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The Failures that Define Us – Addressing Climate Disaster in the MENA Region

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From 31 October to 13 November 2021, world leaders met in Glasgow for the 26th session of the Conference of Parties to the United Nations Framework Convention on Climate Change (COP26). The meeting's agenda included discussions on climate mitigation and adaptation, as well as on climate finance and global collaboration.¹ Perhaps most importantly, COP26 set out to build on the 2015 landmark commitments of the COP21 Paris Agreement to limit the global-means temperature ideally under 1.5°C above pre-industrial levels, and saw commitments to end deforestation and slash methane emissions.² Widely perceived as one of humanity's last chances to prevent climate disaster, COP26 largely failed to meet the demands of the moment, with states remaining well off course from committing to effective, structural changes.³ COP26 came at an unprecedented moment in which the global climate emergency requires swift and effective action towards net-zero carbon emissions, and the adoption of measures to address climate vulnerability and ensure the resilience of the world's vulnerable regions.

The MENA (Middle East and North Africa) is one of the world's most vulnerable regions to climate change, with effects already being felt across communities. With the negative effects of climate change already impacting much of the region – and set to get worse in the years to come – efforts should focus not only on reducing global greenhouse gas emissions (GHGs) worldwide, but on ensuring adequate climate adaptation to mitigate the impacts across MENA societies.

While the effects in other regions of the world are frequently discussed, the MENA region does not sufficiently make headlines in the context of climate change, the environment, and climate vulnerability – but it certainly should. Not only are many of the region's countries major players in key markets for addressing the reduction of GHG emissions worldwide, they are also home to numerous vulnerable communities that are already suffering the consequences of climate change, and largely lack the infrastructure and resources to ensure climate adaptation and resilience.

The effects of extreme temperatures, severe droughts, storms and floods, land degradation, and rising sea levels resulting from climate change threaten the livelihoods of millions and are on course to collapse whatever stability is left in most of the region. These social effects of climate change are sure to not only add to, but be exacerbated by ongoing struggles with armed conflict, economic poverty, political chaos and corruption. Swift and effective action is paramount to reduce GHG emissions and mitigate the impacts of climate change over the MENA region.

Much like the larger, global context, MENA's GHG emissions are principally attributable to electricity production and transportation.⁴ In Gulf countries like Bahrain, Kuwait, Oman, Qatar, Saudi Arabia

1 UN Climate Change Conference UK 2021, last accessed December 8 2021, at: <https://ukcop26.org/>

2 The Paris Agreement, UN Climate Change, last accessed December 8 2021, at: <https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement>

3 Fiona Harvey, "Ratchets, phase downs and a fragile agreement: how COP26 played out", The Guardian, November 15 2021, <https://www.theguardian.com/environment/2021/nov/15/ratchets-phase-downs-and-a-fragile-agreement-how-cop26-played-out>

4 "This Interactive Chart Shows Changes in the World's Top 10 Emitters", World Resources Institute, last accessed December 8 2021, <https://www.wri.org/insights/interactive-chart-shows-changes-worlds-top-10-emitters>

and the UAE, electricity consumption is twice as high or higher than the global average.⁵ In certain oil-producing countries such as Iraq, Iran and Oman, inefficient, carbon-intensive methods for pumping crude oil⁶ are also major generators of Co2 emissions. Notably, the US military – the largest institutional polluter in the world – has also left a trail of emissions and environmental degradation from its activities in the region (added to the incalculable human destruction).⁷ The US military’s fuel usage alone would make it the 47th largest emitter of GHGs among all countries in the world,⁸ and its total GHG emissions would make it MENA’s eighth largest emitter (just over Kuwait and under Algeria).⁹ In particular, the US military is a major contributor to Iraq’s environmental devastation, with common practices of setting fire to their garbage in over 20 locations across the country using so-called “burn pits”, setting ablaze chemicals, paint, medical and human waste, munitions, petroleum, plastics and styrofoam in open pits with jet fuel.¹⁰ Similarly, the US military’s production of toxic waste in the form of depleted uranium is a major driver of soil and air quality degradation in extensive parts of Iraq, rendering crops from entire regions in the country prejudicial to human health.¹¹

The MENA region comprises about 5 to 6% of the world’s population, and while having tripled its GHG emissions over the past 30 years,¹² is currently responsible for roughly 5% of the world’s total emissions.¹³ Despite these relatively low figures, the region is disproportionately vulnerable to the effects of climate change and is already suffering its consequences – with more to come.

