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SECTION 1: INTRODUCTION

All aspects of the fresh water situation in the Middle East and North Africa (MENA) are underlain by the scarcity of water in the region compared with the demands for it. The Millennium Ecosystem Assessment reports that MENA nations are using 115 percent of total renewable runoff, with a third of withdrawals coming from nonrenewable sources (Millennium Ecosystem Assessment, 2005). The World Bank's recent flagship development report on water shows that nations in MENA already withdraw nearly 80 percent of total renewable resources (the next closest region is South Asia, which withdraws less than 30 percent), and that half of MENA nations withdraw more than 100 percent (2007; Tables A1.2 and A1.6).

MENA's water problems originate in a combination of natural and anthropogenic forces. Some regions of the world are drier than MENA, and others have higher populations or larger economies. However, no other region of the world includes countries with such high rates of population growth, and with such high aspirations for a better a standard of living, on the basis of so little water. Still today, fresh water remains the natural resource of greatest concern to the bulk of the region's people, and by far the most important natural resource for their livelihoods. Per capita renewable fresh water fell from 4000 m³ per year in 1950 to 1,100 today, and projections indicate that it will drop further to 550 by 2050 (World Bank, 2007; 5). Anything below 1000 cubic metres per capita-year is commonly taken as indicating physical (first order) water scarcity, and the effects of such levels of physical scarcity can only be mitigated by appropriately designed institutions that are capable of implementing effective management strategies (Wolfe and Brooks, 2003).

Thesis of the Paper

This paper will not focus on a review of supply and demand conditions for fresh water in MENA, as that sort of information can be found in many sources (UNESCO 2003; Brooks, 2006; HDR, 2006; World Bank, 2007).¹ Rather, it will focus on the institutions governing water use, for it is the institutions that determine whether water is extracted in ways that are ecologically sustainable, used in ways that are economically efficiently, and distributed in ways that are socially equitable. To quote from Human Development Report (HDR) 2006 (p. 3):

There is more than enough water in the world for domestic purposes, for agriculture and for industry. . . . scarcity is manufactured through political processes and institutions that disadvantage the poor.

¹ Data on water use is not easy to obtain for MENA (or WANA, as it is sometimes called). Most data sets are categorized by continent, which splits the region in half. HDR 2006 is notable for presenting some data on a regional aggregate called The Arab States, which, except for Iran, Israel and Turkey, covers the region under discussion in this paper.

The thesis of this paper is that water-related institutions in MENA are slowly changing in ways that seem likely to improve the situation. Notably, water institutions in MENA have gradually been turning their attention from technical and engineering ways to cope with chronic water shortages to political and managerial ways. Three of the most important elements of change:

- demand side approaches
- wider stakeholder involvement, and
- heightened concerns for equity.

These changes are long overdue and still far from complete and, but they are promising, for the future of fresh water management in MENA. Sadly, they are not very different from the proposals in the Action Plan that emerged 30 years ago from the Mar del Plata Inter-Governmental Conference on Water in 1977 (Biswas, 1988). Had MENA nations taken those recommendations even partially into policy, the region would today be in a much more stable situation with respect to both human uses of water and ecological requirements for sustainability.

Organization of the Paper

The next section of the paper provides an overview of current conditions in MENA that bear strongly on the way water is managed. Section 3 discusses key internal and external forces that are serving as catalysts for institutional change. Section 4 then presents examples of institutional change based on information from the literature and from IDRC's experience with research in this area. Section 5 suggests further changes needed in institutional design, and Section 6 offers conclusions aimed at speeding up the rate of institutional change.

SECTION 2: REGIONAL CHARACTERISTICS AND WATER MANAGEMENT

This section will focus on regional characteristics that have particular relevance for the ways in which institutions manage water in MENA.

Socio-Economic and Demographic Conditions

MENA varies as much in socio-economic and demographic characteristics as in rainfall. Averages have little explanatory value. For example, the Human Development Index value for the Arab States is almost identical to the average for all Developing Countries.² However, because the former category includes high-income oil-producing states, one can infer that the bulk of the countries are below the average. In fact, most rank between 100th and 150th place in the list of 177 countries. Overall, the region is the second poorest (after South Asia). It continues to exhibit high population growth rates, and many people are trying to live on limited areas of arable land. Selected socio-economic indicators for Lebanon (ranking 78th in the HDR index), Jordan (86th), Egypt (111th), Morocco (123rd) and Yemen (150th) appear in Table 1.

² The Human Development Index (HDI) is intended to be “a summary measure of human development.” It is calculated as the average of three indices: 1) Life expectancy at birth; 2) Adult literacy combined with total school enrollment at two-thirds/one-third weighting; and 3) gross domestic product per capita. HDR 2006, p. 394.

TABLE 1: SOCIO-ECONOMIC INDICATORS IN SELECTED MENA NATIONS

INDICATOR (TABLE NO.)	LEBANON	JORDAN	EGYPT	MOROCCO	YEMEN
Population Growth (%/a) (1975-2004) (5)	1	3.6	2.1	2.1	3.7
GDP per capita (PPP US\$) (14)	5800	4700	4200	4300	879
Ratio of female to male earned income (25)	0.31	0.30	0.23	0.25	0.30
Urban Population (% of total) (5)	87	82	43	58	27
Adult literacy rate (male / female) (24)	high	95 / 85	83 / 60	66 / 40	72 / 33
% of Population earning less than US\$2 per day (3)	low	7	44	14	45
Per Capita spending on health (PPP US\$) (5)	730	440	235	218	89

Source: HDR 2006; italicized numbers in column one show the table where that index appears in the report.

