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## FUTURE NOTES

# FUTURE CHALLENGES OF CLIMATE CHANGE IN THE MENA REGION

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Since the 1980s, scientific research on climate change has emphasized that the changes anticipated will have major impacts on and consequences for all world regions. Within the field of scientific future research and future studies climate change is therefore acknowledged to be one of the major “megatrends”. In essence, this means it has a longevity of several decades and probably even longer, it is a global phenomenon, and it will have a major impact on almost all sectors and all people and institutions. Through interaction with other megatrends and changes, such as demographic change, globalization and urbanization, climate change will very likely pose huge challenges for countries within the MENA region.

The MENA region will be one of those most severely affected by ongoing climate changes. These will be caused by increased average temperatures, less and more erratic precipitation, changing patterns of rainfall, continuing sea-level rise and changes in water supply. All this will happen in a region which already suffers from aridity, recurrent drought and water scarcity.

Climate change in the MENA region is expected to affect water resources, sea level, biodiversity, human health, food production, land use and urban planning, and tourism. Each of these threats poses extraordinary challenges for governance and development and calls for major efforts to lessen their negative and dangerous effects.

## EXISTENTIAL CHALLENGES REGARDING WATER

*Water resources in the MENA region* are diminishing. Water scarcity is already critical in several areas and will reach severe levels within the MENA region by 2025. Some experts even predict that the Fertile Crescent, from Iraq and Syria to Lebanon, Jordan and Palestine, may well lose all qualities of fertility before the end of the century because of deteriorating water supply from the major rivers. Man-made changes are making the situation worse. For example, the widespread construction of dams and unsustainable irrigation practices (which waste about half of the water resources) and high rates of human water consumption (which are well above international standards in some Arab countries) are contributing to making this problem even more acute. The expected effects of climate change are likely to exacerbate this situation. With continuing increases in temperatures, water flow in the Euphrates may decrease by 30 percent and that of the Jordan River by 80 percent before the turn of the century.

Another major challenge for parts of the MENA region is *sea level rise*, because most of the region’s economic activities, agriculture and population centres are located in coastal areas. The

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high vulnerability of coastal areas to sea level rise results from inundation and the increasing salinity of the soil, coupled with the reduced availability of freshwater resources such as aquifers. Overall, sea level rise of 1 metre would directly impact 41,500 km<sup>2</sup> of MENA coastal lands. The most serious impacts of this can be expected in Egypt, Tunisia, Morocco, Algeria, Kuwait, Qatar, Bahrain and the UAE. For example, the effects for Egypt of a sea level rise of 1 metre – which is likely to occur by the end of the century – would mean that more than 6 million citizens have to be moved elsewhere with all their belongings and the whole infrastructure, and that 4,500 km<sup>2</sup> of precious agricultural land would be lost. Overall, a sea level rise of this magnitude would directly affect more than 3 percent of the MENA region's population.

### CHALLENGES FOR NATURE, HEALTH AND FOOD

In the region *biodiversity* is already deteriorating, and it will be further damaged by intensifying climate change. A 2°C rise in temperature will make extinct up to 40 percent of all existing species in the region. The MENA countries have many unique ecosystems that are very vulnerable to climate change risk, such as the cedar forests in Lebanon and Syria, the mangroves in Qatar, the reed marshes of Iraq, the high mountain ranges of Yemen and Oman, and the coastal mountain ranges of the Red Sea.

*Human health* will also be negatively affected by increasing temperatures in the region, mainly owing to changes in geographical distribution of disease vectors such as mosquitoes, waterborne pathogens, water quality and air quality, as well as food availability and quality. It is very likely that cases of infectious diseases such as malaria will increase, mainly in Egypt, Morocco and Sudan. Malaria, which already affects 3 million people annually in the region, will become more prevalent and will affect new territories as higher temperatures reduce the incubation period, spread the range of malaria-bearing mosquitoes and increase their abundance. Furthermore, higher CO<sub>2</sub> concentrations and fiercer and more frequent sandstorms in desert areas will increase allergic reactions and pulmonary diseases throughout the region.

Directly related to human health is *food production*, which will increasingly be threatened, thus affecting basic human needs. Increasing aridity and changes in the spans of seasons may cut agricultural yields in half if no alternative measures are applied. Urgent adaptive measures are required, including changes in crop varieties, fertilizers and irrigation practices. All these will require the development of new varieties of crops that can adapt to the emerging conditions. Crops that need less water and can withstand higher levels of salinity should be developed and introduced on a large scale.

