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Climate Change Has Happened: The Middle East's Climate Crisis

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The maddening pace of developments in the Middle East makes it ever harder to understand what is happening. It also obscures long term changes that are having major effects on day-to-day life. Climate change is perhaps the most important: it is no longer just a theoretical issue for those concerned with the future of the environment. It has, in fact, become an issue of major and immediate strategic significance. Climate change was one of the factors behind the beginning of the war in Syria and is one of the causes of the huge migration of people from the Middle East and Africa to Europe.

The summer of 2015 was dramatic both as a result of the events in Syria and also because of climatic conditions. At the end of July, in the Iranian city of Bandar Mahshahr on the Persian Gulf, the temperature reached 46ºC with a dew point of 90, yielding a heat index – a measure of what the air felt like – of 74ºC! In August, it was reported that temperatures had reached 51ºC in the Iraqi city of Basra and the government ordered a four-day holiday to help people deal with the heat. In Lebanon residents lacking electricity took to sleeping on bare floor tiles during extended power cuts that prevented them from using air conditioning. In September, Israel experienced the worst sandstorm since records began along with extreme heat. The sandstorm may have been the result of the abandonment of agricultural land by farmers in Syria due to the war.

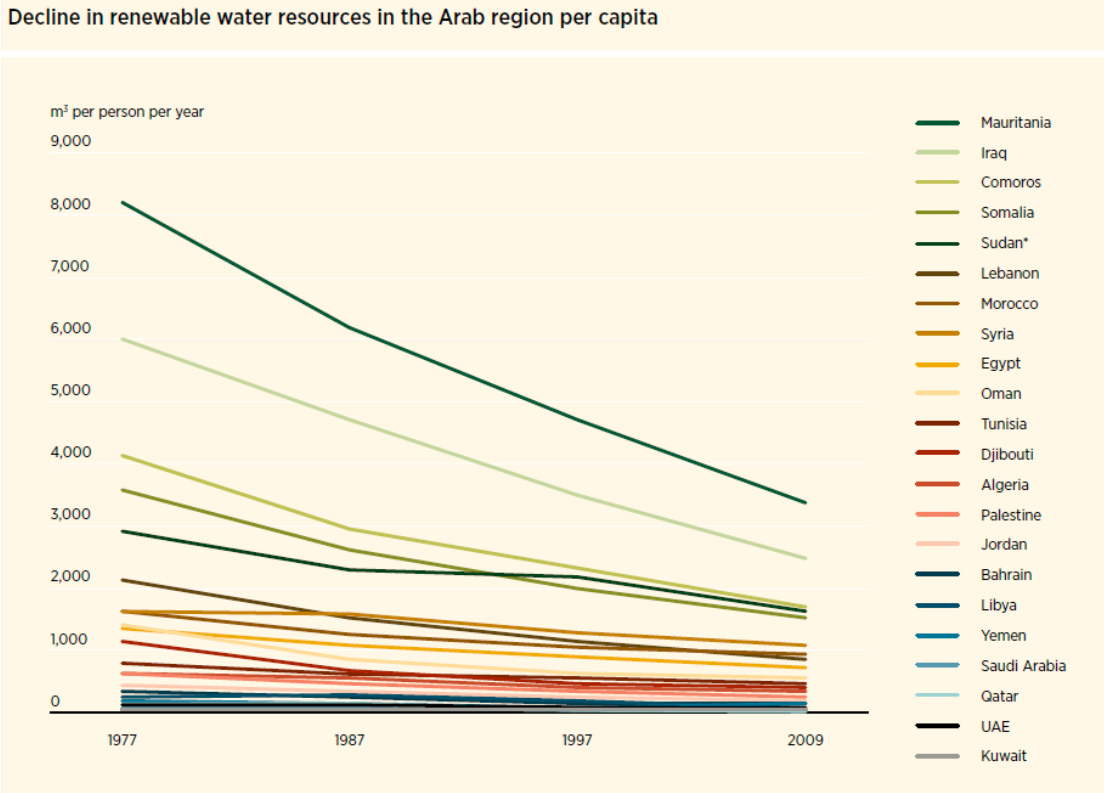
These events occurred in a region that has serious resource imbalances. The Middle East has more than five percent of the world's population and ten percent of its land

area but receives only 2.1 percent of the world's average annual precipitation and contains 1.2 percent of annual renewable water resources. Renewable groundwater quantities are very limited and non-renewable groundwater supplies are threatened by overuse and pollution. Using groundwater faster than it is naturally replenished depletes aquifer reserves and degrades water quality, as a result of the intrusion of seawater by osmosis.