High degrees of urbanization appear to be linked to higher rates of per capita income, to greater female literacy, and to the extent of improved water services. However, the relationship is not direct, nor does it extend consistently to all indicators. A better indicator of the source of poverty may be found in data that focus on the role of agriculture in the national economy. Only a few MENA nations derive even one-fifth of their gross domestic product from agriculture (Table 2), but those that do are among the poorest nations in the region.

TABLE 2: PERCENTAGE OF TOTAL WATER USE USED FOR AGRICULTURE COMPARED WITH CONTRIBUTION OF AGRICULTURE TO THE ECONOMY

(selected countries)

<u>Country</u>	Percentage of water used in	Percentage of GDP obtained from <u>agriculture</u>
Ethiopia	86	55
Sudan	94	33
Egypt	86	16
Yemen	92	16
Morocco	92	14
Turkey	72	14
Jordan	75	6
Lebanon	68	2

Source: Beaumont, 2002.

Institutional Design

National water management agencies in MENA are, for the most part, oriented to large-scale, engineering-dominated supply systems for urban water supply and for irrigation – a traditional approach that goes back to the irrigation canals of ancient Sumer and that has, until recently, worked reasonably well. However, as watersheds come to be fully allocated, and as costs of additional supply continue to mount, its deficiencies are becoming evident:

- Public involvement in decision making is rare, and the agencies tend to be insensitive to local practices, gender concerns, human equity, and environmental impacts.
- Water is allocated primarily to users who produce revenue, which means that irrigation is favoured over household use, and commercial farming (especially for export crops) is favoured over smaller farms producing for local markets.
- Most MENA countries have separate agencies for irrigation water and for drinking water, with no clear guidelines as to how they should collaborate or coordinate their efforts.
- National and municipal water institutions treat demand management as a secondary responsibility, if they see it as their responsibility at all.

Despite the continued domination of centralized management of water in MENA, some forms of decentralization are beginning to appear. Algeria and Morocco have built river basin agencies; Lebanon, Tunisia, and Yemen have decentralized water management to sub-national administrative units (World Bank, 2007). However, in most countries some forms of traditional clan or family control still exist over specific wells or springs, and they typically follow unwritten rules for distributing water (Trottier, 1999). Other forms of decentralization involve farmers who have been brought together to manage

the local level of irrigation systems through Water Users Associations (Attia, 2003) or non-governmental organizations (NGOs) that fill gaps left by failures of central management. These associations will be discussed further below.

Water Use Patterns

As indicated by Table 2, agriculture accounts for at least two-thirds and typically four-fifths of water use in MENA. No other region of the world is so dependent upon irrigation as is MENA, which uses 53% of all renewable water withdrawals for irrigation. The global average is 8%, and only South Asia at 36% is at all close to MENA (HDR, 2006). A surprisingly small proportion of water must meet drinking water standards. At 5 to 10 litres per person-day, only about 2 Mcm per year is needed for every one million inhabitants, which is not very much water. Adding enough water for hygiene, bathing and clothes washing increases the requirement to 50 litres (Gleick, 2000), or about 20 Mcm per year for a city of one million. In contrast, typical irrigation practices in MENA use 10,000 cubic metres per year for every hectare, or the same 20 Mcm for every 2000 hectares.

Urban Water Use and Institutions

Despite their relatively low ranking on the overall Human Development Index, MENA nations do reasonably well in providing drinking water and sanitation services to their people. Even in the poorest nations, two-thirds of the population have “sustainable access to improved water sources” in 2004 (HDR 2006, Table 7), and many nations had rates between 90 and 100% coverage. These data are likely biased toward urban users, and the World Bank (2007) reports that they reflect constructed infrastructure rather than services actually delivered, which are typically lower. Even so, they are impressive. Availability of “sustainable access to improved sanitation” is more limited. Only Algeria, Israel, Jordan, Lebanon, Libya, and Syria, plus the oil-rich states, have rates above 90%, and many nations have rates below 50%.

Urban water institutions are typically either quasi-independent agencies or part of an urban affairs ministry. Institutional patterns do not vary much from one country to the next except in the balance between roles for the public and private sectors, which varies from nil in most countries to almost complete in some cities of the Maghreb. In either case, the starting points are some basic level of service for all residents regardless of ability to pay, plus the concept of water as an economic good for the bulk of the population and for commercial and industrial clients. Apart from those who consume just a little water and pay only the “social tariff,” water rates are moving toward covering full (including capital) costs of supply and wastewater removal. The main problem is less inability or unwillingness to pay than poor service delivery and poor quality of water, which creates a vicious circle of non-payment of bills and thus even worse service.

Rural Water Use and Institutions

The starting point for rural water institutions is not so much the economic value of water as the national plans for agriculture and rural development. If, as in Israel, it accepted that export agriculture will no longer lead rural development, options for water use are much wider than if agriculture is seen as a critical source of foreign exchange. In the

former case, water for agriculture can be cut back sharply in drought years; in the latter case, it cannot. Questions about the future of rural areas are, of course, easier to answer in countries and at times when alternative employment opportunities are evident, as they are, for example, in the more urbanized countries in MENA. The existence of large areas with installed irrigation systems that cannot be serviced for lack of water in many countries of the region (World Bank, 2007) suggests strongly that governments continue to rely rather on simplistic notions about the linkages among agriculture, irrigation, and rural development.

