Greenpeace Research Laboratories
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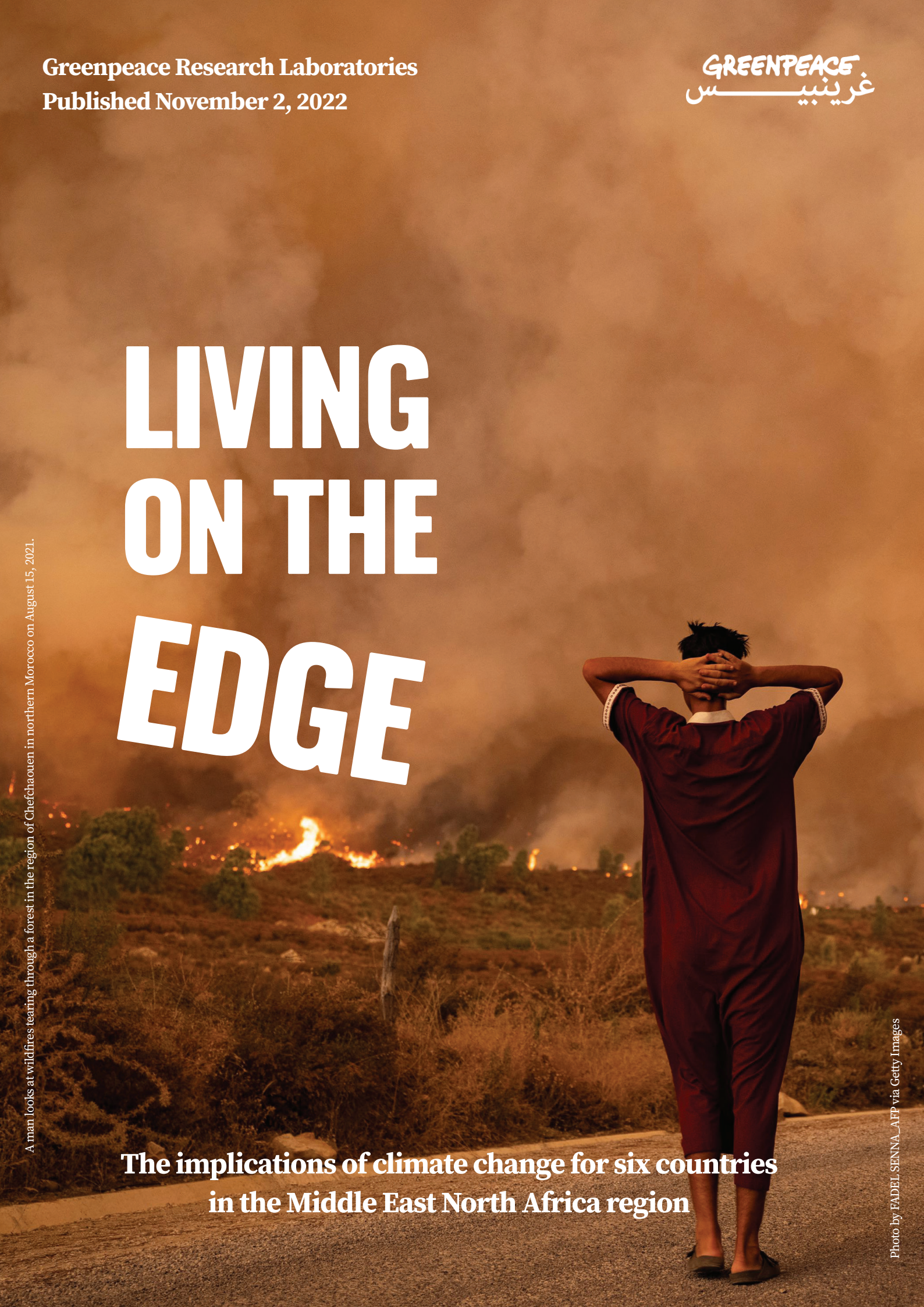
LIVING ON THE EDGE



A man looks at wildfires tearing through a forest in the region of Chefchaouen in northern Morocco on August 15, 2021.

