

## MENARA Future Notes

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# WATER AND FOOD SECURITY STRATEGIES IN THE MENA REGION

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The MENA region faces many short-term challenges such as conflict and war, economic crises and transnational terrorism. Yet another, longer-term challenge looms large below the surface of everyday politics: the future of food and water security in a region that will be heavily affected by climate change as the century evolves. If these issues of water and food security are not sufficiently addressed, they will pose perilous development challenges for the entire region. Integrated approaches can, however, provide many opportunities for the MENA region in the decades to come.

## WHAT IS WATER AND FOOD SECURITY AND HOW DOES IT AFFECT THE REGION?

Water security can be defined as

the capacity of a population to safeguard sustainable access to adequate quantities of acceptable quality water for sustaining livelihoods, human well-being, and socio-economic development, for ensuring protection against water-borne pollution and water-related disasters, and for preserving ecosystems in a climate of peace and political stability. (UNU-INWEH 2013: 1)

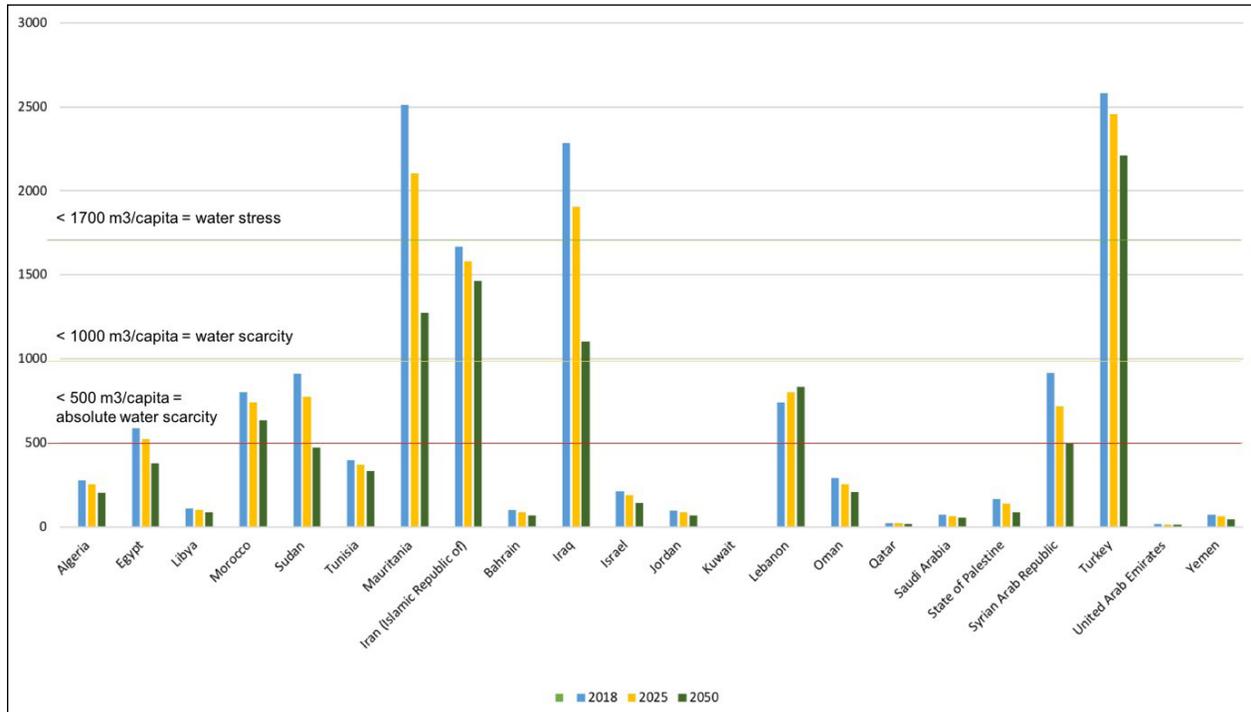
Food security, on the other hand, “exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food which meets their dietary needs and food preferences for an active and healthy life”.<sup>2</sup> These two definitions meet when water is put into an agricultural perspective. They are particularly important in regions with increasing water scarcity. The MENA region cannot currently and in the future meet its food production requirements due to increased water scarcity. As Figure 1 shows, all economies of the MENA region other than Turkey will face either water stress (below 1,700 cm/year/capita) or (absolute) water scarcity by 2050.

