Groundwater Challenges in the MENA Region

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Water in the Mediterranean Region

Freshwater plays a pivotal role for sustainable development in the Mediterranean region. Water in the region is unequally distributed both in time and space. Groundwater is a limited resource in the Mediterranean region, due to arid and semi-arid climatic conditions in many countries and to periods of periodic drought in others. Under these circumstances, aquifer recharge is significantly reduced. The reserves of groundwater and the storage capacity of aquifers play an economic and strategic role in guaranteeing agricultural production and urban water supply in the Mediterranean.
The article takes a look at issues of groundwater management for the countries in the Middle East and North Africa (MENA) regions. The MENA region has among the lowest per capita amount of water supply in the world. Issues of surface water have been at the forefront in much of the debate on water scarcities, water sharing and improved water resources management. Groundwater continues to be a hidden or forgotten issue that deserves much more attention among policymakers.

Water in the MENA Region

Most countries in the MENA region are experiencing water scarcity combined with low water use efficiency in irrigated agriculture. According to FAO, water use efficiency is about 40 percent. This is higher than in Latin America but lower than in South Asia. Figures from the World Water Development Report (WWDR) show that countries like Malta, Libya, Algeria and Jordan are facing extreme situations of water scarcity. Out of 182 countries ranked in the WWDR with regard to the annual per capita total renewable water resources availability, more than half of the countries in the MENA region are ranked in the lowest 10 percent. This has caused almost all renewable water resources to be in use, and many countries have resorted to the use of their non-renewable water resources for agricultural, industrial and domestic purposes.
Groundwater is a hidden problem, since many countries extract more than is being recharged. This puts the region's irrigated agriculture at risk and leads to saltwater intrusion in aquifers close to the seas. Weak enforcement of environmental legislation leads to groundwater pollution, which further decreases groundwater quality throughout the region. In some cases, legislation is not comprehensive enough, lacking specific rules on solid wastes, hazardous chemicals, etc. A disproportionately large share of available freshwater is used in irrigated agriculture, but it is accompanied by an intensive use of fertilisers which also contributes to water quality degradation through pollution and salinisation. The Jordan River, for example, is in poor shape due to overuse of the upper Jordan by Israel and overuse of its tributary, the Yarmouk River, by Syria and Jordan. There is a great need for improved water resources governance, as well as improved water efficiency and productivity in irrigated agriculture.
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economic development further increases water demand, with serious implications for development and poverty reduction. Even though some countries in the region are on track to reach the Millennium Development Goal targets on improved water supply and sanitation, ongoing urbanisation will necessitate increased investments in water supply and sanitation. According to the World Bank, the MENA region will have grown to a projected 430 million in 2025 from around 100 million in 1960 and the present 311 million, bringing the per capita water average to extremely worrying levels. This raises ever bigger questions on the present approximately 80 to 85 percent of water that is used for irrigated agriculture in the MENA region.

The complexities of managing and sharing common water resources are well-known to the region. Conflicts over water in both intra-national and international settings evolve in complex political and hydrological environments. The MENA region's potential for conflict is increasing because it has one of the highest demographic growth rates of the world at 3-4 percent. The water-intensive agricultural irrigation policies are motivated by the pursuit of national water and food security in countries with burgeoning populations but little economic diversification. Some of the highest demographic concentrations in the world are found in the region, such as in the Gaza Strip.

The water resources are used in an agricultural sector which produces little wealth in the MENA region economies. It has been suggested that a gradual reallocation of water from irrigated agriculture to other economic uses that can provide a higher economic return (industrial and services) will be a more realistic and long-term sustainable policy option. Such change will not come easy since many people, the poor in particular, have agriculture as their economic mainstay and employment opportunity.

Groundwater Regulations in Select Countries

Many countries in the region are currently in a stage of institutional reform, orienting priorities and practices towards integrated approaches to water resources management.

Also at the national level there have been some improvements in groundwater management. For example, in Lebanon, Jordan and Syria water is under the public realm and the pumping and use of groundwater is regulated by legislation. Well drilling is subject to a permit, which also specifies the volume of water that can be extracted and its use. In Jordan, the Ministry of Water and Irrigation has also developed a groundwater management policy, which sets out the Government's policy and intentions concerning groundwater management aiming at the development of the resource, its protection, management and measures needed to bring the annual abstractions from the various renewable aquifers to a sustainable rate for each. However the actual implementation and monitoring of legislation and permits continues to be a challenge for all three countries.

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As previously noted, as much as 80 to 85 percent of the water resources in many MENA countries are used for irrigation and countries like Jordan, Lebanon and Syria rely heavily on groundwater. For example, in Syria 60 percent of all irrigated areas are currently irrigated by groundwater. Despite existing rules and regulations on required permits, almost 50 percent of the total number of wells in the country are considered illegal. The consequences include water over-abstraction. Too many times extraction exceeds groundwater recharge, leading to falling groundwater tables. In coastal areas over-used groundwater aquifers are suffering from salt-water intrusion.