Despite the dominance of irrigation as a use for water, three-fourths of all farm land in Arab nations depends exclusively on rain (HDR 2006, p. 177). (Egypt, Israel, Lybia and the nations of the Arabian peninsula are the main exceptions.) Productivity on rainfed farms is far below that for irrigated farms, but they offer great potential for improvement, which in turn has potential for alleviating poverty. A statistically significant relationship exists between greater rainfall variability and lower per capita GDP (Brown and Lall, 2006), and a roughly proportionate reduction in rural poverty can be demonstrated to occur with every increase in agricultural-water productivity (Thirtle *et al.* 2002). With a higher proportion of women working in rainfed than in irrigated agriculture (Inst. For Agriculture and Trade Policy, 2007), women's poverty can be alleviated with the same increase.

These relationships suggest that pro-poor strategies for rural water management should look in two directions. First, they should identify those areas of farm management that are most relevant to poorer farmers. Second, they should move to close gaps in water availability for rural households.

SECTION 3: CATALYSTS FOR INSTITUTIONAL CHANGE

Water management institutions in the Middle East and North Africa (MENA) are changing in response to forces that come from both internal and external sources. As distinguished by Saleth and Dinar (2005, p. 5):

. . . (a) endogenous factors . . . are internal to the water sector (e.g. water scarcity, water conflicts, financial and physical crisis) and the water institutions (i.e. institutional linkages) and (b) exogenous factors . . . are outside the strict confines of both the water sector and its institutions (e.g. economic development, demographic growth, technical progress, economic and political reforms, international commitments and natural disasters).

Based on our own reviews of water institutions in the region,³ and in partial contrast to Saleth and Dinar, who conclude that external forces are more important than internal, we suggest that the two play equally important roles in MENA. Few nations in the region have experienced the kinds of economic convulsion that has initiated the kinds of externally imposed “structural adjustment” that have forced reform of the water sector. However, we agree that it is futile to try to tackle the region’s water problems by working entirely within the water sector. Improved outcomes depend on parallel attention to internal and to external forces. We also agree with Saleth and Dinar that many of the changes we observe are ad hoc rather than systematic, and that economic factors weigh more heavily than non-economic in bringing about change. Finally, we agree fully with the recent World Bank report (2007) that most if not all of the critical forces have important political components; they cannot be resolved exclusively by technical responses.

This section describes the main forces that appear to be driving institutional change in fresh water management in MENA. Forces internal to the region are distinguished from those external, and in each case forces directly linked to water management are distinguished from those indirectly linked. The role of conflict, which does not fit neatly into this framework, is discussed in a fifth sub-section.

Internal Forces Directly Related to Fresh Water

Until recently, most MENA nations acted as if future water demands could mainly be satisfied by new dams, deeper wells and longer pipelines. Of all the forces leading to revised thinking about institutional design and operations in MENA, probably most important is recognition that most MENA nations are approaching – or, indeed, have already passed – the end of their renewable water supply. Whole river basins are “closing” in the sense that there are no further dam locations, and no conveniently located aquifers. Such recognition has by no means reversed the traditional attention to supply management, nor has it permeated deeply into water sector agencies, but it is stimulating senior management to think about ways to live within natural limits. Almost every MENA nation has some central planning group looking at alternative water development options, and several have passed new water laws.

³ Documentation that will summarize and integrate various studies conducted for and by IDRC over the past few years is under preparation.

A parallel influence within MENA is a general thrust toward democratization – not just decentralization – of natural resources management. To now, participatory management for water has been restricted to the lowest level of irrigation canals. Initiatives are now being taken to extend participation upward to manage branch and feeder canals, and also to build watershed management institutions that involve a range of stakeholders in policy development and even, in some cases, operations and management. Though they typically fall short of involving all stakeholders, these initiatives are improving water-use efficiency and water equity.

Internal Forces Indirectly Related to Fresh Water

Except in the oil producing countries, governments in MENA are increasingly budget constrained. This constraint is putting pressure on all sectors to find ways to reduce ongoing expenditures and avoid major investments. One result has been the search for areas where government responsibilities can be devolved to private agencies, public utilities, and cooperatives. The need to cut government expenditures has been the single greatest reason for wider acceptance of participatory irrigation management under which water user groups are expected to find ways to cover operations and maintenance costs from the beneficiaries of the irrigation water (Brooks *et al.*, 2007). The same issue has led to more attention to increases in the price of water, particularly in urban areas, which has the concomitant effect of stimulating greater efforts at water conservation.

The drive toward more financial accountability is less evident for agriculture. However, it does appear in three ways. First, as indicated just above, water users associations are being induced to cover operations and maintenance costs for the irrigation canals. Second, in some countries, specific regions are designated for private participation in the financing of irrigation infrastructure. Such approaches are only applicable to larger commercial farms, but they have the concomitant effect of promoting the introduction of modern irrigation equipment so that water-use efficiency is higher than in other areas. Third, MENA nations are increasingly reluctant to go into debt to obtain the huge amount of capital required for new dams to feed irrigation systems. This is a convenient shift in approach, given the parallel reluctance of international banks and donor agencies to lend money for such projects.

