



Overview

Water security requires effective governance attention to water's vulnerability and value; to good management principles and practices; and to complex and rapidly changing social, economic, political and environmental circumstances.

Water scarcity threatens the livelihoods of countless people in the Arab region, particularly in rural and poor communities. Remote areas with inadequate water and sanitation are especially vulnerable. But water scarcity also affects urban dwellers, particularly in less developed countries. Twelve Arab countries have average per capita water availability rates below the World Health Organization threshold for severe scarcity.¹ Urbanization, population growth and climate change exacerbate the region's natural water scarcity and widen the gap between supply and demand.

To meet escalating demand, Arab countries must develop a responsive governance framework to better manage their vulnerable water resources, both conventional (surface water and groundwater) and nonconventional (desalinated water, treated wastewater, rainwater harvesting, cloud seeding and irrigation drainage water). Threats include natural variability, pollution, overexploitation and climate change. Most shared resources also lack comprehensive international agreements, threatening both water supply and political stability.

The water crisis is a crisis of governance.² All water resources urgently require efficient, sustainable management. As water becomes

scarcer, governance must ensure that all sectors agricultural, industrial and municipal and users have equitable, reliable and sustainable access to water and are using water efficiently. Water security is inseparable from social, economic, environmental and health considerations. Food security, the water-energy nexus and the impacts of climate change require particular attention. Many factors impede progress in water governance, including unclear and overlapping responsibilities, inefficient institutions, insufficient funding, centralized decision-making, limited public awareness and ineffective regulations and enforcement.

Key elements of good water governance include equity, transparency, accountability, environmental and economic sustainability, stakeholder participation and empowerment, and responsiveness to socio-economic development needs. Cost-effectiveness analysis can guide governance by establishing water's proper value and identifying the most socially, economically and environmentally cost-effective policy options. By reorienting policy, reforming institutions, promoting education and awareness, increasing stakeholder participation, establishing international agreements and linking policy to research and development (R&D), governance can develop efficient water management practices. Effective governance must also remain flexible so that it can incorporate social and political changes of modernization and adapt to climate change. The Arab region's current political and economic transformations

can assist efforts to reform water governance, while effective water governance systems can in turn catalyse region-wide aspirations for overall governance reform.

Managing and adapting to water scarcity

Water scarcity has physical and socio-economic causes. Physical scarcity arises from climate conditions (water shortage) and unsustainable management (overabstraction). The Arab region's low and variable rainfall, high evaporation rates and frequent droughts contribute to low water resource reliability and availability. With more than 5 per cent of the global population and about 10 per cent of the world's area, the region receives only 2.1 per cent of the world's average annual precipitation and contains 1.2 per cent of annual renewable water resources.³ Renewable groundwater quantities are limited, and non-renewable groundwater supplies are threatened by unsustainable use patterns.

Overexploitation and pollution of renewable and non-renewable water resources threaten their availability. Using groundwater resources beyond their natural replenishment rates is rapidly depleting aquifer reserves and degrading water quality due to seawater intrusion. Groundwater resources in most Arab countries are also threatened by pollution from agricultural, industrial and domestic activities.

Urbanization and population growth are straining already scarce resources. The population of the Arab countries, estimated at 360 million, is expected to reach about 634 million by 2050.⁴ The region's urban population is expected to increase from 57 per cent of the population in 2011 to 75 per cent by 2050, putting greater pressure on water infrastructure.⁵ Rising living standards and a sizeable young population pressing for enhanced economic growth, will further boost water demand. The gap between water supply and demand, estimated at more than 43 cubic kilometres a year in 2009, is expected to reach 127 cubic kilometres a year by 2020–2030.⁶

Climate change, bringing greater climate

variability and more frequent and severe droughts and floods, will exacerbate the already precarious situation created by chronic water scarcity. The Arab region is home to 5 of the top 10 countries at risk from the impacts of climate change. Many other Arab countries are considered extremely or highly vulnerable. By 2030 the effects of climate change will have reduced renewable water resources by another 20 per cent through declining precipitation, rising water demand as temperatures mount and expanding seawater intrusion into coastal aquifers as sea levels rise and groundwater overexploitation continues. Climate change has disproportionate consequences for the developing world. Women and poor and marginalized communities are especially at risk.

