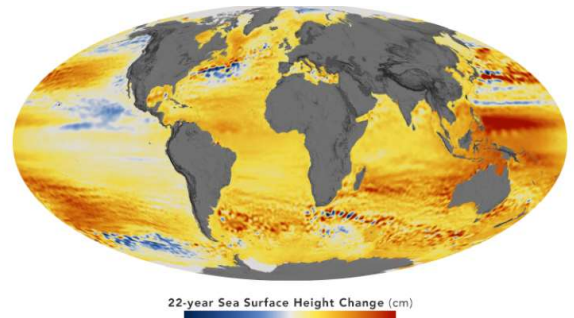


Climate Change, Sea Level Rise, and Sustainable Urban Adaptation in Arab Coastal Cities

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Over the last 25 years, the world has seen a rise in the frequency of natural disasters in rich and poor countries alike. Today, there are more people at risk from natural hazards than ever before, with those in developing countries particularly at risk. This essay series is intended to explore measures that have been taken, and could be taken, in order to improve responses to the threat or occurrence of natural disasters in the MENA and Indo-Pacific regions. Read more ...



Global warming of the oceans and the melting of glaciers and ice caps have been continuously driving the global rise of sea level over the past half-century.[1] Sea level rise (SLR) is expected to directly affect the safety and standards of living of millions of inhabitants of the Arab world's coastal cities in the decades to come. Moreover, SLR may pose unprecedented threats to most Arab metropolises during the second half of the 21st century, with critical social and economic consequences. Collectively fighting the causes of climate change, better planning and innovating for a sustainable adaptation of Arab coastal cities are becoming national security challenges that the countries of the region need to properly address without any further delay.

On January 15, the World Economic Forum (WEF) released its Global Risks Report 2019 on the major threats to the world economy. For the third year in a row, the report stated that environmental-related risks account for three of the top five global risks by likelihood, and four of the top five risks by economic impact, namely: "Failure of climate-change mitigation and adaptation," "Extreme weather

events,” “Water crises,” and “Natural disasters.” Finally, the report bleakly concluded, “[o]f all risks, it is in relation to the environment that the world is most clearly sleepwalking into catastrophe.”^[2] The literature on climate change risks in the Middle East and North Africa (MENA) region has focused mainly on the issues of temperature increase and water scarcity, as both phenomena have been directly affecting the populations.^[3] However, this article highlights how the lesser-known issue of sea level rise makes Arab states increasingly vulnerable to climate change. Using the city of Doha as a case study to highlight how sea level rise represents a critical threat to many Arab coastal cities and a national security challenge to Gulf Arab nations, this article underscores the need for greater anticipation in the region’s urban planning of the risks posed by climate change and sea level rise.

The Warming and Rise of the Seas: A Threat to Arab Coastal Cities

In its fifth assessment report, the United Nations’ International Panel on Climate Change (IPCC) explained the situation in a sober manner: “Warming of the climate system is unequivocal, and since the 1950s, many of the observed changes are unprecedented over decades to millennia. The atmosphere and ocean have warmed, the amounts of snow and ice have diminished, and sea level has risen.”^[4] According to the UN panel, the term “global warming” refers mainly to ocean warming, given that ocean and seas play a dominant role in energy storage. Indeed, “more than 90% of the energy accumulated between 1971 and 2010.”^[5] As a consequence, the Arctic ice sheet is melting six times faster than in the 1980s^[6] and, annually, Antarctic ice alone produces 0.6mm of global sea level rise every year.^[7] However, SLR is the result of a combination of factors, chiefly the thermal expansion of the oceans (warmer water takes more volume), as well as the increase in loss of land ice (glaciers and ice sheets). As the response times for these drivers of change are significantly different, Clark, Shakun *et al.*^[8] have demonstrated that SLR will continue for millennia, irrespective of strong climate action in the coming years and decades.