Concerns for public health, particularly in rapidly expanding urban areas, are coming to play a larger role for governments across MENA. As would be expected, many of the solutions require attention to water. For example, in 2002 diarrhea caused three times as many deaths per million people in the less affluent parts of MENA than in Latin America, despite comparable levels of per capita income (World Bank, 2007). However, it is not so much high disease rates that stimulate action as sudden peaks in those rates. Cities that have faced outbreaks from inadequate treatment of water, as with Aleppo and Amman, typically not only upgrade their water systems but reform the institutions mandated to deliver potable water. Similarly, the desire to avoid health impacts and the need to deal with growing volumes of wastewater, urban water utilities in many MENA nations are developing institutions to promote and regulate re-use of treated wastewater (Scott *et al.*, 2004). Though ideal institutions for managing large

volumes of urban wastewater for re-use have yet to be defined (Brooks *et al.*, 2007), the range of experiments reflected in the IDRC-funded Forum on wastewater reuse in Rabat in 2002 is encouraging.⁴

External Forces Directly Related to Fresh Water

The most evident force that will directly affect the availability of water in MENA is global climate change. Different scenarios imply different results for many parts of the world, but almost all models project higher temperatures, lower rainfall, and longer droughts for MENA. Even if such models remain uncertain in detail, it would be foolish to ignore their broad results, and particularly not the prospects for longer and more frequent droughts. Moderate to severe socio-economic effects can be anticipated in countries across the region, regardless of per capita incomes (World Bank, 2007).

Working in the opposite direction are technological developments that can improve efficiency, and to some degree equity and sustainability, in the use of water. Almost immediate gains can be obtained through better ways to detect and repair leaks in the typically very leaky water systems of cities in MENA. Drip (micro) irrigation is also coming to be more common. Some developments, such as sensors that control valves so plants get water only when and as much as they need, are only appropriate for large commercial farms; other developments are identifying ways for drip irrigation to be used by small farmers without much capital. The key force is not new research itself, but the institutions that direct research and that effectively determine whom the research will benefit.

External Forces Indirectly Related to Fresh Water

Both bilateral donors of international aid and the large multilateral banks have strongly supported measures to increase the long-term financial viability of the sectors they support. For various reasons, fresh water supply for both drinking water in cities and irrigation water in rural areas have been strongly subsidized by all MENA governments, and thus they have been targets of general efforts toward reform. Internationally, those forces have led to privatization of a number of former government agencies, but the results have not been particularly good in the case of fresh water, and in MENA total privatization of water services is not contemplated by any nation. The greater effect has been the need to compete in world markets, which has forced some rationalization of agriculture under various components of structural reform, all of which look skeptically (many would argue too skeptically) at any form of subsidization. As one result, irrigation across MENA has had to become more efficient per unit of water applied than it was in the past. Whether it is more efficient per dollar investment is quite another question, and much more difficult to determine.

In addition, Finally, more attention is being placed today on human rights, and social and gender equity. About a third of the general tables presented at the end of the 2006 Human Development Report focus directly on social or gender equity, with nations

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Results available at: http://www.idrc.ca/en/ev-43794-201-1-DO_TOPIC.html

implicitly criticized on the extent to which they fail on one or another of the indicators of equity. The same thrust is also reflected in the *General Comment on the Right to Water* from the United Nations Committee on Economic, Social and Cultural Rights (a part of the UN Commission on Human Rights; November 2002). The Committee asserts that rights to water exist on the basis that it “. . . is indispensable for leading a life in human dignity. It is a prerequisite for the realization of other rights.”

Though limited exclusively to household water, the focus on human rights and on social and gender equity are gradually exerting an influence on water management goals, policies and programs across MENA. Rather than assuming that more and cleaner water improves everyone's life equally, governments will be forced to show how their efforts are helping those who, to now, have been disadvantaged in access to water.

Conflict and Institutional Reform

Institutional reform is conflict adverse. It tends to slow down, if not disappear entirely, in areas under conflict. Per contra, the period when tensions start to relax appears to be a propitious time for institutional change. It is a time when it becomes feasible to negotiate the creation of basin-wide international management authorities, and to review traditional patterns for allocating water among competing users and uses. The best example of such a change occurred after the collapse of the old South African government, which favoured a top-down supply-oriented approach to water and allocated most water to white farmers. The African National Congress not only established constitutional guarantees of water (for people and for the environment), but its management systems were changed in many ways – including, for example, giving management authority to those who work the land as opposed to those who own it (Schreiner, 2002; Wolfe, 2006; Turton, 2007).