5 Katharina Waha, Linda Kruppenauer, Sophie Adams, Valentin Aich, Florent Baarsch, Dim Coumou, Mariana Fader, Holger Hoff, Guy Jobbins, Rachel Marcus, Matthias Mengel, Ilona M. Otto, Mahé Perrette, Marcia Rocha, Alexander Robinson, Carl-Friedrich Schleussner, “Climate change impacts in the Middle East and Northern Africa (MENA) region and their implications for vulnerable population groups”, *Regional Environmental Change*, 17, 6 (2017), last accessed December 8 2021, at:

<https://research.csiro.au/foodglobalsecurity/wp-content/uploads/sites/63/2017/12/Waha-et-al-2017-Climate-change-impacts-in-the-Middle-East-and-Northern-Africa-MENA-region-and-their-implications-for-vulnerable-population-groups.pdf>

6 Claudia Carpenter, “Middle East is a mixed bag as investors weigh oil’s role in climate change”, *S&P Global*, November 9 2020, last accessed 8 December 2021, at:

<https://www.spglobal.com/platts/en/market-insights/latest-news/oil/110920-middle-east-is-a-mixed-bag-as-investors-weigh-oils-role-in-climate-change>

7 Bruce Stanley, ““Boots on the Ground” leave footprints: the Anthropogenic Legacy of the US Military in the Middle East”, *Orient XXI*, September 13 2021, last accessed 8 December 2021, at: <https://orientxxi.info/magazine/Boots-on-the-Ground-leave-footprints-the-Anthropogenic-Legacy-of-the-US>

8 Benjamin Neimark, Oliver Belcher, Patrick Bigger, “US military is a bigger polluter than as many as 140 countries – shrinking this war machine is a must”, *The Conversation*, June 24 2019, last accessed 8 December 2021, at:

<https://theconversation.com/us-military-is-a-bigger-polluter-than-as-many-as-140-countries-shrinking-this-war-machine-is-a-must-119269>

9 Umar A Farooq, “COP26: US military ‘one of the biggest polluters in the Middle East’”, November 6 2021, last accessed December 8 2021, at:

<https://www.middleeasteye.net/news/us-military-bigger-polluter-most-middle-east>

10 Umar A Farooq, “COP26: US military ‘one of the biggest polluters in the Middle East’”, November 6 2021, last accessed December 8 2021, at:

<https://www.middleeasteye.net/news/us-military-bigger-polluter-most-middle-east>

11 “Radiological Conditions in Selected Areas of Southern Iraq with Residues of Depleted Uranium”, *International Atomic Energy Agency, Radiological Assessment Report Series* (2010), last accessed December 8 2021, at: https://www-pub.iaea.org/MTCD/Publications/PDF/Pub1434_web.pdf

12 Anchal Vohra, “The Middle East is Becoming Literally Uninhabitable”, *Foreign Policy*, August 24 2021, last accessed December 8 2021, at:

<https://foreignpolicy.com/2021/08/24/the-middle-east-is-becoming-literally-uninhabitable/>

13 Khaled Sulaiman, “After Cop26, it is time for na ‘Arab Climate Summit’”, *The National News*, October 15 2021, last accessed December 8 2021, at: <https://www.thenationalnews.com/opinion/comment/2021/10/15/after-cop26-it-is-time-for-an-arab-climate-summit/>

Environmental and social effects of climate change

In August 2021, the Intergovernmental Panel on Climate Change (IPCC) – the principal United Nations body charged with assessing the science related to climate change – released its Sixth Assessment Report on the Physical Science Basis of Climate Change.¹⁴ Among other issues, the report assesses how future climate may affect different subregions of the world under incremental global warming scenarios.