Current trajectories of global warming, as calculated by the present commitments of member countries to the United Nations Framework Convention on Climate Change under the Paris Agreement (COP21) indicate that the world might face a global increase in temperature of 3 to 3.5 degrees Celsius by the end of this century — a particularly high level of temperature increase that is very likely to cause about two meters of SLR by the by the end of this century and several meters more during the next.^[9]

At the global scale, warmer waters have already led to devastating consequences for marine life. Since 2016, for instance, half the Great Barrier Reef — a world biodiversity hotspot — has bleached due to the rising temperature of the water.^[10] The ARC Centre of Excellence for Coral Reef Studies has estimated that 93% of tropical reefs have already suffered fatal bleaching, because water temperatures are too warm for corals, leading to their bleaching and death.^[11] The major problem is that reefs constitute hotspots of marine biodiversity and species reproduction sites, and that their partial loss negatively affects the global marine biodiversity and fish stock. In the already warm waters of the Gulf, the Red and Mediterranean Seas, which constitute the habitat and traditional source of seafood for the Arab world’s coastal cities and villages, bleaching corals are plainly evident in many areas. The overall marine fish stock has been declining almost everywhere in the Arab world, partly due to climate change and the death of corals, but also due to over-fishing and oil and gas pollution.^[12] This represents a significant risk for many communities of fishermen and for coastal tourism along the Red and Mediterranean Seas. Yet the Arab world’s greatest risks are arguably onshore, or more precisely, at the moving barrier of what is off- and what is on-shore.

From Nouakchott and Rabat to Kuwait and Dubai, including all of North Africa and most of the Levant, the majority of the Arab world's capital cities and large metropolises are located on at-risk coastal areas or nearby, and their populations are becoming increasingly vulnerable to sea level rise. Across the world, 800 million people are living in more than 570 coastal cities that are vulnerable to a 50 cm rise by 2050.[13] But this is a particularly important problem in the Arabian Sea and Persian Gulf region, where most capitals are coastal cities and where several of the fastest-growing cities — such as Abu Dhabi, Doha, and Dubai — are located on low-lying coastal zones or islands.

Urban Planning and Innovation Are Critically Important

The vulnerability of coastal cities has profound social as well as economic implications. In 2007 for instance, cyclone Gonu directly killed more than 50 persons, affected 20,000 people, and generated over estimated US\$ 4 billion of direct damages in Oman alone.[14] Because warmer waters are conducive to tropical cyclones, sea level rise may lead to more regular coastal flooding during extreme environmental events, including cyclones, which can impact essential services such as transport, logistics, water and energy supplies. The World Bank has identified no less than 24 ports in the Middle East and 19 ports in North Africa at particular risk of sea level rise.[15]

Adaptation measures are thus needed to protect societies, local and national economies, and the environment. Although these measures may affect some economic and financial interests in the short term, they are an undeniable necessity. Classic adaptation strategies include: restricting construction in the most at-risk urban areas, and avoiding unplanned settlements, improving the reliability and durability of relevant existing real estate property (especially for collective housing in poorer areas), improving or constructing flood defenses, and preparing for contingency plans and potential relocation (similarly to what happens for cities at risks of earthquakes). All these classic measures assume that urban land use planning is key. However, given the diversity of the Arab world, this is far from being the rule.