An attenuated example of the same potential was evident during the post-Oslo period of relaxed tensions between Israel and Palestine. Not only were gains achieved in both the Water Resources and the Environment Working Groups of the Multilateral Track of the Peace Process, but a range of “second track” (non-diplomatic) programs were initiated. Led by academic institutions and NGOs, they delved into areas that governments had, to then, avoided. Notable were investigations for bilateral Palestinian-Israeli management of the Mountain Aquifer (Feitelson and Haddad, 2000) and for trilateral Palestinian-Jordanian-Israeli management of the Dead Sea basin (Bromberg, 2004), both of which were supported by IDRC and other donor agencies. New governmental institutions were also created. The Palestinian Water Authority was created and began to absorb functions that would be necessary under normalization. So too was a Joint Water Committee to negotiate disputes. Unfortunately, as Israeli occupation of the West Bank and, until recently, Gaza continued, traditional forms of water management re-exerted themselves (Trottier, 2007). In the last few years, the Israeli “separation” fence appears to have reinforced the role of the PWA at the expense of local water managers (*Ibid.*), the dynamism of the Oslo period has abated, and it is not clear what water institutions will serve Palestinians in the future.

Resultant of Forces

All MENA nations continue to work within highly centralized water management institutions, and, given the importance of water to their economic and social development, such centralization is probably necessary. One happy result of this centralization, and of the forces described in this section, is a new focus, perhaps for the first time, on those strategic issues for which clear directions and management are most necessary. This shift from top-down management to strategic policy development is unique to each country but typically involves the creation of a long-term draft water planning document that looks 20 or 30 years into the future and that is cast within the framework of integrated water resources management (IWRM).

- There is much in this approach that is new: publication (or ongoing preparation) of national water strategies
- presentation of IWRM as the core element in that strategy
- inter-ministerial consultation
- explicit treatment of water demand management as one of a few core elements in IWRM.

The process is most evident in Egypt, Jordan, Morocco and Tunisia. Efforts are less advanced in other Arab countries, but almost everywhere there is new attention to developing strategies that will accommodate water demand to hydraulic limitations. Moreover, the experience of Morocco, which has undergone the most thorough reform of its water institutions, is encouraging. According to Doukali (2005, p. 87):

the reform experience of Morocco suggests that although undertaking initial reform can be difficult, subsequent reforms are relatively easier as the country consolidates and adjusts with the earlier reforms.

Of course, barriers to implementation of institutional reform remain strong. Though water agencies may now be mandated to work within a framework of IWRM, they are largely staffed by the same people who have spent their careers focusing on supply management. It is hardly likely that they will promote demand-side approaches, local management, and environmental protection with the enthusiasm they require. We will return to this issue in the concluding section of this paper.

SECTION 4: EXAMPLES OF INSTITUTIONAL CHANGE

This section presents examples of the kinds of institutional change that are taking place in MENA. No attempt is made to cover all changes discussed in Section 3.

Water Users Associations

From an historical perspective, water management in MENA has always had both centralized and decentralized components. What is new is the neglect of the latter in the post-World War II era of economic development when governments (commonly in collaboration with donor agencies) concluded that modern irrigation management was just too complex for peasant farmers. Subsequently, with the failures of top-down management to achieve its objectives, the same governments and donors re-discovered the benefits of local water management. The most common adjustment was the creation of Water Users Associations (WUAs) to enable farmers to participate in the operations and maintenance of local irrigation systems. The whole approach has come to be called Participatory Irrigation Management (PIM).

Water use efficiency typically increases by 30 to 50 percent with PIM, and the energy used for pumping is cut in half or even more (Attia, 2003; Doukali, 2005)⁵. The increase in water efficiency does not necessarily yield a reduction in water use; more commonly, it means that tail-enders on the water system now get water regularly – *ie*, greater equity and efficiency, but not less water use. Farmers inside WUAs report that their incomes are 50 percent higher than those of nonmembers. Women say they too get a better break inside WUAs, and there are other, less well-documented benefits, such as reduction in conflict and improvements in family health (van Hoffwegen, 2003). On the other hand, WUAs reinforce traditional power structures; richer farmers benefit most. Despite mixed results, experience with PIM shows that irrigation efficiency can be improved with the collaboration of farmers and with insight in their daily experience on the land.

Rural Water Supply

Though Morocco has passed a new water law and is well along in moving into a new era of water resources management (Doukkali, 2005), it has required special effort to improve water supplies in rural areas. In 1990, nearly three-fifths of the nation's population and most of the people living on less than \$2 a day lived in rural areas; only one person in five had access to clean water. Several programs were initiated about a dozen years ago, with the lead taken by the Water Supply Program for Rural Population in Morocco. This program put as much emphasis on local empowerment as it did on water infrastructure. According to the 2006 Human Development Report (p. 121):

Local authorities were required to carry out needs assessments, working through community organizations. Interventions are triggered by requests for infrastructure from rural populations.

⁵ Further examples can be found in the material presented at the IDRC-funded Forum on Participatory Irrigation Management in Cairo in 2003; available at http://www.idrc.ca/en/ev-44175-201-1-DO_TOPIC.html

About 80% of the budget for provision comes from the central government, 15% from local community associations and 5% from beneficiaries. Management of infrastructure has been transferred to local communities, supported by engineers and technical experts.

The results of this committed pro-poor water program are indicative. About half of rural people now have access to clean water. Other indicators have also risen, including a 60% increase in the proportion of girls in school, presumably because they do not have to spend so much time carrying water (Dubreuil and Van Hofwegen, 2006).