A society's adaptive capacity determines how scarcity affects it. Socio-economic scarcity arises from a society's economic inability to develop additional water resources or social inability to adapt to the conditions imposed by physical scarcity.⁷ Forced scarcity arises due to occupation and political conflict. Water governance must address all types of scarcity. It is essential to strengthen adaptive capacity—a complex function of a society's infrastructure; wealth; economic structure; and physical, human and institutional resources.

Augmenting water availability

Conventional water resources comprise surface water and groundwater. The Arab region contains 23 major watersheds with perennial rivers or ephemeral streams, or wadis. Several countries with highly variable rainfall and transboundary waters have invested in water storage and conveyance networks to bolster water availability and sustainability and reduce the risk of water-related disasters. Other countries, especially in hyper-arid areas, have built dams. Although dams have yielded economic and social benefits, they have also reduced water levels and soil fertility.

Even countries fairly rich in surface water are relying more on groundwater to meet steadily rising demand. Shallow and deep groundwater resources, within or across national boundaries,

are recharged by precipitation and by rivers. Vast areas, spanning many Arab countries, contain non-renewable groundwater resources, or fossil aquifers. These resources are being used mainly for agricultural expansion and development and mostly without integrated planning.⁸ Groundwater overexploitation is not only depleting resources but also damaging the environment. Water salinization has dried natural springs and degraded or destroyed surrounding habitats and ecosystems.

Nonconventional water resources include desalination, treated wastewater, rainwater harvesting, cloud seeding and irrigation drainage water. The Arab region leads the world in desalination, with more than half of global desalination capacity. Desalinated water is expected to expand from 1.8 per cent of the region's water supply to an estimated 8.5 per cent by 2025. Most of the anticipated increase in capacity will be concentrated in the region's high-income, energy-exporting countries, particularly the Gulf countries. Desalination is energy- and capital-intensive, though technological advances have reduced production costs. Investments in infrastructure and R&D in solar and other renewable energies can lower desalination costs and make it more sustainable.⁹ While desalination plants reduce pressure on conventional water resources, they have harmful environmental effects, including pollution and greenhouse gas emission.

To meet escalating demand in urban areas, Arab countries are using more treated municipal wastewater. Treated wastewater, estimated at 6.5 billion cubic metres a year and rising,¹⁰ offers many advantages for the arid Arab countries. It lacks the uncertainties of surface water resources and can meet a substantial share of rising water demand from urbanization and population growth. Many factors prevent the expansion of water reuse, however, including social barriers, technical obstacles and institutional and political constraints. Regulations are needed to protect human health and the environment.

Several Arab countries are experimenting with water harvesting and cloud seeding. Improving water harvesting techniques requires a long-term government policy to

support national research centres and extension services; adequate institutional structures; beneficiary organizations (associations, cooperatives); and training programmes for farmers, pastoralists and extension staff. Cloud seeding experiments have registered positive results, but cloud ownership disputes are a potential concern. Arab countries, especially Egypt and Syria, also draw heavily on reused irrigation drainage waters. A long-term policy and comprehensive monitoring are needed to improve the efficiency of drainage water reuse and limit its polluting impact.

As populations have grown and food demand has escalated, Arab countries have been forced to acquire water by importing agricultural commodities requiring large amounts of it. Because the Middle East and North Africa imports half of its grain, virtual water trade is necessary. The amount of virtual water imported in the region doubled from 147.93 billion cubic metres in 2000 to 309.89 billion in 2010.¹¹

Water governance that focuses on sustainability, energy efficiency, investment and R&D in water technology is essential to maximize water supply. International coordination and agreements are also needed. More than two-thirds of surface water resources originate from outside the region, and large groundwater systems extend between neighbouring Arab countries and across the region's borders. Almost every Arab country depends for its water supply on rivers or aquifers shared with neighbouring countries (Table 1.6). But most shared resources lack comprehensive international agreements. With stress on the region's water supply mounting, cooperation in managing shared water resources is imperative to ensure their sustainability in serving socio-economic development.