The implications of climate change for six countries in the Middle East North Africa region

Photo by: FADEL SENNA_AFP via Getty Images

Key demands by Greenpeace
Middle East North Africa

Demands written by Greenpeace MENA staff

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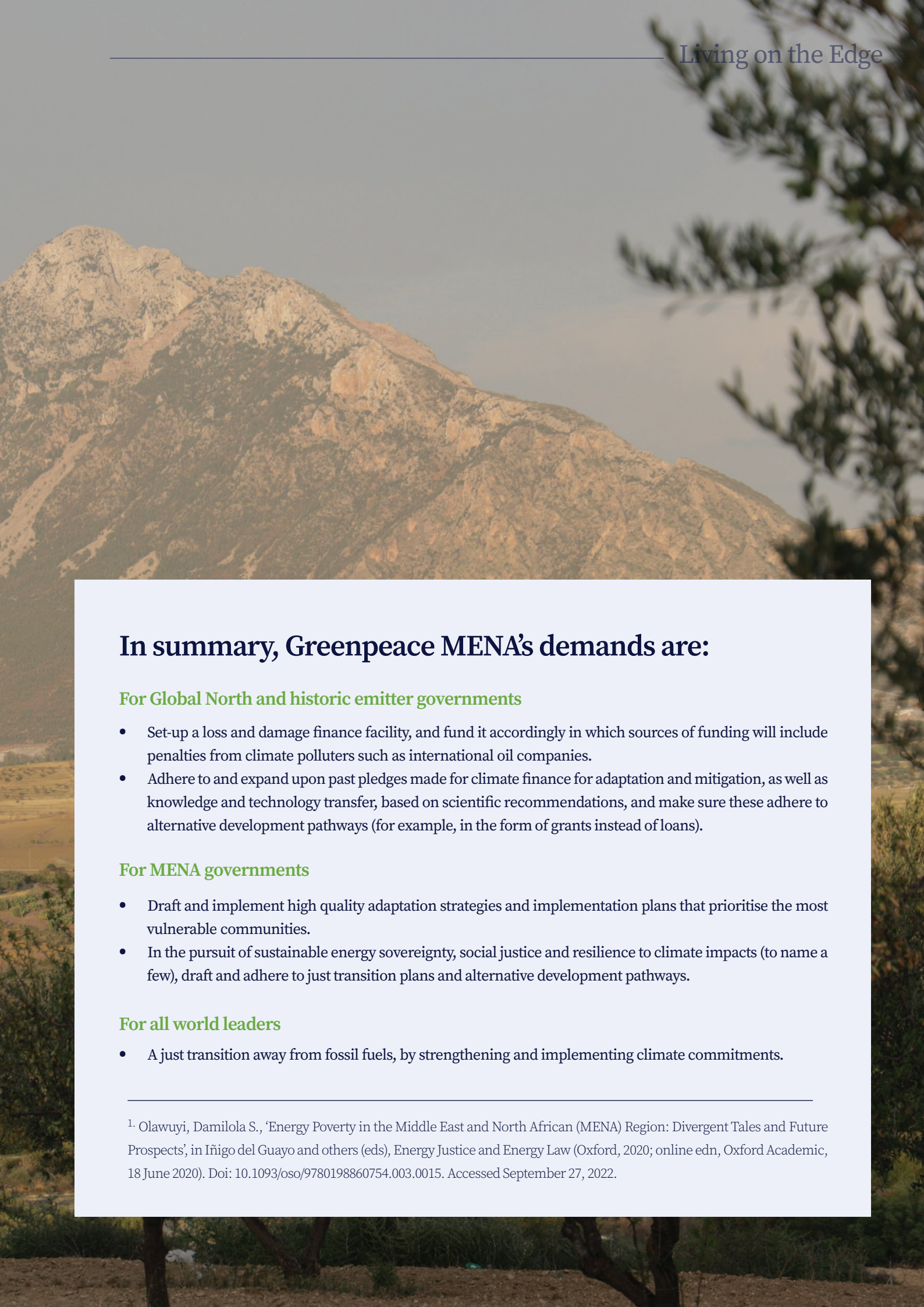
This report, 'Living on the Edge: The implications of climate change for six countries in the Middle East North Africa region', illustrates that the Middle East North Africa (MENA) region, a highly water-scarce region, is warming nearly twice as fast as the global average. The MENA region is extremely vulnerable to the impacts of climate change, which are driving and exacerbating risks on food and water security.

Although most countries in the MENA region have historically contributed very little to climate change, it is possible and necessary for us to choose alternative development pathways that are locally attuned and culturally relevant, and can lead towards sustainable energy sovereignty. We are in no means tied or due the same path that was chosen by the Global North over the past 50 years and which has significantly led to the global climate disaster.