Water Pricing in MENA - Drinking Water

Many MENA nations revised their water valuation systems within the last decade, and most of them did so on the basis of economic and social studies (marginal value; willingness to pay; etc.) to obtain not just higher prices but smarter pricing. Even so, prices remain below costs in most countries, and very much below costs in some. Typical prices per cubic metre are similar to those in Canada or the United States, and far below what Europeans pay (Saghir, 2002). However, there are constraints to raising prices much higher than enough to cover costs. In the case of Jordan, new water supply costs about \$1 per cubic metre but is valued at over \$5 (Taha and Bataineh, 2002). Tariff structures designed to cut use would have to be higher than those to recover costs, and those to achieve optimal economic efficiency would be higher yet. This problem is widespread in MENA, and, as a result, MENA nations are moving to adopt increasing block rates for the domestic sector with the lowest block set very low (a "social tariff") to ensure even poor households have some water. Jordan and Tunisia prevent richer households from benefitting from the social tariff by requiring consumers who use more water than that covered by the initial block to pay at the higher rate for the full, not the marginal, volume. Subsequent blocks are priced marginally. Happily, not all aspects of urban water pricing require choices between conflicting goals. A workshop on water valuation conducted by IDRC concluded that good delivery of water services and public willingness to pay for water are mutually reinforcing.⁶ Given high rates of non-payment in many cities, this is a lesson that is worth learning.

Water Pricing in MENA- Irrigation Water

MENA nations are moving more slowly with pricing reform for water in rural areas than in urban. Farmers are not generally expected to pay capital costs for irrigations systems, which implies a huge subsidy. As put succinctly in *Human Development Report 2006* (p. 191), "Governments since the time of the ancient Egyptians have financed the capital costs of irrigation infrastructure out of general tax revenue." The only exceptions are those parts of Egypt and Morocco where irrigation infrastructure is being extended to new areas and where commercial farmers will produce for export markets. Even then, subsidies are high and, as Hellegers and Perry indicate (2006) there is a big gap between the price of irrigation water to farmers and the value they gain from the added quantity and quality of their crop. A large increase in price would be necessary before farmers would cut back use to the point where, through market

⁶ This conclusion and other results of the workshop, held in Beirut in June 2002, are available at: http://www.idrc.ca/en/ev-44056-201-1-DO_TOPIC.html

forces alone, the supply of irrigation water would be equal to demand for it. Effects on farm income and on equity in rural areas would be substantial, and, therefore, most observers conclude that reliance on pricing and market forces to balance supply and demand is not appropriate.. As Dinar and Mody say in their global survey of irrigation water allocation and pricing (2004; 19):

. . . for the most part, water markets are in their testing stage. A number of institutional changes are needed before they can play a more prominent role.

They go on to say that “secure property rights, a supporting infrastructure, and recognition and internalization of externalities” are critical to successful functioning of water markets. None of these conditions is found to any extent in MENA. Therefore, they conclude that establishment of well-functioning Water Users Associations should have higher priority than water markets.

Refocusing Agricultural Research

For many years there has been a bias against investing in agricultural research for less favoured areas, such as the rainfed farms in MENA (Baghouti and Hazell, 2000). As a result, the world has experienced greater relative increases in water productivity in irrigated than non-irrigated cereal crops (Rosegrant, Cai and Cline 2002). However, the many years of conventionally directed agricultural research have failed to resolve growing poverty, food insecurity and environmental degradation. What Fan and Hazell (2000, p. 1) conclude with respect to China and India seems likely to apply to MENA as well:

It now seems plausible that increased public investment in many less-favored areas may have the potential to generate competitive if not greater agricultural growth on the margin than comparable investments in many high-potential areas and that these investments could have a greater impact on the poverty and environmental problems of the less-favored areas in which they are targeted.

As one example, three-fourths of all wheat in MENA is grown under rainfed conditions with typical productivity of one tonne per hectare, a rate that can certainly be doubled and possibly quadrupled by coupling additional research with supplementary irrigation (IWMI, draft chapter of Comprehensive Assessment – *not yet citable*). Pender and Hazell (2000) suggest that small-scale irrigation will yield highest returns in areas with good market access and suitable soil conditions, whereas road development is likely to have the highest returns in densely populated areas. Moreover, in many arid and semi-arid areas food production is limited more by the lack of nutrients than by lack of water, and improved water-use efficiency depends on changes in agronomic practices (Warner *et al.*, 2006). Such approaches are particularly important for small farmers, who make up the bulk of the rural poor. They can also be helped by modest improvements in such traditional approaches as rainwater harvesting (Oweis *et al.*, 2001), and in such modern ones as drip irrigation (Postel *et al.*, 2001). No surprise then that Pender and Hazell (2000, p. 2) caution:

No single strategy will work in all less-favored areas. . . . The key is to identify and implement the appropriate portfolio of such public and private investments for

different circumstances in less-favored areas. Achieving this goal requires more than simply new technologies or policies. It requires responsive and effective institutions to mobilize such investments and to ensure accountability, efficient management, and equitable distribution of benefits.

SECTION 5: SOME GAPS IN INSTITUTIONAL REFORM

Despite advances in recent years, important gaps remain in shifting water management institutions in MENA toward goals of equity, efficiency and sustainability. This section will identify five particularly important gaps.

Poverty and Discrimination

There are still large segments of the population in the Middle East that are treated inequitably with respect to the availability of drinking water or irrigation water. In some cases, the problem comes from land allocation, as with farmers who are at the tail-end of an irrigation canal. In other cases, the problem stems from membership in a group that has little political power or that suffers from deliberate discrimination, as with Arab communities in Israel or Berber communities in Morocco.