Challenges to effective governance

Balancing multiple water uses amid water scarcity and competing interests can generate social and economic strains. Although agriculture contributes only 7 per cent of GDP, it consumes more water than industrial and municipal

users.¹² But reallocating water to more productive sectors such as heavy industry and tourism would make Arab countries even more dependent on food imports and leave millions of unskilled labourers jobless. Rising domestic water consumption will also reduce the water available for agriculture. Countries will have to increase irrigation efficiency, use more nonconventional water, manage crops better and help agricultural workers find other jobs.

Water equity

Water equity is a challenge in many countries. Rural areas and poor people, as well as groups marginalized due to race, caste, tribe or gender, generally lack access to clean drinking water and improved sanitation. These inequities reflect social and political marginalization that systematically excludes poor people from opportunities and services.¹³ Although access to water and sanitation has expanded in the Arab region, progress has been slow in many countries. In 2010, about 18 per cent of the Arab population still lacked access to clean water and around 24 per cent lacked access to improved sanitation.¹⁴ Most of these underserved people live in lower income, occupied or conflict-ridden countries. Disparities are particularly large between rural and urban areas in water services, though several of the region's major cities also face water shortages. Effective water governance systems must ensure that all people have access to safe drinking water. Ensuring equity requires that all stakeholders, especially poor people and women, participate in water management.¹⁵

Drinking water and sanitation are basic human rights. The World Water Council, the Third World Water Forum, the Global Water Partnership, the Dublin Statement on Water and Sustainable Development and the United Nations have endorsed the view that the "human right to water is indispensable for leading a life in human dignity" and that access to water and sanitation is a "prerequisite for the realization of other human rights". In September 2010 Human Rights Council Resolution A/HRC/RES/15/9 affirmed that rights to water and sanitation were part of international law and confirmed that these rights are legally

binding on states. It also called on states to develop tools to fully realize the human rights obligations of ensuring access to safe drinking water and improved sanitation for all.

Water-related conflict

Because water allocation often reflects and emphasizes social, political and economic inequities, it can cause conflicts to emerge or escalate. Competition over transboundary waters such as the Jordan River, shared by Israel, Jordan, Lebanon, the State of Palestine and Syria and the Jubba and Shabele rivers, shared by Ethiopia and Somalia, are at the heart of regional political conflicts. Inadequate governance of shared water resources continues to threaten the region's stability and impose uncertainty on water resource planning in the downstream countries.¹⁶ Deprivation of water resources in occupied territories is another major issue requiring political movement.

Water's connection to food security and energy

Water security is inseparable from other critical issues such as food security and energy. Competition over increasingly limited water resources severely challenges Arab countries' ability to feed their growing populations. Futile attempts to achieve food self-sufficiency are behind much of the overexploitation of water in agriculture. Failure of these policies has led Arab governments to import more food. Grain imports have more than doubled since 1990, now accounting for almost 60 per cent of grain consumption (Figure 1).¹⁷ To achieve national food security, governments can improve agricultural productivity, maximize water productivity, increase trade in virtual water by expanding food imports and work towards regional agricultural integration, including human, financial, and land and water resources.

Desalination, electricity generation and oil exploration and production manifest the interdependence of water and energy. Effective water governance requires understanding this interdependence. For example, Arab governments should link any future expansion in desalination capacity to investments in abundantly available renewable sources of energy,

Table 1

The expected cost and benefit of action and estimated rate of return on investment in improved water and sanitation provision for 2010-2020

Country	Required investments in water and sanitation services (\$ million)	Potential benefit (\$ million) ^a	Rate of return (%)	Average annual rate of return (%)
Algeria	3,622.3	19,303.3	432.9	39.4
Comoros	218.7	400.9	83.3	7.5
Djibouti	284.4	320.9	12.8	1.2
Egypt	4,484.4	11,073.6	146.9	13.4
Iraq	8,217.1	22,653.3	175.7	16.0
Jordan	135.3	1,635.5	1108.7	100.8
Mauritania	2,146.3	1,772.9	-17.4	-1.6
Morocco	8,484.2	9,608.4	13.3	1.2
Oman	259.7	1,756.0	576.1	52.4
Sudan	30,187.1	18,634.3	-38.3	-3.5
Tunisia	1,461.9	2,438.0	66.8	6.1
Yemen	12,722.4	9,767.5	-23.2	-2.1
Total	72,224.0	99,364.5	37.6	3.4

a. Avoided total cost attributable to low quality or no provision of improved water and sanitation

Source: Authors' estimates.

such as wind and solar. Arab countries must also enhance coordination and investment in R&D in water technologies, most of which are currently imported. Acquiring and localizing these technologies will make them more reliable, increase their added value to Arab countries' economies and reduce their cost and environmental impacts.