Extreme temperatures

Increasingly high temperatures are already felt across the region and are expected to reach further extremes. From 1961 to 1990, the MENA region has observed an average warming of 0.2°C per decade, and an even faster rate since.¹⁵ Slight increases in average temperatures such as these have major implications on livelihoods and human health, especially in the hotter, drier months of the year. Recently, in June 2021, Kuwait, Oman, the UAE and Saudi Arabia all recorded temperatures over 50°C, with Iraq and Iran following suit a month later.¹⁶ The past years have seen successive record-breaking temperatures across the region, with Kuwait reaching 54°C and Iraq 53.9°C within the same week in 2016.¹⁷ In July 2020, temperatures in Baghdad reached 51.6°C, breaking the governorate's previous record set just five years prior.¹⁸ Parts of the UAE and Saudi Arabia also recorded their highest-ever temperatures in 2017.¹⁹ While the region is generally known for its warm and dry weather, successive record-breaking temperatures are not normal and are indicative of a worrying trend towards scorching, unbearable temperatures in the years to come.

High temperatures potentially change weather patterns, threaten human health, and lead to extreme weather events such as fires, droughts, storms and floods. They also affect water supplies

¹⁴ Intergovernmental Panel on Climate Change, "AR6 Climate Change 2021: The Physical Science Basis", Sixth Assessment Report, last accessed December 8 2021, at: <https://www.ipcc.ch/report/ar6/wg1/>

¹⁵ Katharina Waha, Linda Krummenauer, Sophie Adams, Valentin Aich, Florent Baarsch, Dim Coumou, Mariana Fader, Holger Hoff, Guy Jobbins, Rachel Marcus, Matthias Mengel, Ilona M. Otto, Mahé Perrette, Marcia Rocha, Alexander Robinson, Carl-Friedrich Schleussner, "Climate change impacts in the Middle East and Northern Africa (MENA) region and their implications for vulnerable population groups", *Regional Environmental Change*, 17, 6 (2017), last accessed December 8 2021, at: <https://research.csiro.au/foodglobalsecurity/wp-content/uploads/sites/63/2017/12/Waha-et-al-2017-Climate-change-impacts-in-the-Middle-East-and-Northern-Africa-MENA-region-and-their-implications-for-vulnerable-population-groups.pdf>

¹⁶ Anchal Vohra, "The Middle East is Becoming Literally Uninhabitable", *Foreign Policy*, August 24 2021, last accessed December 8 2021, at: <https://foreignpolicy.com/2021/08/24/the-middle-east-is-becoming-literally-uninhabitable/>

¹⁷ Jason Samenow, "Two Middle East locations hit 129 degree, hottest ever in Eastern Hemisphere, maybe the world", *The Washington Post*, July 22 2016, last accessed December 8 2021, at: <https://www.washingtonpost.com/news/capital-weather-gang/wp/2016/07/22/two-middle-east-locations-hit-129-degrees-hottest-ever-in-eastern-hemisphere-maybe-the-world/?noredirect=on>

¹⁸ Matthew Cappucci, Mustafa Salim, "Baghdad soars to 125 blistering degrees, its highest temperature on record", *The Washington Post*, July 29 2020, last accessed December 8 2021, at: <https://www.washingtonpost.com/weather/2020/07/29/baghdad-iraq-heat-record/>

¹⁹ "Temperature climbs above 50°C in UAE", *Gulf News*, June 30 2017, last accessed December 8 2021, at: <https://gulfnews.com/uae/weather/temperature-climbs-above-50c-in-uae-1.2051108>; "Record temperature in central, eastern parts of the Kingdom", *Arab News*, July 7 2017, last accessed December 8 2021, at: <https://www.arabnews.com/node/1125641/saudi-arabia>



and agricultural crops, which in turn threaten human health and livelihoods, and potentially lead to or exacerbate conflict and involuntary migration.