### CHALLENGING FOR PLANNING AND TOURISM

So far, *land use and urban planning* regulations in the MENA region largely ignore basic adaptation requirements to climate change. An estimated 75 percent of buildings and infrastructure in the region are at direct risk of climate change impacts, mainly from sea level rise, higher intensity and frequency of hot days and storm surges. Reliability of transportation systems, energy generation stations, water supply and waste-water networks will be at risk. Planning requirements should take into account the threat of rising sea levels, specifying a minimum distance between

permanent structures and the shoreline as well as providing strict requirements related to the choice of construction materials used for buildings and roads. Plans for making infrastructure and buildings resilient to climate change are badly needed.

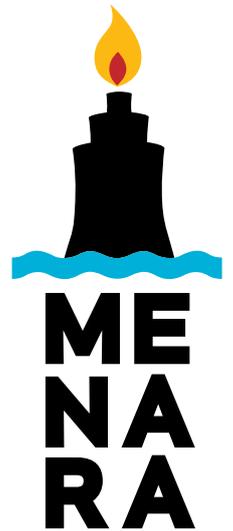
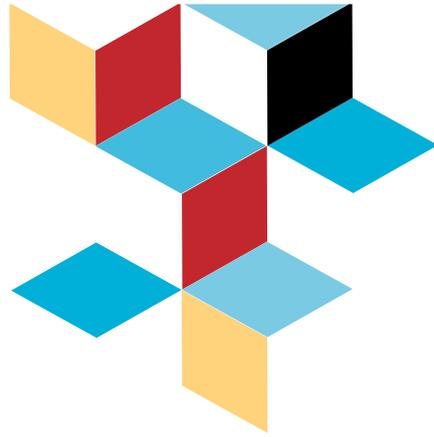
As an important sector of the economy for a number of MENA countries, *tourism* is highly vulnerable to climate change. An increase of 1–4°C in average temperature will cause a drastic decline in the index of tourism comfort all over the region. Areas classified between “good” and “excellent” are likely to become “marginal” to “unfavourable” by the year 2080, mainly because of hotter summers, extreme weather events, water scarcity and ecosystems degradation. In addition, phenomena such as the bleaching of coral reefs will affect tourism in countries in the Red Sea basin, mainly Egypt and Jordan. Beach erosion and sea level rise will affect coastal tourist destinations, mainly in Egypt, Tunisia, Morocco, Syria, Jordan and Lebanon, especially in locations where sandy beach stretches are narrow and buildings are close to the shoreline. To counter this, options for “alternative tourism” which is less vulnerable to climatic variability, such as cultural tourism, should be explored.

## **DANGEROUS DEFICITS IN THE PREPARATION FOR CLIMATE CHANGE**

There has not been much effort made to prepare the MENA countries for these climate change challenges. For example, no systematic data gathering and research efforts seem to exist regarding the impacts of climate change on health, infrastructure, biodiversity, tourism, water and food production. Reliable records of climate patterns in the region barely exist. The economic impact seems to have been totally ignored, despite the prognosis that the later climate policies are adopted, the costlier the necessary investments will be. In sum, with regard to mitigation or adaptation for climate change, the policy-making of most governments in the region has shown dangerous deficiencies that need to be urgently remedied. Many arenas of governance – from sustainable management of natural resources and monitoring development to risk planning and evaluation of activities – have to be rapidly created. This is badly needed, since almost all countries in the MENA region are among the most vulnerable in the world with regard to the likely impacts of climate change, as previously stated. In addition, latest research suggests that there may be dangerous tipping points. Among these is the further expansion of the Sahara Desert and the further deterioration of the natural environment in Sahel.

## **SUPPORT NEEDED TO COUNTERACT CLIMATE CHANGE EFFECTS**

One of the consequences of these major climate-related changes in the MENA region will be increasing migration to Europe. Environmental deterioration does not play a major role in the decisions of people and groups to migrate, for instance to EU countries, but it has been shown that climatic events may well account for about 10–20 percent of current migration flows. The role played by weather patterns in choices whether to stay or leave could well increase in the future as climatic conditions further deteriorate. It is therefore urgently required that the EU, its member states and relevant civil society organizations as well as business and the science community support their counterparts in the MENA region, focusing on mitigation and adaptation activities related to climate change. Their activities would also encompass support for sustainable development, such as implementation of the United Nations’ Agenda 2030 Sustainable Development Goals.



**Middle East and North Africa Regional Architecture: Mapping geopolitical shifts, regional order and domestic transformations (MENARA)** is a research project that aims to shed light on domestic dynamics and bottom-up perspectives in the Middle East and North Africa amid increasingly volatile and uncertain times.

**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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