Environmental degradation

Water governance must also balance socio-economic needs and environmental protection. Overexploitation and pollution have led not only to lower water quality and quantity, but also to ecosystem degradation. Such environmental damage incurs both economic and social costs.

Impediments to improved water management

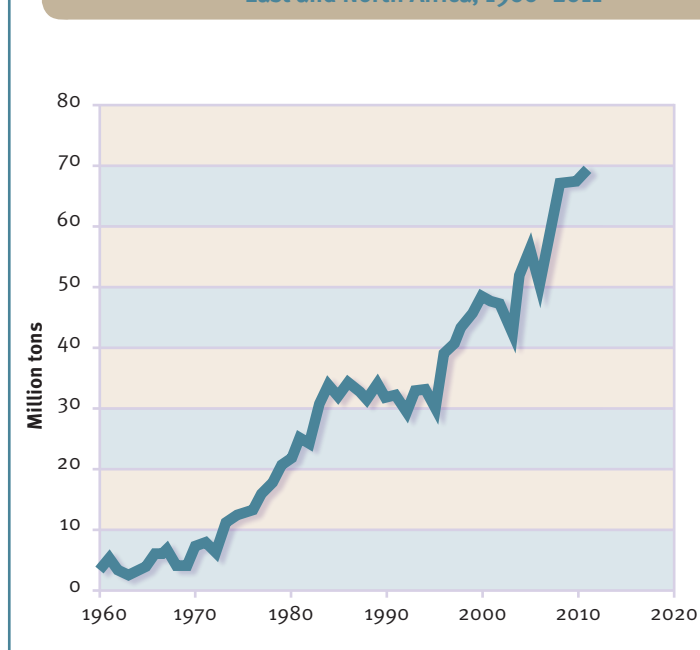
The water sector, predominantly publicly owned, has a large funding gap. While most Gulf oil-producing countries can afford the needed investments in water-source solutions such as desalination, many other Arab countries cannot. The Islamic Development Bank estimates that Arab countries may need

to invest up to \$200 billion in water-related infrastructure over the next 10 years to satisfy growing demand.¹⁸

International donors and lenders have

Figure 1

Net grain imports to the Arab Middle East and North Africa, 1960–2011



Source: Rasmussen 2012.

promoted privatization of water management and distribution to achieve full cost recovery and improve distribution efficiency. But privatization is controversial. Proponents argue that private corporations can better manage and distribute water and that allowing market forces to establish true water prices will force water users to adjust consumption and constrain waste. Opponents argue that privatizing water will create new barriers to common resources, leading to inequitable distribution as vulnerable groups are deprived of their basic water rights. A small group of capital owners will exploit a public good without regard for environmental consequences. Privatization can also reduce local control over natural resource management. Treating water as private property creates the possibility of “excluding others from access” to a life-sustaining element.¹⁹

Some Arab countries have taken steps to reform water governance, but impediments remain, including unclear responsibilities, lack of coordination, inefficient institutions, limited public awareness, highly centralized decision making and ineffective regulations and enforcement. Effective water governance is essential to development. The top-down approach to water governance has failed; the bottom-up approach, ensuring participation of all stakeholders, is the right one.

Achieving effective governance

The water crisis requires a multidimensional approach incorporating social, economic, political and environmental concerns. The social dimension demands equitable use of water. The economic dimension demands efficient water use and attention to water’s role in economic growth.²⁰ The political dimension demands equal democratic opportunities for all stakeholders and water equity for women and other socially, economically and politically weak groups. The environmental dimension demands sustainable water use and ecosystem services.²¹

Key elements of good governance are efficiency, transparency, accountability, environmental and economic sustainability, responsiveness to socio-economic development needs and stakeholder participation to balance competing interests and ensure social equity. Civil society and the private and public sectors must cooperate in reforming and implementing water governance. Governance needs continuous refinement and flexibility as new challenges arise. Each country requires its own model, though general guidelines can be laid out (Box 1).