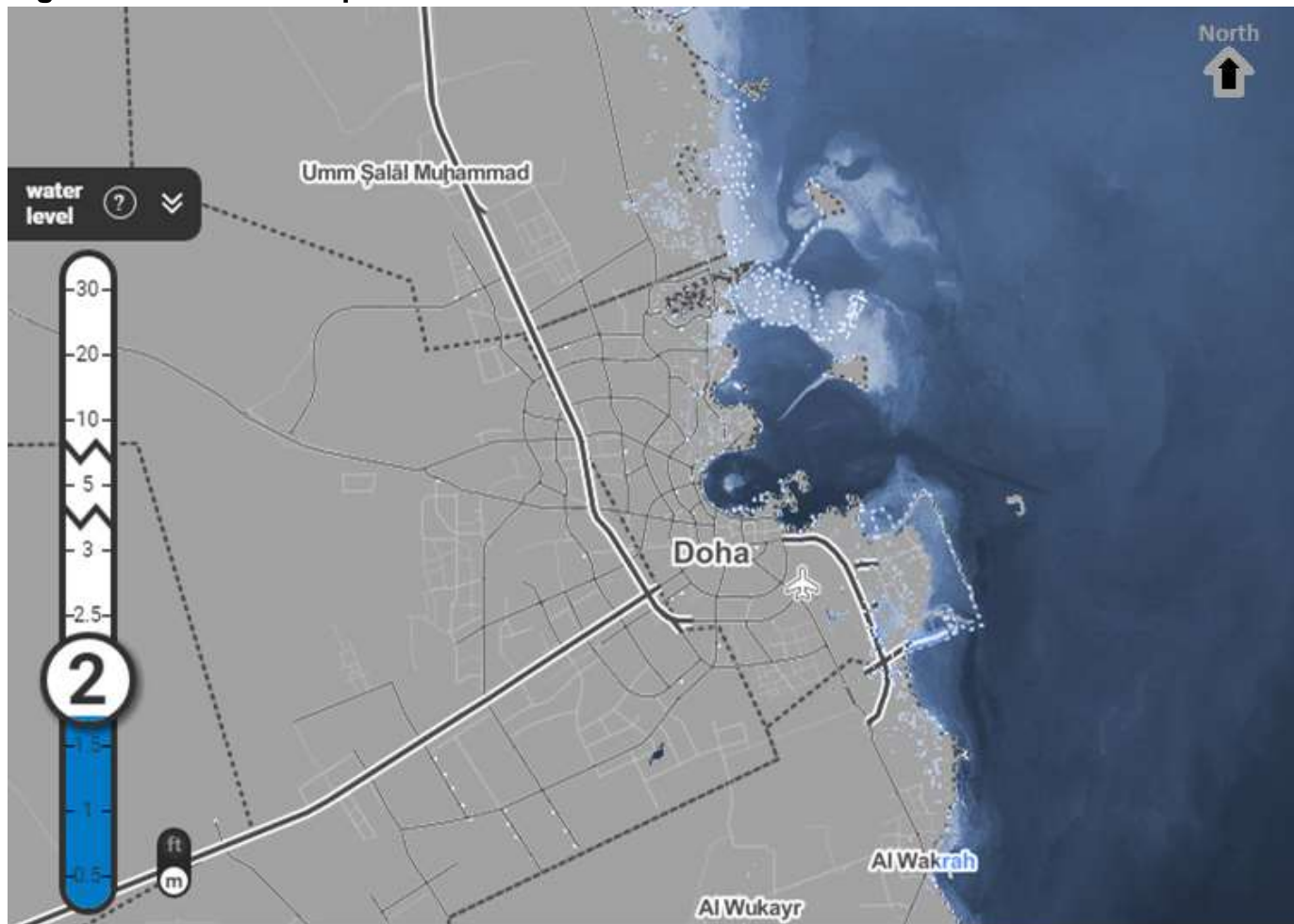
The rapid demographic growth of Arab cities is even stronger in coastal cities and surrounding areas, which are magnets in this dynamic era of globalization. This demographic pressure, with its consequent youth bulge, also explains why many coastal cities are expanding so rapidly.[16] SLR is not just a long-term risk but is also a short- to medium-term challenge for Arab coastal cities. Qatar is a useful example when it comes to documenting the efforts and challenges related to SLR risks and adaptation in the contexts of the Gulf sub-region.

The Case of Doha

The small peninsular state, Qatar, has important coastal urban areas, including the capital city of Doha, which is located on the Gulf coast and whose hinterland does not extend beyond a hundred kilometers. Doha's most economically and politically important areas (e.g., West Bay, Al Corniche, and Al Dafna) are all adjacent to the waterfront. Furthermore, recent developments and megaprojects (e.g., the Lusail neighborhood) are all located along the coast. The Interim Coastal Development Guidelines point out that one of the four main coastal zones is "likely to be inundated due to rise in sea level consequent upon global warming." [17] Against the background of the negotiations on the Paris Agreement, the Ministry of the Environment published in 2015 an even more alarming statement in Qatar's official communication to the United Nations Framework Convention on Climate Change:

Qatar is extremely vulnerable to sea level rise as it is liable to inland flooding of 18.2% of its land area, at less than 5m rise in sea level, along with the associated adverse impacts on the population as 96% are living on the coastal areas.[18]

