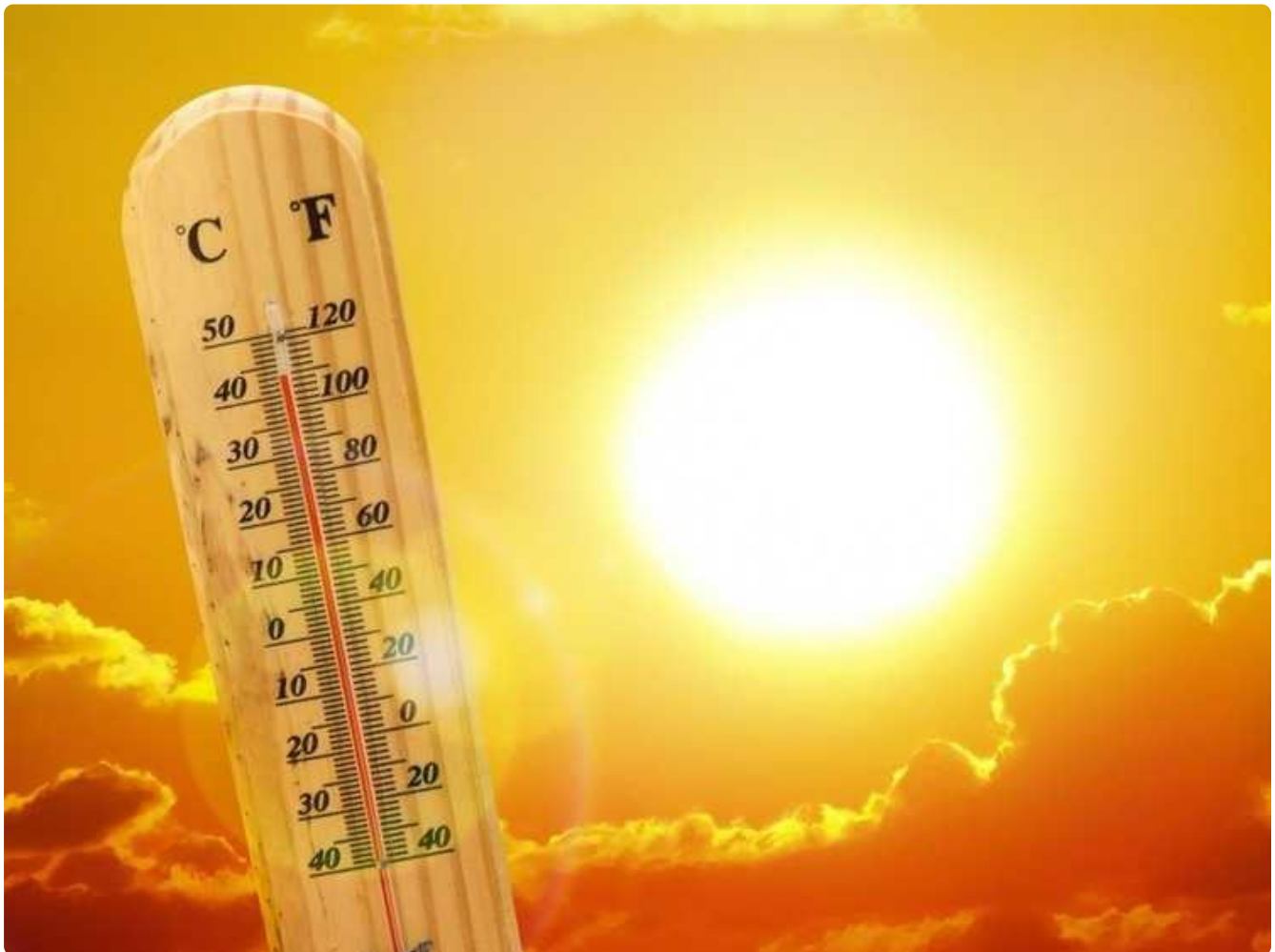


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## Towards an Improved Governance of Heatwaves in the MENA Region



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## Executive Summary

- Temperatures across the Middle East region are predicted to increase by 3°C by 2050
- Warming will be felt more in cities because of the urban heat island (UHI) effect, causing heat-related health problems
- City planning and management regimes are often disconnected from disaster risk and resilience building and legislation is lacking
- Lacking data and information sharing across multiple levels of governance hamper heatwave warning systems
- Urban building projects lead to a soaring demand for cooling systems
- Traditional adaptations such as street grid design, wind catchers and *mashrabiya* screens could be used more
- Policy response should include national Heat Health Action Plans that are translated into Local Heat Plans, coordinated and implemented by local governments

