaffing, yet remain unable to retain the most qualified individuals. Low tariffs cause utilities to defer maintenance, which accelerates the deterioration of infrastructure. In general, these problems lead to poor operational performance compared with international good practice standards, such as observed in water utilities in Chile (see table 4.1).

The costs of these practices are diffuse and difficult to assess. Many utilities in the region practice "intermittent supply" in which they deliver water to various parts of the city for a fixed number of days on a scheduled basis. Water is supplied twice a week in Amman during the summer, and once a month in Taiz, Yemen. In the West Bank and Gaza, water is available for a few hours every day. In the Algerian city of Oran, water is supplied every other day during drought years. In major cities such as Jeddah and Riyadh in Saudi Arabia, water is available once or twice a week, depending on the district.[7] Utilities do this for many reasons, including (a) a need to reduce leaks (deferred maintenance leaves the network vulnerable to additional leaks if it operates at full pressure), and (b) a desire to ration water when demand exceeds supply and the cost of developing additional sources is prohibitive (Decker 2004). This inefficiency has a high, but largely hidden, cost to consumers and to utilities.

Households bear four types of cost from badly run utilities. First, they must get water from alternative sources, usually from private vendors

TABLE 4.1

Selected Operating Performance Indicators for MENA Water Utilities

Indicator	Iran (%)	Morocco (%)	Saudi Arabia (%)	Tunisia (%)	Chile (%)
Urban water coverage	98	88	90	98	100
Urban sewerage coverage	20	80	45	96	95
Unaccounted for water	32	33	29	19	33
Employees per thousand water and sewerage accounts	3.5	3.0	—	9.6	1.1
Operating costs to operating revenue ratio	90	132	2,000	116	59

Source: World Bank sector studies.

Note: — = Not available. The figures for coverage here differ from those in chapter 2, table 2.3, because the definitions are different. Here, coverage means access to piped water and wastewater networks.

who charge between 3 and 14 times more than the city for the same volume of water, as illustrated in table 4.2. Second, households have to invest in water storage. Most households have a storage tank that costs approximately the equivalent of 60–100 percent of a month's salary. This cost is spread over a long period, and may be reflected in the purchase price or the rent of the housing, probably leaving individuals unaware of this additional cost. Third, households pump the stored water to the roof, although no precise estimates exist to quantify the additional energy required. Fourth, because intermittent supply can introduce contamination into both network and supplemental water, households must then treat their water or rely on bottled water for drinking and cooking. Studies in India and Honduras estimate that the costs of coping with intermittent supply are more than 150 percent of the average household's average water utility bill (Yepes, Rinskog, and Sakar 2001).[8]

Utilities also incur costs of intermittent supply, in several ways. First are the costs to the distribution system itself. Conventionally, engineers designed the systems assuming continuous supply. The pipes were not built to withstand sudden large changes of pressure. This is the case in the city of Gaza, where water resources are available but the utility cannot supply more than six hours per day without multiplying the number of pipe breaks. Frequent pressure changes stress the pipes and joints, as does the alternation between dry and wet conditions, requiring pipes, valves, and joints needing to be replaced more frequently. Second, managing the distribution takes extra labor. Additional staff must open and close the valves distributing water at different times to different parts of the city. In Oran, for example, about 15 percent of the utility's labor force manipulates the valves as part of their assignments. Third, intermittent supply causes water meters to become inaccurate, leading to problems with bill collection and to consumer dissatisfaction. Fourth, leaks remain undetected for longer. All of these factors reduce consumer confidence in the utility and reduce their willingness to pay the water tariffs, which,

TABLE 4.2

Excess Cost of Vended Water Compared with Utility Water in Selected MENA Cities

City	Ratio of costs of vended to utility water
Amman	4
Ramallah	3
Gaza	8
Oran	14
Sana'a	8

Source: Compiled from WB sector analysis and project preparation work.

in turn, contributes to the deterioration in utility finances. A representative of the utility in Oran, Algeria, estimates that intermittent supply increases operating and maintenance costs by 50 percent (Khelladi, Maya personal communication October 2005), and a study in India indicates that switching to continuous supply saved around 39 percent of the same costs (Yepes, Rinskog, and Sarkar 2001).

Lack of accountability in water supply utilities, therefore, can increase the costs of water supply. Poor operations can lead to a downward spiral of increasing costs, further deferred maintenance, and so on. The costs of these situations, however, are spread between the utility and the large number of urban consumers. The costs can be financial (for example, the cost of additional bottled water) or in the form of additional time (fetching or treating water, for example). They can also be spread over a long time (as in the costs of a household storage tank). Thus, the full extent of the costs is not well known and the issue is less likely to be given due weight in the policy debate

Conclusions

This chapter has shown that improvements in accountability will be important for improving water management in the region. The countries in MENA that have better than average external accountability appear to provide better water services to their populations. Several cases from the region illustrate how accountability problems contribute to suboptimal water outcomes. The issues fall into two categories: (a) the voices of relevant interest groups are not all considered and equally weighted in the decision-making process, and (b) the costs of the status quo are not known because they are spread over a large number of actors and are difficult to measure. Countries outside the region that have transformed water management organizations have often done so in a context of broader changes in their countries' governance structures. Actions to manage water, then, need to tackle scarcity of accountability mechanisms as well as scarcity of organizations and of the physical resource.

Endnotes

1. The reductions in the allocations to agriculture were consistently less than those recommended by Israeli water experts (Fischhendler forthcoming).
2. The term "governance" is used to mean the rules and processes governing the exercise of authority in the name of a constituency.
3. The index of governance quality combines two indexes: an index of public accountability, and an index of the quality of public administration. The index of

public accountability measures the level of openness of political institutions, political participation, civil liberties, freedom of the press, responsiveness of government to the people, and degree of political accountability. The index of quality of administration measures corruption, the extent to which rules and rights are protected, quality of budget processes and public management, efficiency of revenue mobilization, quality of the bureaucracy, and independence of the civil service from political pressure. Annex A of World Bank 2003a gives details.

4. Access to irrigation is not a useful measure because irrigation services supplied by public agencies are only a part of total supply: many farmers rely on rainfall, ground water, and small privately constructed reservoirs, spate irrigation structures, qanats, and so forth.

5. WRR or water requirement ratio measures the efficiency of water use in agriculture. This is computed based on the existing cropping pattern, evapotranspiration, and the climatic conditions in the country during the year considered. Thus, a ratio close to one implies higher efficiency of irrigation under the existing irrigation system and cropping pattern.

6. The government of Iran has recognized this problem and is reducing the budget allocated to dams in 2006.

7. See appendix 2 for sources.

8. Consumers in India and Honduras are estimated to spend more on coping with intermittent supply than they pay to the utility.