In much of the region groundwater resources are also threatened by pollution as a result of agricultural, industrial, and domestic activities. Urbanization and population growth are also straining scarce resources. The population of the Arab countries, currently estimated at 360 million, is expected to reach about 634 million by 2050. The urban population is forecast to increase from 57 percent of the total in 2011 (about 200 million) to 75 percent (about 475 million) by 2050, putting greater pressure on the water infrastructure.

The demand for water is forecast to grow as the population increases, living standards rise, and the economy grows. (These are assumptions that somewhat defy the imagination at present). The gap between the demand and supply of water, estimated at more than 43 cubic kilometers a year in 2009, is expected to reach 127 cubic kilometers a year by 2020–2030. Chart 1 below shows the decline in per capita water resources between 1977 and 2009.

Chart 1



*Note: *Area covering South Sudan and Sudan.*
Source: FAO AQUASTAT.

Climate change has increased climate variability and resulted in frequent and severe drought and floods. It will exacerbate the already precarious situation created by chronic water scarcity. The Arab region includes five of the top ten countries in the world at risk from the impact of climate change. Many other Arab countries are considered vulnerable. By 2030, the effects of climate change will have reduced renewable water resources by another 20 percent through declining precipitation; rising water demand as temperatures rise; continuing seawater intrusion into coastal aquifers; rising sea levels and continuing groundwater overexploitation.

Middle East emissions of greenhouse gases are low in absolute terms, accounting for less than five percent of the world's total. The volume of these emissions and their contribution to regional climate change varies between countries. The main oil producing states – Algeria, Egypt, Iraq, Saudi Arabia, and the United Arab Emirates – account for 74 percent of the total. Between 1990 and 2004, the growth of carbon dioxide (CO2) emissions in the region – at over 88 percent – was the third-largest in

the world and was more than three times faster than the world average. Most of that growth came from fuel combustion from automobiles and electric power generation that was exacerbated by heavily subsidized fuel prices.

According to the Intergovernmental Panel on Climate Change (IPCC), from 1970 to 2004, the region experienced an uneven increase in surface air temperature ranging from 0.2ºC to 2.0ºC. It has forecast an increase in temperature up to 2.0ºC during the next 15 to 20 years, and over 4°C by the end of the century. North Africa and the Mediterranean regions are among the most physically sensitive regions to climate change. Climate models project hotter, drier, and less predictable climate, resulting in a fall in water run-off by 20 to 30 percent in most of the Middle East and North Africa by 2050, mainly due to rising temperature and lower precipitation.

Table 1

Increase in annual average temperature range in degrees Celsius

	Best case scenario	Worst case scenario
2030	0.5-1.0	1.0-1.5
2070	1.0-1.5	2.0-2.5
2100	2.5-3.0	3.0-4.0

Source: UNDP: Arab Human Development Report, Research Paper Series 2010 based on IPCC 2007

The projected higher temperatures and reduced rainfall are expected to increase the likelihood of droughts. Many parts of North Africa, especially Morocco, have already experienced more droughts. Morocco's drought frequency increased from one every 10 years in the beginning of the twentieth century, to five or six every 10 years currently. The vulnerability of the region to climate change is aggravated by the dependence on climate-sensitive agriculture, the concentration of population, and economic activity in flood-prone urban coastal zones, as well as the presence of conflict-ridden areas in which climate-induced resource scarcity could escalate violence and political instability even beyond the region's boundaries. (The Islamic State has seized dams and other water installations. The struggle to control the Iraqi city of Mosul and its dam is the best example.) Sub-Saharan Africa is particularly vulnerable to the risk of environmental changes due to global warming. This area is home to many of the world's poorest nations, countries that will not be able to afford

implementing adaptation strategies on their own. The IPCC 2007 report noted that between 1900 and 2005, the Sahel (the boundary zone in Africa between the Sahara to the north and the more fertile region to the south), the Mediterranean, southern Africa, and parts of southern Asia had become drier, adding stress to water resources in those regions. The increase in emigration via North Africa to Europe has been a notable consequence.

The main climate change risks in the North African and Middle East region will largely be linked to long-term desiccation (extreme dryness) and drought associated with large climate swings. Overusing limited water resources is very significant, and as water becomes increasingly scarce it may have a severe impact on food security. Some projections indicate that even a moderate increase in temperatures will have major effects on regional water flows. This is true for the Euphrates and Jordan rivers, which could shrink by 30 percent and 80 percent respectively, by the end of the century.

Agricultural yields, especially in rain-fed areas, are expected to fluctuate more widely over time and to converge at a significantly lower longer-term average than present. Agricultural output may decrease 21 percent in value terms by 2080, with peaks of an almost 40 percent decrease in Algeria and Morocco.