On the one hand, the transition from fossil fuels towards renewable energy is necessary to safeguard the health of our ecosystems and a dignified life for future generations. Renewable energy is a safe and clean solution to the region's exacerbating challenge of energy-poor populations, of which about half either have no access to electricity or suffer from prolonged power outages and undersupply1, despite the accelerated pace at which the fossil fuel industry is growing (especially in the Gulf). It is important to recognise that vulnerability to climate change is very much interlinked to other social injustices, such as energy injustice, social exclusion, conflicts and political instability, to name a few, to which the fossil fuel industry has directly contributed.

Our recommendations to governments and/or decision makers in the run-up to COP27 and beyond is for a dignified and prosperous future for our region and the world. Lives are being lost, homes are being destroyed, crops are failing, livelihoods are disrupted and cultural heritage is being wiped out, but the historic polluters who have contributed to these losses and damages are refusing to adhere to the 'polluter pays' principle. Impacted communities are owed reparations to account for the losses and damages endured, as well as adaptation and mitigation finance, and technology and knowledge transfer, utilised for the implementation of scientifically and locally developed strategies.

It is also the responsibility of the MENA region's governments to ensure that locally developed adaptation strategies are inclusive and that funding is adequately and justly distributed to those least resilient and frontline communities. Adaptation strategies must prioritise communities and marginalised groups that have been made vulnerable because of climate change impacts by ensuring their needs, cultural heritage and local traditional knowledge are a central part of adaptation plans. Until climate finance and technology and knowledge transfer is secured, a major barrier will remain in place for MENA countries and others in the Global South to adapt to the climate change impacts outlined in this report and make the transition towards an alternative, just, more sustainable and resilient future.



In summary, Greenpeace MENA's demands are:

For Global North and historic emitter governments

- Set-up a loss and damage finance facility, and fund it accordingly in which sources of funding will include penalties from climate polluters such as international oil companies.
- Adhere to and expand upon past pledges made for climate finance for adaptation and mitigation, as well as knowledge and technology transfer, based on scientific recommendations, and make sure these adhere to alternative development pathways (for example, in the form of grants instead of loans).

For MENA governments

- Draft and implement high quality adaptation strategies and implementation plans that prioritise the most vulnerable communities.
- In the pursuit of sustainable energy sovereignty, social justice and resilience to climate impacts (to name a few), draft and adhere to just transition plans and alternative development pathways.

For all world leaders

- A just transition away from fossil fuels, by strengthening and implementing climate commitments.

[1.] Olawuyi, Damilola S., 'Energy Poverty in the Middle East and North African (MENA) Region: Divergent Tales and Future Prospects', in Iñigo del Guayo and others (eds), Energy Justice and Energy Law (Oxford, 2020; online edn, Oxford Academic, 18 June 2020). Doi: 10.1093/oso/9780198860754.003.0015. Accessed September 27, 2022.

Iconic cedar forests in the Tannourine nature reserve of North Lebanon suffer the consequences of climate change.

Executive summary

The Middle East – North Africa (MENA) region is geographically as well as sociopolitically diverse, including high mountain ranges, fertile river valleys, coastal plains and lagoon ecosystems alongside the more predominant semi-arid and arid conditions. Much of the region is characterised by scarcity of freshwater, whether surface or groundwater, and by limits to land suitable for agriculture. It is also a region in which populations continue to grow (projected to reach 1 billion by the end of this century), especially in major cities (expected to be home to as much as 70% of the region's people by 2050), and one in which consumption of energy, water and food are consequently also expected to continue to rise.

Given the diversity and extent of the MENA region, stretching from Morocco in the West to the Gulf states in the East and bordering the distinct ecosystems of the Mediterranean Sea, the Red Sea and the Persian/Arabian Gulf, there are dangers in over-generalisation in relation to historic, current or projected future conditions for the climate, for nature and for the lives of its people. Nevertheless, it is self-evident that many of the countries in the region naturally experience very warm and dry conditions relative to other parts of the world, making life challenging from the outset. Furthermore, although there is considerable variability in weather patterns and climate year on year, it is also now clear that the region as a whole is warming fast under a climate changing world, with an accelerated rate of 0.4 °C per decade since the 1980s, nearly twice the global average.

By focusing on six countries in the MENA region (Morocco, Algeria, Tunisia, Egypt, Lebanon and the United Arab Emirates), this report provides an overview of the evidence available from scientific studies and assessments relating to past trends, ongoing observations and future projections of climate change and its impacts on the natural world and on human societies across a region within which temperature and water stress and threats to food security are already a daily reality. Rather than attempting to provide a comprehensive analysis of the threats facing the entire region, the report draws on examples from each country to illustrate the impacts of a changing climate and the vulnerabilities of human societies experiencing them.