Understanding, appreciating and properly establishing water’s real value—including environmental and social as well as operational and construction costs—is essential. By properly valuing water and identifying the most

Box 1

The World Water Assessment Programme principles of good governance

- **Participation:** All citizens should have a voice in policy and decision-making, either directly or through intermediate organizations that represent their interests.
- **Transparency:** Information should flow freely within society; processes and decisions should be transparent and open to public scrutiny. Right to access this information should be clearly stated.
- **Equity:** All members of society, both men and women, should have equal opportunities to improve their well-being.
- **Accountability:** Governments, the private sector and civil society organizations should be accountable to the people or to those representing their interests.
- **Coherence:** Water issues, policies and actions, though inherently complex, must be coherent, consistent and easily understood.
- **Responsiveness:** Institutions and processes should serve all stakeholders and respond properly to preferences, changes in demand or other new circumstances.
- **Integration:** Water governance should enhance and promote integrated and holistic approaches.
- **Ethics:** Water governance must be based on the ethical principles of the society where it functions—for example, by respecting traditional water rights.

Source: Rogers and Hall 2003; IRG 2009.

Good governance can help decrease gender inequalities by:

- “Ensuring that poor women’s and men’s human rights and fundamental freedoms are respected, allowing them to live with dignity.
- Introducing inclusive and fair rules, institutions and practices governing social interactions to improve outreach to the vulnerable, such as poor men and women, and the younger and older generations.
- Ensuring that women are equal partners with men in decision-making over development, use, technology choice, financing and other aspects of water management.
- Ensuring that the environmental and social needs of future generations are reflected in current policies and practices.

- Focusing water development policies towards eradicating poverty and improving the livelihoods of women and men.”

Agriculture and the water sector must become gender aware, beginning with training programmes for water professionals and the community on gender approaches and methodologies. Reforms are also needed at the local level to effectively integrate gender-aware and participatory approaches into local and regional businesses, especially to empower women in conflict zones and agricultural and poor communities.

Source: UNDP 2003.

socially, economically and environmentally cost-effective policy options, cost-effectiveness analysis can help decision-makers narrow the gap between supply and demand. Assessing policy options, with attention to all variables, helps establish consensus among stakeholders. Cost-effectiveness analysis can weigh the costs of action against the costs of inaction, revealing the health, political and environmental benefits of providing improved water and sanitation. The goal should be to identify the intervention with the highest rate of return to achieve universal water and sanitation coverage (Table 1).

Building blocks of effective water governance include reorienting water policy, enforcing legislations and regulations, adequately financing the water sector, developing organizational capacities, monitoring and evaluating programmes, managing data and information, coordinating regional and international cooperation, educating and raising awareness, promoting stakeholder participation and empowerment, ensuring water rights and social equity, increasing water use efficiency and improving links between research and management.

The supply-driven approach to water management in the water-stressed Arab countries has failed to deliver water security. Acquiring water supplies while neglecting use and allocation efficiency has led to unsustainable water

practices. Policies must shift from managing supply to managing sustainable demand. Policy must also shift from crisis management to long-term planning.

Most Arab countries have developed the institutional and legislative framework for good water governance but still lack legislative instruments to support its implementation. New challenges require innovative tools, such as decentralization, a participatory approach, strengthened technical and financial capacities of local authorities, dialogue and consensus, effective enforcement and compliance and better water institution performance.²²

Good governance requires coordination and cooperative relationships among organizations with separate water mandates and responsibilities. As competition for water increases, so do such challenges as clarifying mandates, coordinating agencies, collaborating across sectors, managing disciplinary and administrative boundaries and planning multisector and multi-stakeholder consultations.

Deficiencies in human resources are key contributors to water scarcity. Capacity building, training, and organizational development constitute a cornerstone for developing the water sector. Capacity development requires enhancing human resources, strengthening institutional capacity and creating an enabling

environment for sustainable development. Successful organizations have an efficient decision-making structure, an effective partnership with all stakeholders and a spirit of transparency and shared responsibility.