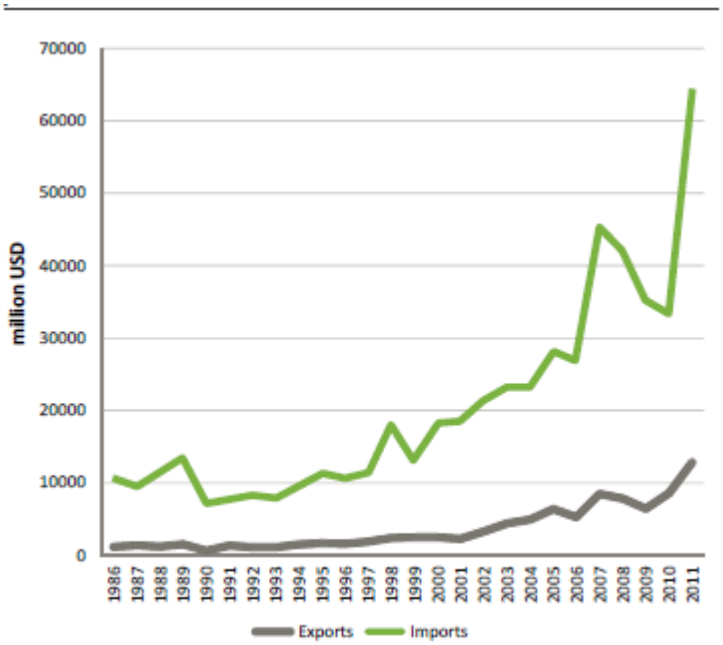
Droughts hit the region with punishing regularity, bringing significant water shortages, economic losses, and adverse social consequences. The 2004 floods in Djibouti led to 230 deaths and affected 100,000 people. Between 2008 and 2011, drought in Djibouti caused a yearly economic contraction of about four percent of gross domestic product (GDP). Droughts are the third most prevalent hazard in MENA after earthquakes, but despite the alarming levels of water scarcity, floods also pose a significant danger. The 2008 floods in Yemen caused damages totaling $1.6 billion, or six percent of the country's GDP. The 2009 floods in Jeddah, Saudi Arabia, brought losses of $1.4 billion and there were others in 2011 and 2013.

The region is highly dependent on food imports (see Chart 2 below). Some 50 percent of wheat and barley consumption, 40 percent of rice consumption, and nearly 70 percent of maize consumption are imported. The region has coped with the water

scarcity by using groundwater, desalinization, and local community coping strategies, including rationing. Despite extreme water scarcity, the Gulf countries use more water per capita than the global average, and Arab residential water and energy markets are among the most heavily subsidized in the world. The region is very diverse in terms of socio-economic and political conditions. Thus, adaptive capacity and vulnerability to climate risk varies enormously within the region, especially between the Arab Gulf States and the other Middle East and North Africa countries.

The Middle East and North Africa is an area of worsening extreme heat, drought, and aridity conditions. Agriculture, which is 70 percent rain-fed, is highly exposed to changing climatic conditions. With high import dependency, agriculture is very vulnerable to changes in prices on international markets. Extreme effects, such as a more than 45 percent decline in annual water discharge, which is projected in parts of the region, would present unprecedented challenges to the people affected. Climate change is already affecting the security situation in the region by imposing additional pressures on already scarce resources and by reinforcing threats of migration following forced displacement. Changing precipitation patterns and an increase in extreme heat threaten agricultural production and regional food security. Most agriculture in the region takes place in the semi-arid climate zone, either close to the coast or in the highlands, and is highly vulnerable to the effects of climate change. Rainfall is predicted to decline by 20 to 40 percent in a 2°C world and by up to 60 percent in a 4°C world in parts of the region. Agricultural productivity is expected to fall in parts of the Middle East and North Africa region.

Chart 2
Middle East and North Africa: Trade Deficit in food and agricultural products, 1986-2011



Source: FAO

Awareness of the environmental crisis and it implications has, for different reasons, spread to some unexpected places. In September 2015, the governor of the Bank of England, Mark Carney, noted that climate change could affect financial stability: physical risks, such as claims from floods and storms; liability risks that could arise if those suffering climate change losses sought compensation from those they held responsible; and transition risks caused by the revaluation of assets caused by the adjustment to a lower-carbon economy.

Carney stated that global action to tackle climate change could have a profound impact on companies if their businesses were challenged by the move away from fossil fuels. The International Panel on Climate Change's estimate of a carbon budget that would likely limit global temperature rises to 2°C above pre-industrial levels, amounts to between a fifth and a third of the world's proven reserves of oil, gas, and coal. If that estimate is even approximately correct, it would result in the vast majority of reserves becoming stranded – oil, gas, and coal that could not be used without expensive carbon-capture technology, which itself alters fossil fuel economics. This would have huge effects on Middle Eastern oil and gas producers. The expectation of this process may already be contributing to low oil prices today.