Across North Africa, including the countries of Morocco, Algeria, Tunisia and Egypt, climate change-induced warming is already more pronounced in the summer, with some evidence also for the wet seasons becoming progressively dryer over time, with recent multi-year droughts being unprecedented for at least the past 500–900 years. Climate models under all scenarios project further increases both in average temperature and in the number, length and severity of extreme heat and drought events across North Africa, and for further reductions in average precipitation, though modelling results for rainfall are subject to greater uncertainties than for temperature. The combination of warming and drying is expected to further increase the pressure on agricultural production across much of the region, especially in those countries in which there is heavy reliance on rain-fed agriculture.

Despite the naturally higher temperatures and lower rainfall across the Arabian Peninsula, trends of further warming and drying are also evident and are expected to worsen over the coming decades, including in the UAE. Lebanon's geography and Eastern Mediterranean climate make it naturally much less arid compared to the other MENA countries considered in this report, though even here water stress is rapidly increasing due to a combination of factors, including rapid warming.

All of these observed and projected changes have implications for wildlife and whole ecosystems, as well as for humans, but in many parts of the MENA region data on the distribution, population health and climate responsiveness of species remain extremely limited.

Despite observed and projected future reductions in rainfall, warming in coastal countries in the region is expected to be accompanied by increases in humidity as the seas also warm. This combination of high temperature and high humidity can, at best, make life increasingly uncomfortable for human populations, especially those groups without access to natural shade and green spaces or to air conditioning, and at worst can present serious threats to health as survivable thresholds are exceeded. These risks could be particularly severe in large cities in which the 'urban heat island' effect exacerbates such exposures, especially during periods in which high temperatures are sustained through the nights. At the same time, the understandable increased demand for air conditioning of buildings is expected to increase demands for energy and water across the region.

While the overall trend is for reduced precipitation, especially in those countries bordering the Mediterranean, model projections of rainfall patterns are more uncertain than those for temperature change in part because of the complexity of the interactions between weather features and geography in landscapes in which rainfall is already scarce. The scientific consensus suggests that ongoing drying throughout this century is likely. Rain in some places is increasingly associated with short, high intensity events, which can cause localised flooding and which may lead to lower replenishment of depleted groundwater reserves over time.

Dramatic ecological changes and rising sea levels are threatening Egypt's Nile Delta which provides a third of the country's crops.

Photo credit: KHALED DESOUKI_AFP via Getty Images

The climate change-related trends and projections outlined above present serious implications for agriculture and food security and for the natural environment in all six countries examined in this report, especially when considered against a background of other pressures. For example:

Morocco is already experiencing unprecedented droughts, and the drying and loss of oasis ecosystems is increasingly being documented, due to a combination of climate change and other human-induced changes. Drying of the climate is also projected to occur across the Souss-Massa basin, which is critical for agricultural production in the country.

In Algeria, rising temperatures and reduced rainfall are also expected to impact key agricultural areas, including those around Algiers and in the Bourj Bou Arreridj region in the northeast of the country. Coastal aquifers are expected to become more saline over time as a result of continued abstraction combined with sea level rise.

Tunisia is also expected to warm further, though models are less certain in terms of future rainfall patterns.Given the country's heavy reliance on rain-fed agriculture, any future disturbance in rainfall patterns may be anticipated to increase stresses on domestic production and necessitate even greater reliance on food imports.
Agriculture in Egypt is less rainfall dependent, because much depends on irrigation from the waters of the Nile. However, models project significant decreases in water flow in the Nile under a range of climate change scenarios. The situation is further complicated by upstream controls of flow arising from dam developments in countries further to the south, which could decrease overall water availability for irrigation and lead to progressive inundation of the delta with more saline waters. Furthermore, threats of flooding along the Mediterranean coast are becoming ever more pressing, with studies suggesting that some of the most vulnerable communities are also those with the lowest resilience in socioeconomic terms.

Although Lebanon is naturally far more abundant in water resources than the other countries examined in this report, it is projected to undergo rapid warming and drying in the coming decades. River flows have, on average, already declined by around one-quarter since the 1960s, in part because of overexploitation and in part because of declines in the fall of both rain and snow. Extreme summer heat and dryness has increased the risk of forest fires, further depleting the cedar forests, which might ultimately be restricted to small high altitude areas in the north of the country.