Different approaches are needed to deal with these two situations. In the case of deliberate discrimination, political efforts are needed to call attention to the problem and to ensure that services are provided to previously disadvantaged groups. This is a role that can be, and in some cases has been, taken on by non-governmental groups (for example, Keinan, 2005). In the case of poverty, institutions must develop “pro-poor” strategies. It is not sufficient to say that the poor will benefit from some new policy; it must be shown that they will benefit more than those who are already better off (van Koppen, 1999; Gender and Water Alliance, 2003; Singh *et al.*, 2005). However, only a small proportion of this literature focuses on MENA. A set of policy briefs entitled “Empowering Women to Achieve Food Security” (2001) published by the International Food Policy Research Institute cites work in most parts of the world, but none in MENA.

Demand Management Institutions

Though demand management is slowly gaining attention in water management, very few institutions have the mandate to develop and implement programs. Jordan is an exception, but the relevant agency has only a small budget and is low in bureaucratic status. The naive assumption in most countries is that the same agencies that have been delivering supply management all these years will now devote equal attention to demand management. Worse yet, in many cases, drinking water utilities in MENA countries explicitly disavow any interest in or responsibility for the efficiency of water use beyond the main valve – that is to say, inside the house or building or factory. Perhaps because of the sheer volumes of water, irrigation water supply agencies are somewhat more proactive, and in a few countries they provide the extension workers who help farmers use irrigation water more effectively.

Experience with the parallel shift from supply to demand management for energy shows that committed agencies with explicit responsibility for developing demand management policies are essential (Wolfe and Brooks, 2003; Brooks *et al.*, 2007). Moreover, such agencies must have the status and the resources to ensure that those policies are put into operation. The main problem is not the lack of tools or good intentions but rather lack of institutional capacity, capability and motivation – barriers that arise mainly from internal rather than external forces

Water Utility Viability and Water Conservation

Contributing to the lack of support for demand management is the trap in which many water utilities find themselves when they are told both to deliver water at rates that cover all or some proportion of their costs and to promote water conservation for their customers. Typically, those utilities operate close to the financial margin, and, if they promote demand management among their customers, sales are apt to decline and thus threaten the revenue stream they need to remain viable. The only win-win form of demand management for such utilities is reducing leaks and other losses in their own operations. As a result, their demand management programs consist of little more than public information materials.

Innovative rate structures can be designed that allow the utility to share in the benefits (savings) of customer water conservation so that they have a neutral, or even positive, impact on the utility's books. Devolution of responsibility for accountability and management efficiency makes good sense, but it must not put the utility into a trap such that water demand management reduces its revenue stream.

Ecological Demand for Water

Most states in MENA treat their water resources as if all water can be extracted for human uses. There is little recognition that a large share of the water must be left in place to provide natural services ranging from sanitation to flood control and habitat protection (Postel and Thompson, 2005; Falkenmark and Rockstrom 2004). Even approximate numbers suggest that intact ecosystems provide economic values for society well above the private values achieved after land is converted to purportedly "more productive" uses (Millennium Ecosystem Assessment, 2005b). Israel has amended its 1959 water law to recognize the ecosystem as a beneficial use of water and to require annual reports on allocations of water to the ecosystem. Jordan, Morocco, Tunisia and Turkey have all adjusted water management projects to protect nature reserves or increase flows into lakes and wetlands. Generally, however, MENA nations rank low in terms of the ecological protection afforded their water bodies (World Water Development Report, 2003).

Groundwater Management

Finally, groundwater management continues to be neglected in most of MENA. In some cases, higher income farmers or factory owners are permitted to drill for water without regulation, and, as prices for conventional water supplies are increased, they have every incentive to shift from the priced to the unpriced source. According to the World Bank (2007), over-extraction of groundwater is undermining national assets at rates equivalent to 1 to 2 percent of GDP every year in some countries of the region. In Sana'a, Yemen, uncontrolled drilling of wells is causing the water table to fall by more than a metre a year (WRAY-35, 1995). Extraction of ground water from the coastal aquifer in the Gaza Strip portion of Palestine is nearly twice the recharge; water levels are falling by 20 to 30 cm per year, and less than one-fifth of the wells meet WHO standards for drinking water (Bashir and Rabi, 2006).

The two key criteria for groundwater management have to be sustainability of flow (for renewable aquifers) and maintenance of water quality (for all aquifers), both of which require treating the aquifer as a unified body. Almost invariably this means that ground water must be treated as a public, not a private, asset, and a government body must have clear responsibility for allocating permits to drill and to withdraw water, even on private land. Unfortunately, even in the better managed systems, political considerations play an excessive role in groundwater management for many years before reforms are implemented (Feitelson, 2005).

SECTION 6: CONCLUSION: FROM BOARD ROOM TO HOMES AND FIELDS

In response to the catalytic forces identified in this paper, institutional change to improve water management is occurring in the Middle East and North Africa (MENA). However, it is not occurring to the extent nor with the speed that is required by the evident contrast by growing demands for water and distinctly limited supplies. The reasons for the slow rate and limited extent of institutional change are typically found inside the water sector itself. The problem is less the lack of good policy design than ineffective policy implementation. Almost everywhere the needed institutional changes find support among senior planners and in the minister's cabinet, but those changes are not carried through to lower levels of the organization.