Transboundary Groundwater

Countries like Libya, Tunisia and Algeria are sharing vast amounts of groundwater. Despite the region's heavy reliance on groundwater, most of the political focus in the region is on shared surface water. There are some exceptions to this, such as the groundwater between Palestine and Israel. Interesting cases are now emerging where countries have started to cooperate on transboundary groundwater, such as between Tunisia, Algeria and Libya regarding the North Western Sahara Aquifer System. Cooperation has so far been on a technical level, such as jointly defining the boundaries of the aquifer, identifying

areas where the pressure on the groundwater resource is the strongest and developing a common database. Cooperation is now moving into a second phase of establishing joint legal and institutional frameworks: a steering committee consisting of the three countries' national water authorities; a joint coordination unit; and an ad hoc scientific committee. The framework will manage common databases, establish monitoring indicators and promote information exchange.

There are long-standing traditions in the region of developing small- and large-scale water management alternatives. The irrigation-based civilisations that have emerged in the region are of course well known. Less emphasised, however, are the nomadic and pastoralist cultures that for centuries have applied, for example, rainwater harvesting techniques and sustainable ways of using water resources. The more recent water scarcity responses include, among others, desalination, reuse of wastewater, water pricing, modern irrigation technologies and virtual water and water imports. Countries in the MENA region have applied these techniques when they find it necessary and appropriate to gain more supply and/or use the existing limited supply in a more efficient way. So far, these national water policy adjustments have not been reflected in the transboundary water allocation discussions and negotiations. In most cases riparian states do not include various water management options in shaping and changing inflexible positions along transboundary water resources.

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Regional Work on Groundwater – Recent Responses

As compared to surface water, groundwater aquifers do not have the same level of attention with regard to water resources protection and legislation. Normally, existing knowledge and information on groundwater replenishment and boundaries are weak, thus making it even more difficult to regulate.

There is a long tradition in the Mediterranean of cooperation and networking on issues of sustainable development, environmental protection and management of natural resources. Water is a priority in many regional processes, such as the Euro-Mediterranean Partnership, Barcelona Convention, and the Mediterranean Commission on Sustainable Development (MCSD). The EU Water Framework Directive offers a concrete example of water management in the European Union that could also be explored by other countries along the Mediterranean.

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Málaga-Marrakech Declaration on Groundwater in the Mediterranean

A very recent initiative to improve groundwater management in the Mediterranean region is the Málaga-Marrakech Declaration on Groundwater in the Mediterranean from 2006. The Declaration is aimed at influencing the governments of Mediterranean and EU countries, national and international associations and agencies, companies and local and regional administrations that are concerned with groundwater. In sum, the Declaration recommends promoting research, to passing new regulations and national legislation to promote integrated groundwater management, and developing educational programmes to raise awareness of groundwater, to protect it and to promote sustainable use of this natural resource in Mediterranean countries.

Not only countries in the MENA region are dependent on groundwater; the same holds true for many other countries along the Mediterranean basin. This would underscore the need for prudent use of groundwater for future generations. With this as the backdrop, researchers, technicians, managers and politicians participated in two international congresses on groundwater in the Mediterranean, held in Málaga, Spain, and Marrakech, Morocco, in April and May 2006. Both meetings have given their backing to the present Declaration on Groundwater in the Mediterranean.

The Road Ahead – Making Groundwater Visible

Groundwater extends beyond administrative frontiers and international borders and it is clear that effective management of groundwater must be carried out in cooperation between stakeholders as well as countries. Even though groundwater is regulated, it has not received the same attention as surface water and there is therefore a continued need for national and regional cooperation programmes for sustainable use of groundwater aquifers. It is thus very important to continue efforts of national, regional and sub-regional cooperation. As has been pointed out, there are some promising signs of, for example, transboundary groundwater cooperation between countries like Libya, Tunisia and Algeria. The recent Málaga-Marrakech Declaration on Groundwater in the Mediterranean is also promising. These types of regional and sub-regional arrangements should be increasingly supported. With a view to improving groundwater management it is important to:

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- Make groundwater a strong part of integrated approaches to sustainable water resources management;
- Support processes of national and regional cooperation on shared groundwater;
- Enhance capacities to work with groundwater management;
- Increase the knowledge on groundwater recharge and boundaries;
- Not only focus on declarations, policy and legislative developments but increasingly on stricter enforcement of existing as well as new groundwater policies and legislation.

The above changes will not come easy for the MENA region and will require much political commitment and resolve.

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