## Rising temperatures in the MENA region present serious threats to human health

Heatwaves are a 'silent killer' around the globe, and the MENA region is no exception. Since the 1970s, warm days and nights have almost doubled in frequency (Lelieveld et al., 2016 cited in RCRCCC 2021, p. 2). Many cities already experience temperature and humidity maximums that make it difficult to find acceptable levels of comfort outdoors during most of the day in summer, and midday in temperate seasons (Skelhorn, 2019, p. 98). Temperatures across the Middle East region are predicted to increase by 3°C by 2050 (Lelieveld et al, 2016 cited in RCRCCC 2021, p. 2). The number of people experiencing major heatwaves is predicted to quadruple between 2010 and 2050 (see Lahn and Shapland, 2022 and Varela et al, 2020; see also Namdar et al, 2021). Indeed, peak temperatures during future heatwaves could exceed 56 °C in some locations in the Middle East (Zittis et al, 2021, p. 5, see also Al-Delaimy, 2020 cited in RCRCCC 2021, p. 7).

Urban areas are climate vulnerable hotspots in MENA countries, and urban dwellers are expected to make up 68% of populations in Arab countries by 2050 (Saghir 2021, p. 4 citing UNDP 2018). Warming will be felt more in cities because of the urban heat island (UHI) effect that makes cities 2-6°C warmer than their surroundings (UNDP 2018. p. 36).

The increase of UHI will cause heat-related health problems, including mental and physical fatigue, increased likelihood of exhaustion, heart attack, and mortality (Kjellstrom et al., 2016; Loughnan et al., 2010; Ross et al., 2018; all cited in Ahmadalipour and Moradkhani, 2018, p. 215). As the immune system weakens due to heat stress, susceptibility to disease will also further increase (UNDP, 2018, pp. 36-37, see also World Bank 2014, 141). Indeed, heat stress from more severe and longer lasting heatwaves may be the most serious threat to human health caused by climate change in the MENA region (Zittis et al., 2021).

The most vulnerable population groups in cities include the elderly, people with chronic conditions such as cardio-vascular diseases and disabilities, those working outdoors (construction workers, street vendors, etc), homeless people, and refugees and IDPs living in camps. On top of that are those who cannot afford air conditioning or any other form of protection (see Al-Bouwarthan et al., 2019; Benzie, Davis and Hoff, 2012; Waha et al 2017). Due to the economic disparities between richer and poorer, peaceful and conflict-affected MENA countries, there is an “adaptation divide” in which there is a disproportionate impact on vulnerable countries as well as on vulnerable populations within many MENA countries (Rabinowitz, 2020, p. 5; Sowers et al., 2011; Sowers, 2019; all cited in Daoudy et al, 2022, p. 7)

## **Weak policy responses and unhelpful governance practices**

While climate awareness and action are increasing across the MENA region, a lack of specific legislation on climate change has been observed. According to Olawuyi (2022, p. 11), there is no coherent development of climate change principles, norms, and standards across the region. UN-Habitat has drawn particular attention to the potential role of “urban law,” whether national laws or local regulations. Unfortunately, city planning and management regimes are still often disconnected from disaster risk and resilience building, while countries lack legislation to integrate city resilience into broader development planning (Home, 2022, p. 161).

Some cities’ Strategic Development Plans do link development, urban renewal and resilience plans under a broader vision. But to implement these plans successfully there is a need for improved coordination between central and local levels and more devolution of responsibilities to local authorities and local budgets for implementation (Saghir, 2019, p. 4). Indeed, in practice we see overlapping mandates along with limited exchange of information across institutions within and beyond government hampering multi-hazard risk analysis and forecasting

and beyond government, hampering multi-hazard risk analysis and forecasting (see also Zea-Reyes et al, 2021, for the case of failing climate change adaptation in Beirut). This also undermines the effectiveness of early warning systems (to the extent that the latter exist at all) (Peters et al, 2022, p. 57). As Peters et al (2022, p. 56) argue, enhancing forecasting (including of heatwaves) to enable timely action is relevant for the MENA region and should be part of an agenda that accelerates and scales up anticipatory action.