High population growth from currently 569 million to more than 1 billion people in 2100 will make meaningful food production very challenging in vast parts of the MENA region (McKee et al. 2017). By the end of the century, Egypt and Iraq in particular, but also Sudan, will be faced by high absolute population growth to approximately 500 million people or half of the MENA region’s population, which will severely impact these countries’ ability to produce food. Climate change will further add to the challenge, with more countries in the MENA region facing high precipitation variability in future decades, including more droughts on the horizon (Mulligan et al. 2017) (see Figure 2).

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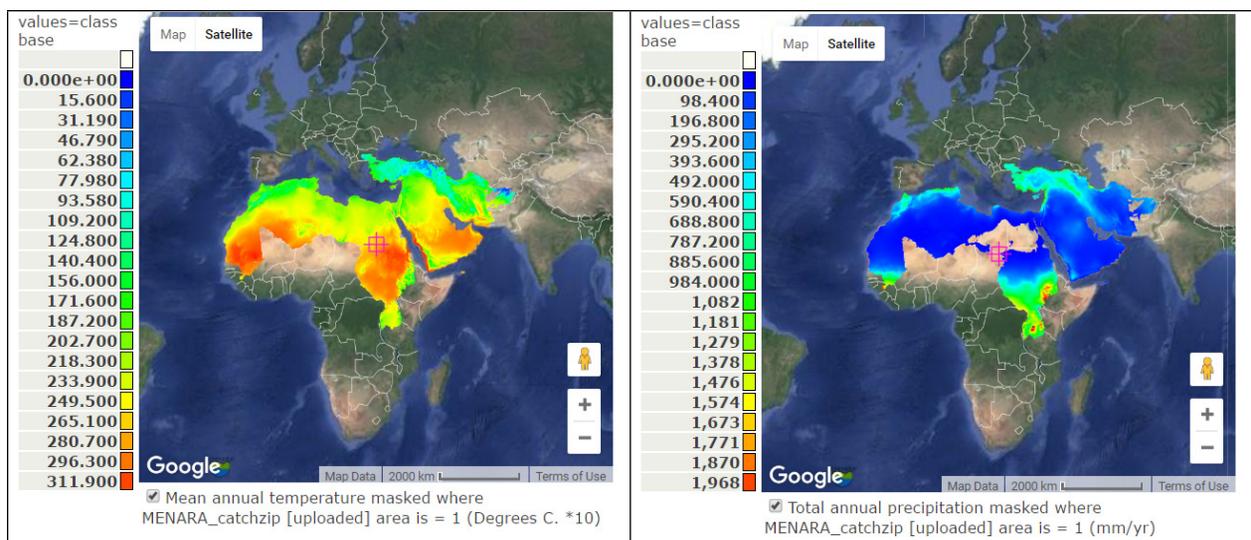
2 See FAO website: *Food Security Statistics*, <http://www.fao.org/economic/ess/ess-fs/en>.

**Figure 1** | Water availability per capita, 2018, 2025 and 2050



Source: Author's elaboration (2018).