Figure 1. Doha's metropolitan area at risk under a 2-m. and a 5-m. SLR scenarios

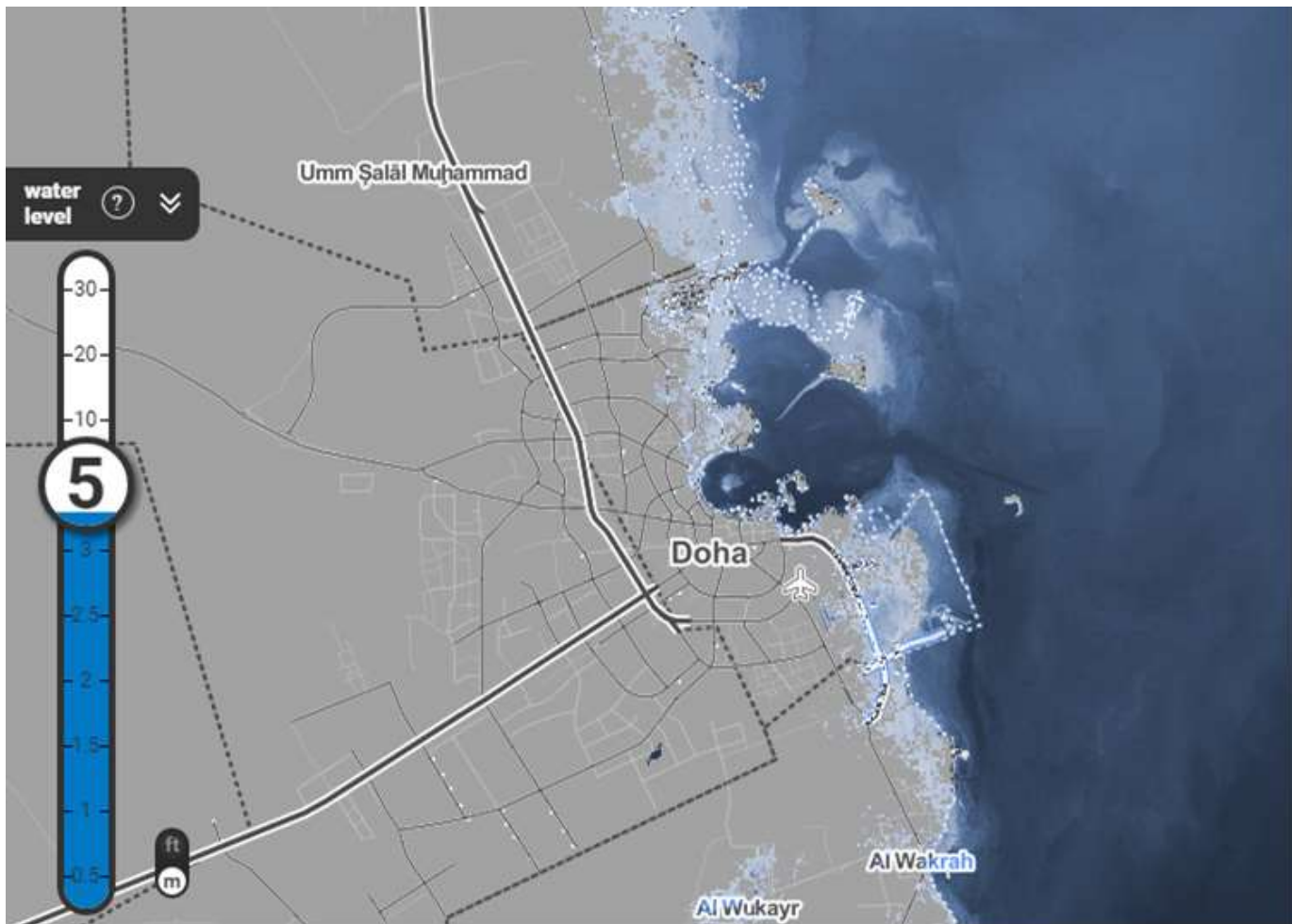


Note:

These projections are independent from those of Qatar's Ministry of Municipalities and the Environment.[19]