It seems so far that cities in the MENA region have failed to respond effectively to the huge challenges posed by heatwaves. Apart from some research and development (R&D) in alternative sources to carbon-based energy, investment has concentrated in high-income real estate and global business competitiveness. In Dubai, for example, one of the hottest climates on the planet, the construction of many high-rise structures of concrete and glass, and black-top roads and car-parks has darkened what was near-white sand, thus absorbing and releasing more heat (Home, 2022, p. 158). Similar trends are visible in Casablanca and Mecca (Home, 2022, pp. 159-160). Yet increasing temperatures mean more demand for air conditioning and cooling systems. For example, due to unbearable heat, Qatar has already begun to air-condition the outdoors (Mufson, 2019).

### **Possible solutions: traditional building and urban design adaptations**

Green Building Councils across the MENA region provide reports and best practices that support informed policy making on low-carbon, energy-efficient, and environmentally sustainable practices in building design and construction (Olawuyi, 2022, p. 14). Scholars and experts also recommend retrofitting buildings by installing reflective and green roofs, window shading, and solar cooling. Jordan is reported to be the first developing country to use solar thermal energy to cool buildings and to reduce cooling power consumption (Duygu Sever, 2022, p. 92).

Other commonly proposed interventions include both planning and architectural solutions such as: tree planting and increases in green or blue spaces (Oliveira et al., 2011; Qiu et al., 2017; Upreti et al., 2017), green roofs, window treatments and window placement, architectural materials which are thermally responsive (Santamouris et al., 2011), and lightening roads, roofs, and buildings to increase light reflection (Radhi et al., 2017; Kyriakodis and Santamouris, 2018; all cited in Skelhorn, 2019, p. 99).

In this respect, the MENA societies centuries-old traditional adaptations to deal



with water scarcity and hot climate offer a valuable repository of human knowledge. Examples include the wind catcher or wind tower (known as *malqaf* in the Arab Gulf countries). These passive cooling towers capture cooler winds aloft, directing them into the living space and displacing warm air. Where possible, these were used in conjunction with the *falaj* irrigation tunnels, providing an exceptionally effective air conditioning system. Another example is the carved *mashrabiya* screen. Carved from wood or stone or cast in plaster, often with Islamic geometric patterns, these block and diffuse sunlight, allow fresh air to pass into living space, and provide privacy (Hobbs, 2017, pp. 58-59; Home, 2022, p. 154, see also PEEB, 2020, p. 21).

Some of these vernacular bioclimatic designs have been used in contemporary sites, such as Abu Dhabi's ambitious urban project Masdar City, which started in 2007. Its compact design was inspired by traditional Islamic architecture to maximise passive shading and air circulation in the extreme dry, hot, and windy desert conditions. Short (no longer than 70 m) and narrow streets are blocked off at the end by a building, creating turbulence and a flushing effect. As a result, the temperature in the streets is as low as 20°C, whereas just meters away in the desert sand, the temperature is as high as 35°C (Home, 2022, p. 159 and UNDP, 2018, p. 78). These examples show that if buildings are adapted to the local climate and use passive cooling techniques, they can keep cool naturally. Policies to curb cooling demand often concentrate on promoting the use of efficient cooling technologies and appliances. This is not enough. There is a need to foster (and enforce) improved building designs which take into account the climatic and cultural context (PEEB, 2020, p. 4).

## **Policy recommendation: develop comprehensive Local Heat Plans**

Although national Heat Health Action Plans (HHAPs) are important frameworks that can guide local action (see WHO 2008), it is at the local level that such plans can really make a difference for particular vulnerable population groups. A Local Heat Plan is first and foremost a communication plan that activates an early warning system about an impending heatwave. It is directed towards vulnerable population groups and coordinates the actions of various local stakeholders.

As part of a recent research project on the effects of heatwaves on vulnerable populations in The Hague (Bergh et al., 2022), we developed some policy recommendations that are relevant also for local governments in the MENA region. For example, local governments and their non-governmental partners should run community-awareness campaigns about the heat-related health risks.

as well as about low-cost solutions such as cooling scarves. Local governments should amend building regulations that prohibit the installation of awnings for aesthetic reasons (especially in social housing estates), and give subsidies to install such awnings or sunscreens to improve temperature regulation in private residences and care or elderly people's homes. During a heatwave, they should provide cooling centres (in malls, libraries, and community centers) and telephone helplines for vulnerable people in need of help, treatment and support (see also van Loenhout et al, 2021, p. 11).

For the cities in the MENA region, stronger national and regional networks of local authorities are key in order to exchange experiences with local adaptation planning and implementation (Bergh, 2020, p. 4). There is a huge untapped potential for knowledge exchange here to improve the governance of heatwaves in the region. Hopefully COP 27 will utilize this potential.

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