The United Arab Emirates has always relied heavily on food imports and on desalination for supplies of drinking water, though the limited areas of agricultural production place a heavy demand on what limited supplies of groundwater there are, supplies that fell by an estimated 5mm per year over the period from 2003–2012. Average temperatures in the UAE are expected to continue to

increase from the already high baseline, with extreme heatwaves expected to present an increasing hazard, especially in the urban heat islands of major cities.

Just as on land, increasing temperatures affect marine ecosystems, especially in relatively shallow coastal waters. For example, under all climate change scenarios, marine heatwaves are expected to become more frequent and to last longer in the Mediterranean Sea, with severe implications for wildlife and for coastal communities reliant on marine ecosystems for their livelihoods.

Furthermore, the coral reefs of the Red Sea, recognised globally as a hotspot for biodiversity, are also under increasing threat from sea surface temperatures that are rising faster than the global average. Despite showing some greater natural resilience than in other regions, coral bleaching events have become increasingly common here in recent decades in response to elevated temperatures, and there are suggestions that the full extent and severity of the problem has, so far, been under-reported.

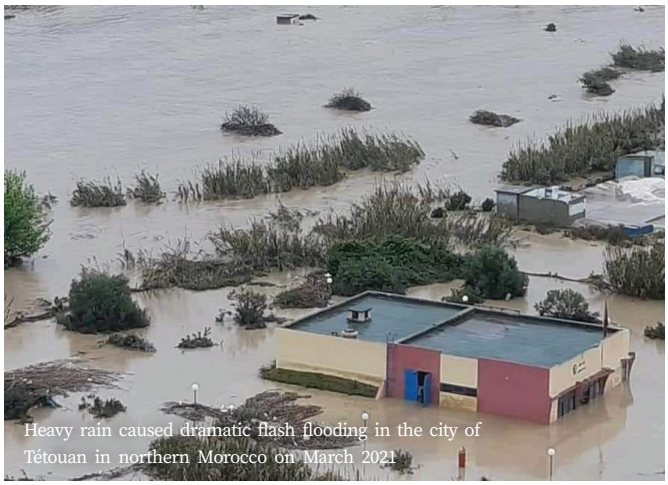
In the waters of the Gulf off the coast of the UAE, corals are known to be even more adapted to high temperatures, resulting in ecosystems with naturally much lower diversity of both corals and other species. However, given that these ecosystems are already at the very limits of their temperature tolerance, recovery from past bleaching events has often been slow and incomplete, a problem that may be exacerbated in the future.

In all these marine regions, climate change may be acting as a 'threat multiplier', superimposed on the pressures arising from rapid coastal development, an increase in industrial activities on the coast and at sea and a rise in brine discharges from desalination plants to produce water for ever growing populations. Even tourism can take a significant toll on the very natural ecosystems around which its development is often centred.

Given the central importance of climate change to the rising threats faced within the MENA region, the trends and projections can only be slowed and ultimately reversed through concerted global action to cut emissions of greenhouse gases rapidly and deeply. In common with other regions of the globe already experiencing some of the most rapid changes and impacts, and already living on the edge in terms of resilience and adaptability, most MENA countries have made only a small contribution to greenhouse gas emissions to date.

Inevitably, however, the speed and severity of ongoing change will mean that those MENA countries that are the focus of this report, in common with countries across the region, cannot simply wait for emission cuts to take effect, and there is therefore also an immediate need for greater focus on measures to reduce vulnerabilities, support disadvantaged and low resilience communities and adapt ways of living in as sustainable way as possible. Food imports are likely to remain a necessity and will inevitably be subject to the unpredictabilities of international events. Some adaptation of domestic agricultural practices may be possible in the short term, such as changing the types or varieties of crops grown and improvements in management of soil and water, but to make these changes widely accessible and impactful is likely to need both regional cooperation and international assistance. Likewise, action across the region will be necessary to ensure that urban environments are more amenable to human comfort and survivability going forward, and are better protected from the threats of flooding from both sea level rise and extreme rainfall events.

Recognising that climate change is a threat multiplier, any actions that can be taken to reduce other pressures from human activities, such as chemical pollution and the physical degradation and loss of ecosystems, will be vital to increase the resilience of the natural systems and processes on which both wildlife and humans depend. An increased focus on monitoring and documenting those ecosystems across the region, and the threats to them arising from a range of human activities, would provide an even stronger scientific evidence base to improve not only projections of future change but also the the design of strategies to reduce impacts and work towards a more sustainable future.



Heavy rain caused dramatic flash flooding in the city of Tétouan in northern Morocco on March 2021