Three forces that are today only nascent will have a lot to do with the degree to which institutions in the water sector move beyond the current pattern of hesitant implementation.

- First, is the presence of “champions” in the ministries, ideally the minister or the secretary general, positions that are generally as important from a political as from a technical perspective. Bureaucracies do not move easily, particularly not when the required change will reverse long-standing policies. However, they will move when they are given clear instructions and when they are sure that those instructions are backed by senior managers, not just by planners in a section far removed from daily operations. The role of a champion is partly to give the bureaucracy the confidence it needs to change, and partly to indicate that managers will be judged on how effectively they carry out proposed changes. Those champions can be helped enormously by non-governmental champions from industrial lobbies (including those from agriculture) or from interest groups, which the World Bank identifies as a new force in the region (2007). However, ultimately the inevitable clashes of interest must be resolved by government, and that comes back to the ministerial champions.

- The second force needed to stimulate implementation of improved water management is greater inter-ministerial cooperation. At present different ministries dealing with water are notable more for operating within their own framework than for working with other ministries with overlapping interests. Some gains are evident in urban areas where, among other things, the need to collect, treat and find uses for growing volumes of wastewater crosses the mandates of several ministries. Inter-ministerial cooperation is less evident in rural areas, even when ministries of irrigation and of rural development are operating in the same area. Instead, in pursuit of the goal of integrated water resource management, basin-wide agencies are being created. Some, as with the Litani River Authority in Lebanon or the Jordan Valley Authority in Jordan, have been in place for many years, and generally achieve rather better levels of coordination than what is found elsewhere.⁷ Watershed-based agencies are also being formed in the nations of the Maghreb. Some of these newer authorities have quasi-governmental powers, including the power to tax, which should promote a high level of cooperation. However, they have not been in place long enough to permit evaluation of results. There is no magic bullet that will induce ministries to work together. Rather, it requires a commitment from the prime minister on down, along with selection of ministers and secretaries general who are willing to “knock heads” within their bureaucracies and also to accept political responsibility for the shifts in winners and losers that inevitably accompany institutional change.
- The third force is a review of agricultural policy. Agriculture requires special attention partly because of its domination of water budgets in every MENA nation, and partly because institutional reform is proceeding more slowly in rural areas. In urban areas, institutional change affects a critical but small portion of people’s lives and incomes. (Exceptions must be made for people engaged in urban agriculture and for local water-dependent industry, such as brewing.) Land-use decisions can be separated from water-use decisions, and the balance between water for growing food and water for ecosystem services tends to be complementary rather than competitive. Further, there is a demonstrated willingness in urban areas to pay for better water services, and one can more easily adopt conventional economic approaches to pricing and allocation. None of these characteristics apply nearly so well to rural areas. In rural areas, water availability and livelihoods are almost the same thing; land-use decisions must be coupled with water-use decisions; and there is a roughly proportionate reduction in rural poverty with every increase in agricultural-water productivity. As a result of these differences, institutional change must be introduced more cautiously in rural areas, and the basic approach has to be based on agricultural policy..

Where does MENA stands at this time with respect to improved institutional design and operations for water management? Generalizations are difficult, given the region’s size

⁷ Informal evaluations of the performance of these institutions can be found in the results of the IDRC-funded Forum on Public-Private Partnerships in Water; available at http://www.idrc.ca/en/ev-44056-201-1-DO_TOPIC.html

and diversity. However, we suggest the following based on our observations and impressions:

- There is almost universal recognition of the need for institutional change in the water sector, including a commitment to integrated water resources management.
- For the most part, the kinds of institutional change that are needed are known, though application in the specific circumstances of each country is highly varied.
- There is, as yet, only limited evidence of the political will to ensure that the institutional change is as thorough as it needs to be.
- To now, greater changes have been effected in urban areas than in rural, particularly with respect to water pricing and allocation.
- Of the three goals for new institutions mentioned at the start of this paper – greater attention to demand management, to stakeholder participation, and to pro-poor strategies – modest gains are evident on the first two, but comparatively little on the third.

In conclusion, we are mildly optimistic that MENA nations will accept the challenge of reforming their water institutions in ways that will both provide water for their citizens and for their farms while protecting the ecological systems on which those water supplies depend. As stated by M. Abdelkader Hamdane, Director General for Rural Engineering and Water Development, with specific reference to Tunisia but general application across MENA:

La réforme de la politique de l'eau en Tunisie a été un processus de longue haleine. . . .
Cependant, le processus de réforme dans ce domaine est à caractère dynamique. Il est appelé à se "radicaliser" dans le futur face à la rareté des ressources et à une demande en eau accrue en volume et en qualité, des différents secteurs d'usage, y compris celui de l'environnement dont les besoins s'exerceront d'une façon vigoureuse dans l'avenir.

We are in full agreement with the World Bank's Flagship Development Report on water that "water need not be a constraint to economic development and social stability in MENA" (World Bank, 2007, p. xxvii). However, that conclusion is heavily dependent not just upon planning reforms of water sector institutions but upon effectively implementing those reforms. Again citing the World Bank report, the reforms "will involve some difficult choices and painful changes" (*Ibid.*, p. xxviii). The best argument for pursuing the reforms vigorously and thoroughly is that, in their absence, the choices will become even more difficult and the changes even more painful.

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