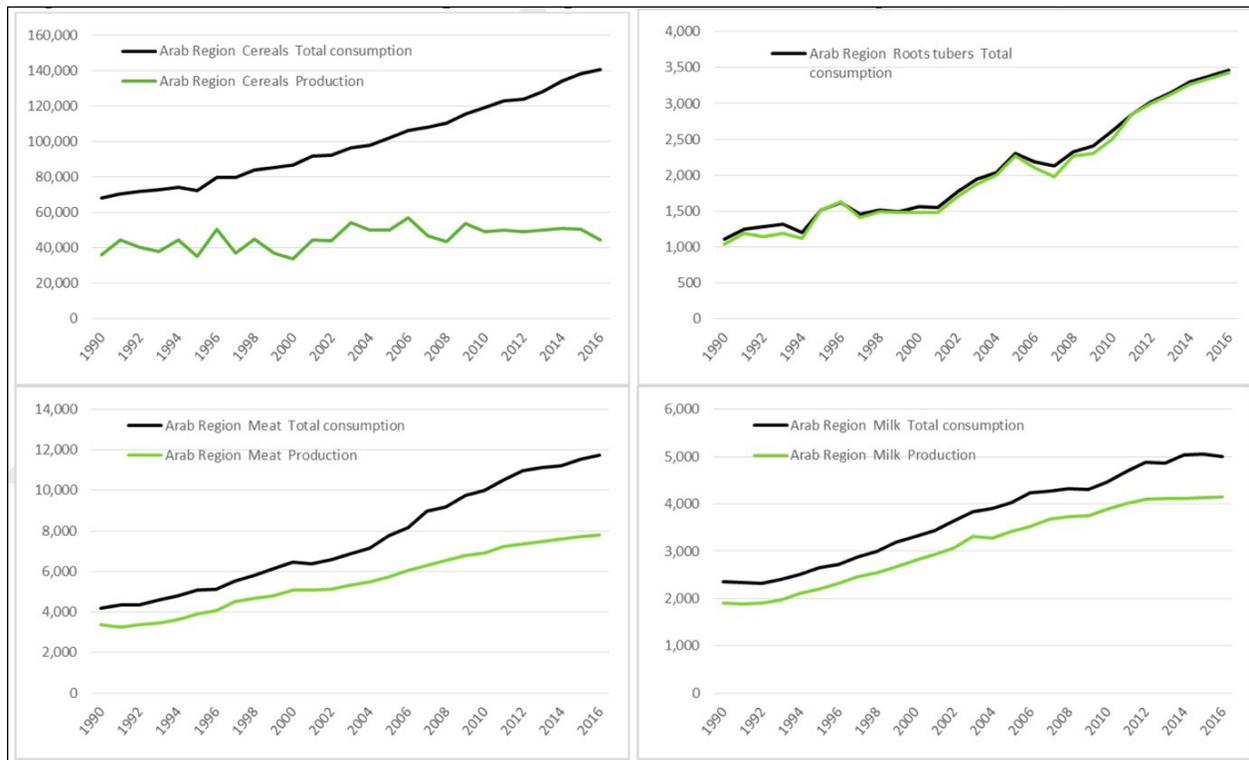
**Figure 2** | Mean annual temperature (deg. C\*10, left) and total annual precipitation (mm, right) in the countries covered by the MENARA project, based on Hijmans et al. (2005)



Source: Mulligan et al. (2017: 5).

Water stress and water scarcity are not new to the MENA region: since the 1970s there have been several instances of insufficient water for food self-sufficiency (Allan 2002). However, while water and food insecurity can be mitigated through moderate food imports, the trend will only intensify. To date, the vast majority of MENA economies are almost entirely reliant on food imports for maintaining an adequate level of food and water security. The key import commodities are cereals and meat (UNESCWA 2017b: 76) (see Figure 3).

**Figure 3 | Consumption and production of key commodities in the Arab region (1,000 MT)**



Source: Konandreas (2017: 36).

## CONSEQUENCES OF WATER AND FOOD INSECURITY IN THE MENA REGION

When food production is limited by insufficient water resources, the consequences are of high geopolitical relevance. In the MENA region, water and food insecurity tend to lead to a greater rural exodus and therefore higher levels of urbanization. Cities grow much faster in the MENA region than in other world regions, a trend that will intensify if rural livelihoods are threatened due to water scarcity. The future of the MENA region will thus be played out in urban areas requiring substantial domestic and international policy shifts to strategically address specific challenges. These challenges include industrializing economies to obtain sufficient foreign exchange to act as a strong player in global agricultural trade. MENA economies could follow the example of the Mercosur countries to strategically cooperate to achieve improved trading terms.

The Syrian conflict can be taken as an example of what happens if high migration to cities due to environmental problems is inadequately addressed. Syria was affected by a severe drought between 2006 and 2010, which led to a decrease in the contribution of agriculture to national gross domestic product (GDP) from 25 to 17 per cent. This resulted in high urban migration, and farmers being unable to find sufficient job opportunities (Kelley et al. 2015). The rest is history, with climate change and associated water problems as one of the drivers of the Syrian conflict.

The social question of agriculture is not exclusive to Syria. Across the MENA region, farmers are living precarious livelihoods. Only those farmers who have off-farm income or access to land enjoying relatively high precipitation levels or irrigation water live in moderate poverty (see Table 1). Thus, the social dimension of agriculture is a crucial issue for governments to address if the lessons from Syria are to be taken seriously.