Monitoring is the vital link between policy reform and implementation. Effective monitoring allows fine-tuning policies and reallocating financing across reform priorities. Stakeholders must be able to monitor the quality of decisions and their implementation. Each Arab country should develop monitoring indicators for water reform progress and impacts. A regional monitoring system could improve the understanding of problems and promote solutions, particularly for transboundary waters. Indicators should be identified for monitoring and assessing the enabling environment, institutional frameworks and management instruments.

Ensuring compliance and enforcement of water legislation will require updating water legislation using a participatory approach, disseminating information and providing technical assistance and economic incentives, and developing inspection and monitoring capacities to investigate and penalize violations.

The financial sustainability and viability of effective water governance depend on a clear water financing scheme that identifies financing sources and economic instruments for ensuring optimal funding allocation. Private sector participation in the water sector is growing in response to governments' inability to raise adequate capital to finance, operate and maintain water and sanitation infrastructure. All possible approaches to privatization should be weighed for effectiveness, efficiency, equity and other elements of effective water governance.

Access to data and information is also essential for effective water governance. Without good data, water cannot be allocated efficiently. Better water data support decision-making at every scale, from local crop decisions to larger planning efforts for balancing water demand from agricultural, municipal and industrial sectors. Data can also improve the equity and transparency of decisions and support water quality monitoring.

Regional cooperation in water governance is essential because of the high dependency on

shared water resources. Arab countries must adopt a strategic approach that leverages their socio-cultural solidarity into a unified political position supporting the rights of all riparian countries to fair, just and equitable shares in international water resources. High-level cooperation with neighbouring non-Arab countries is also vital for setting priorities, building consensus, nurturing and strengthening institutions, and supporting action programmes to strengthen the joint management of water resources. Cooperation for effective governance of shared surface and groundwater basins will help to achieve sustainable development.

Social equity, a declared goal of effective water governance, should anchor policy choices. Policies should rely primarily on approaches that allow meaningful participation of all stakeholders. Regardless of social status or power, all social groups should be able to voice their claims and concerns in an open, transparent environment. Reflecting on social and gender equity concerns in policy formulation and programmes is a prerequisite for effective water governance (Box 2). To realize the goal of inclusiveness, countries must go beyond legislative arrangements and staged participatory processes to work towards cultural change.

Public awareness is the foundation for meaningful participation and tangible action. A long-term awareness programme needs to be instituted that takes local and regional socio-economic and ecological dimensions into account.²³

Research and innovation are critical in setting the stage for effective water policies that ensure sustainability, efficiency and equity in access to and use of scarce water resources in the Arab region. Yet water research organizations are hampered by a lack of adequate human and financial assets and the absence of national science and technology policies. In particular, the links between R&D and production require strengthening.²⁴

To succeed, any long-term vision for water governance requires a solid understanding of the social and cultural changes brought by modernization. As lifestyles evolve with rising education levels, accelerating urbanization and ongoing political and social reform, governance

must evolve in tandem. Arab countries must also prepare for the impacts of climate change on water resource planning and augment their adaptive capacity. The Arab region's current economic and political transformation could advance water governance reform through increasing participation and accountability, and water governance reforms can in turn catalyse larger social change through water's effects on livelihoods and other socio-economic activities.

Endnotes

- ¹ FAO 2013.
- ² UNDP 2004.
- ³ World Bank n.d.
- ⁴ UNDESA 2011.
- ⁵ Mirkin 2010; World Bank n.d.
- ⁶ World Bank 2011.
- ⁷ Turton and Ohlsson 1999.
- ⁸ Al-Zubari 2008.
- ⁹ Abdrabo 2003.
- ¹⁰ World Bank and others 2011.
- ¹¹ Timmerman 2013.
- ¹² World Bank n.d.
- ¹³ Beck and Nesmith 2001.
- ¹⁴ WHO and UNICEF 2013.
- ¹⁵ Giupponi and others 2006.
- ¹⁶ LAS and UNEP 2010; ACSAD 2009.
- ¹⁷ Rasmussen 2012.
- ¹⁸ ISDB 2008.
- ¹⁹ Sitaraman 2008.
- ²⁰ World Bank 2003.
- ²¹ Miranda, Hordjik, and Torres Molina 2011.
- ²² GWP Med 2007.
- ²³ Al-Mohannadi, Hunt, and Wood 2003.
- ²⁴ UNDP and Mohammed Bin Rashid Al Maktoum Foundation 2009, 2011.