As a result of this clearly identified major risk, important and innovative master planning efforts have been made, such as the Qatar National Master Plan and the more recent Climate Change Strategy for the Urban Planning and Urban Development Sector.[20] However, some key challenges remain. First, there are important economic challenges, such as the need to rapidly generate large numbers of jobs for a growing, young and increasingly educated population, while continuously shifting the economy from a model of commodity-dependent rentierism towards a more diversified national economy. Against that background, short-term opportunities to develop tourism, including in at-risk areas, tend to take precedence over sustainable coastal development. Finding an appropriate balance between risks and economic activities will have to be made with enough transparency for all stakeholders, for them to be able to assess, and eventually invest into, the appropriate risk mitigation measures.

Another economic challenge, which is more acute in low- and medium-income Arab states, is the planning and implementing (and staying committed to) the necessary but costly risk mitigation infrastructure developments given that national budgets vary significantly due to their heavy dependence on a few commodities. Government provisioning of and commitment to long-term



infrastructure development, such as Doha has overall successfully managed over the past two decades, will be critically important for low-lying coastal cities as they seek to adapt to the formidable challenge of SLR.

Lastly, throughout the MENA region, the limited capacities of government agencies in charge of urban planning tend to generate problems of poor planning quality, underestimated risks, selection of inappropriate technologies, and sub-optimal returns on investment. In Qatar, for instance, despite strong efforts by the government to make its urban development more sustainable, some mega-projects have been assessed as not properly taking into consideration SLR and other related risks to urban environments.[21] The general lack of pro-activity on this matter across the region is likely to cost more over time in adaptation and remediation measures than it would have initially with climate-smart designs, planning, and commitment.

State Commitment and Stakeholder Contributions are Essential

The global phenomenon of sea level rise is undeniably a global threat for coastal populations around the world but is an even greater threat in the Arab world, most of whose population lives within 100 kilometers from the sea or a delta, and in cities where rapid demographic growth already exacerbates urban planning challenges.

In line with the United Nations Sustainable Development Goal 11 (Sustainable Cities and Communities), vulnerable cities such as Amsterdam, Copenhagen, Queensland, Shanghai and New York City, among others, have already accumulated a precious experience in assessing and deploying adaptation solutions at a large scale. Local and international ideas, projects and cooperation will be needed to simultaneously face the formidable challenges of SLR, economic diversification, job creation, and, ultimately, poverty eradication.

The United Nations system provides numerous vehicles for facilitating and partly or wholly financing this process of transformation of MENA coastal cities. Yet, as of early 2019, a review of the projects supported by the various climate finance facilities reveals that they have been under-utilized by Arab countries. For instance, the UN Climate Technology Centre and Network, in charge of green technology transfer to developing countries, has not been optimally used to facilitate technology transfers, such as climate adaptation strategy designs, or for capacity building in climate-smart technologies. Similarly, Arab countries have not fully availed themselves of the UN's Clean Development Mechanism (CDM), the Adaptation Fund, the Green Carbon Fund (GCF) or the World Bank's Green Environment Fund (GEF). By contrast, some emerging countries such as China, India and Kenya, have been more proactive in requesting and obtaining multilateral resources for sustainable development. This is something that most Arab countries will have to work on.

Arguably more importantly, sharing experiences, knowledge, lessons learned, and technological solutions and innovations among coastal cities in different parts of the world should be supported, as a relevant and cost-efficient way to adapt to climate change. This is especially relevant between and among metropolises of the Global South, as in Southeast Asia and Africa. This adoption of technology from outside the OECD economies holds the potential to greatly benefit Arab coastal cities, some of which must look for cost-efficient solutions, while others are widely known for developing and branding themselves as smart global cities. Against the backdrop of limited proactive action on climate change and SLR in many of the Global South's coastal cities, consistently investing in the management of sea-related urban risks could transform a major challenge for Arab cities into a structural competitive advantage and economic opportunity.

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[13] WEF, 2019.

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[19] Laurent A. Lambert, “Climate Change Risks for the State of Qatar.” Presentation made at the Conference “Climate Change: Facts, Risks and Solutions.” Qatar University. Doha, Qatar. September 27-28, 2015.

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