**Table 1** | Farming systems in the Arab world

Farming system	per cent of the region's		Main livelihoods	Prevalence of poverty
	Land area	Agricultural population		
Irrigated	2	17	Fruit, vegetables, cash crops	Moderate
Highland mixed	7	30	Cereals, legumes, sheep, off-farm income	Extensive
Rainfed mixed	2	18	Tree crops, cereals, legumes, off-farm income	Moderate
Dryland mixed	4	14	Camels, sheep, off-farm income	Extensive
Pastoral	23	9	Camels, sheep, off-farm income	Extensive
Arid zones	62	5	Camels, sheep, off-farm income	Limited

Source: UNESCWA (2017a: 1-2).

## WHAT FUTURE FOR THE REGION?

Water stress or water scarcity does not mean that food production is precluded. Rather, agriculture has to be reformed in a way that livelihoods can be protected and water resources used in the most efficient manner. Agricultural sectors in the MENA region will have to move to high-value crop production with high-resource efficiency methods and higher water productivity. This requires a shift to integrated water management concepts. For example, lessons can be drawn from the water-energy-food nexus (WEF nexus) to reuse wastewater for food production or desalinated water through the use of renewable energy to grow cash crops. Australia's Sun Drop Farms show, in an arid context, how to grow vegetables using desalinated water through solar energy to cater for the domestic market (Margolis 2012). Researchers at the University of Wageningen have gone further by developing metropolitan food clusters and agroparks where food is grown in urban and

peri-urban areas using highly efficient technologies such as hydroponics and precision agriculture to produce more food per drop of water (Buijs et al. 2010). This is especially promising if the life span of water is expanded by utilizing treated wastewater for food production. Another key resource in rainfall-prone areas of the MENA region is the so-called green water – water stored in the soil profile generated from rainfall (Assi et al. 2018). This water has very low opportunity costs as it cannot be pumped or diverted to be used as irrigation water. It is an essential part of any food security strategies in the MENA region.

Resource use efficiency is not only a technological question. Grafton et al. (2018) showed that higher irrigation efficiency rarely reduces water consumption if public authorities fail to introduce water quotas to strictly allocate water resources among farmers. This means that, before investments in technology are made, a policy shift is called for, to introduce strict water policies. At present, illegal wells are widespread across the MENA region, which may lead to a tragedy of the commons situation in which self-interest of farmers negatively affects common goods such as water resources.

## **WHAT IS THE EUROPEAN UNION'S ROLE IN FUTURE WATER AND FOOD SECURITY IN THE MENA REGION?**

The European Union can play a very important role in mitigating the effects of water scarcity in the MENA region. There are several ways in which it can act as a friendly external power to support the transition of agricultural economies to low-resource and high-tech economies. First, the EU could give firm support to governments with better advice on institution-building to regulate water use in the agricultural sector. Second, the EU can provide technology transfer from its agricultural research organizations as well as targeted investment in wastewater treatment facilities and high-tech farming facilities to support MENA economies in their transition from traditional agriculture to high-tech, low-resource input agriculture. Third, MENA economies will be unlikely to grow sufficient cereals for domestic and regional food security. Thus, the region will further have to import cereals from around the world. This can be facilitated by establishing an agricultural customs union between the EU and MENA economies to provide producers of high-value crops in the MENA region with access to the European market. Similarly, MENA importers can be provided with tariff-free access to European cereals and other staple foods to support food and nutrition security in the MENA region. Therefore, the key arena for mitigating water and food management in the MENA region will have to come from policymakers both regionally and internationally.

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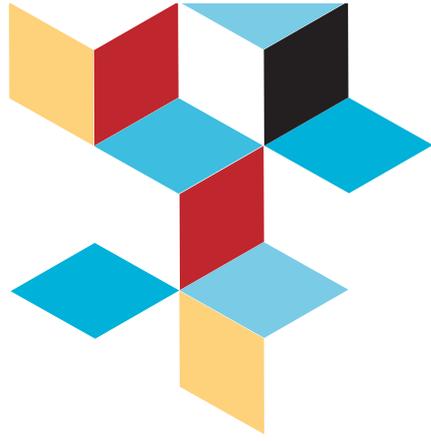
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**MENARA** maps the driving variables and forces behind these dynamics and poses a single all-encompassing research question: Will the geopolitical future of the region be marked by either centrifugal or centripetal dynamics or a combination of both? In answering this question, the project is articulated around three levels of analysis (domestic, regional and global) and outlines future scenarios for 2025 and 2050. Its final objective is to provide EU Member States policy makers with valuable insights.

**MENARA** is carried out by a consortium of leading research institutions in the field of international relations, identity and religion politics, history, political sociology, demography, energy, economy, military and environmental studies.



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