The disruption caused by extreme temperatures is already felt in countries undergoing economic hardship, underlying wealth disparities across the region. Heatwaves in Iraq and Libya have led to power outages due to increased demand on electricity for air conditioners.²⁰ Just this year, people in Iraq surrounded power plants, blocking roads and burning tires in protest against the outages.²¹ In Lebanon, even in periods of relative social stability, authorities plan daily power outages to account for the demand in electricity.²² While the outages may not be a direct result of climate change, they underline many countries' inability to address the increasing demand for electricity, which will only escalate as temperatures increase. On the other hand, richer Gulf nations manage to cover the climbing demand for electricity and have gradually increased their domestic usage, going as far as to pump cold air onto outdoor sidewalks and markets.²³

Increases in temperatures have also contributed to forest fires that have burned through Algeria, Tunisia and Lebanon in the past couple years. The 2021 fires in Algeria and Tunisia resulted in the deaths of dozens of people and the displacement of hundreds more.²⁴ In 2020, Lebanon suffered the worst fire season in recorded history, with fires burning through an area seven times the size of the annual average.²⁵ In both North Africa and Lebanon, fires are in great part attributed to changing weather patterns, with climate change leading to higher temperatures and irregular rainfall patterns.²⁶ Notably, high temperatures – at least in Lebanon – not only lead to more wildfires, but hinder forests' ability to regenerate, creating an entirely new set of risks associated to loss of natural carbon sinks, key ecosystems, and resources. Such changes in forest ecosystems may lead to even more wildfires and further loss of biodiversity.

²⁰ Pedram Javaheri, Nada AlTaher, Jack Guy, "Middle East grapples with heatwave during Eid and Coronavirus pandemic", CNN, July 30 2020, last accessed December 8 2021, at:

<https://edition.cnn.com/2020/07/30/middleeast/middle-east-heatwave-intl/index.html>; Nadine Dahan, "Deadly heatwave and 14-hour power cuts leave Libyans on the edge", Middle East Eye, August 15 2018, last accessed December 8 2021, at:

<https://www.middleeasteye.net/news/deadly-heatwave-and-14-hour-power-cuts-leave-libyans-edge>

²¹ Anchal Vohra, "The Middle East is Becoming Literally Uninhabitable", Foreign Policy, August 24 2021, last accessed December 8 2021, at:

<https://foreignpolicy.com/2021/08/24/the-middle-east-is-becoming-literally-uninhabitable/>

²² Kareem Shaheen, "Middle East heatwave: power failures and rotting rubbish as Beirut is overwhelmed", The Guardian, August 4 2015, last accessed December 8 2021, at: <https://www.theguardian.com/world/2015/aug/04/middle-east-heatwave-power-failures-rotting-rubbish-beirut-overwhelmed>

²³ Yara M. Asi, "Climate Change in the Arab World: An Existential Threat in an Unstable Region", Arab Center Washington DC, March 2 2021, last accessed December 8 2021, at: <https://arabcenterdc.org/resource/climate-change-in-the-arab-world-an-existential-threat-in-an-unstable-region/>

²⁴ Erin Ogunkeye, Wassim Cornet, "More than 60 killed in Algerian wildfires", France 24, August 11 2021, last accessed December 8 2021, at:

<https://www.france24.com/en/africa/20210811-death-toll-mounts-in-algeria-as-dozens-of-wildfires-continue-to-burn>

²⁵ Ruth Sherlock, Nada Homsy, "Climate Change Closes In On Lebanon's Iconic Cedar Trees", NPR, November 22 2020, last accessed December 8 2021, at:

<https://www.npr.org/2020/11/22/935885394/climate-change-closes-in-on-lebanons-iconic-cedar-trees?t=1636113555417&t=1638970980287>

²⁶ "IFRC: Wildfires and Covid threaten tens of thousands in Algeria and Tunisia", Climate Centre, August 16 2021, last accessed December 8 2021, at:

<https://www.climatecentre.org/6040/ifrc-wildfires-and-covid-threaten-tens-of-thousands-in-algeria-and-tunisia/>; Ruth Sherlock, Nada Homsy, "Climate Change Closes In On Lebanon's Iconic Cedar Trees", NPR, November 22 2020, last accessed December 8 2021, at:

<https://www.npr.org/2020/11/22/935885394/climate-change-closes-in-on-lebanons-iconic-cedar-trees?t=1636113555417&t=1638970980287>

Most concerning of all, the above is a mere fraction of a dramatically worsening trend. Warming at a rate twice the global average, MENA is soon set to undergo conditions described as “potentially life-threatening for humans”.²⁷ The World Bank predicts that the Middle East could face four months of scorching sun every year as temperature increase 4°C by 2050, with others expecting heat waves, desertification and droughts to make parts of MENA “unlivable”.²⁸ Under current levels of global GHG emissions, the region may see 200 days of exceptional heat every year by 2100, exposing 50% of the region’s population and rendering entire cities uninhabitable under temperatures that could reach 60°C.²⁹

Rising temperatures and drought are threatening access to water, food and electricity of more than 12 million people in Iraq and Syria, depriving them of drinking and agricultural water, and exposing them to a number of health risks such as cholera, heat stroke and heat exhaustion.³⁰

Effects on water availability and agriculture

The increase in temperatures has also greatly contributed to shifts in much of the MENA population’s access to water and is soon expected to reach catastrophic levels. Extreme temperatures are projected to lead to changes in precipitation patterns, desertification, and alterations in river flows, which will in turn affect crop yields, livestock and access to drinking water.

Access to water is, of course, essential for livelihoods of communities across the world. Historically, much of MENA’s sedentary societies have settled and thrived along freshwater basins – from the Nile in Egypt and Sudan, to the Tigris and Euphrates in Iraq and Syria. While the region is one of the most water-stressed parts of the world, much of the MENA’s societies have developed based on

27 Anchal Vohra, “The Middle East is Becoming Literally Uninhabitable”, *Foreign Policy*, August 24 2021, last accessed December 8 2021, at: <https://foreignpolicy.com/2021/08/24/the-middle-east-is-becoming-literally-uninhabitable/>; Robert Kennedy, “Extreme hotspot: What 60C means for the Middle East”, *Al Jazeera*, November 8 2021, last accessed December 8 2021, at: <https://www.aljazeera.com/news/2021/11/8/climate-hotspot-what-60c-means-for-the-middle-east>

28 Climate Change in the Middle East & North Africa, The World Bank, last accessed December 8 2021, at: <https://www.worldbank.org/en/programs/mena-climate-change>; Peter Hegersberg, “Hot Air in the Orient”, Max Planck Institute for Chemistry, last accessed December 8 2021, at: https://www.mpg.de/10856695/W004_Environment_climate_062-069.pdf; “Climate Change has made the Middle East ‘unlivable’”, *Asia News*, October 10 2021, last accessed December 8 2021, at: <https://www.asianews.it/news-en/Climate-change-has-made-the-Middle-East-%e2%80%98unliveable%e2%80%99-54397.html>

29 Douglas Broom, “How the Middle East is suffering on the front lines of climate change”, *World Economic Forum*, April 5 2019, last accessed December 8 2021, at: <https://www.weforum.org/agenda/2019/04/middle-east-front-lines-climate-change-mena/>; George Zittis, Panos Hadjinicolaou, Mansour Almazroui et al., “Business-as-usual will lead to super and ultra-extreme heatwaves in the Middle East and North Africa”, *NPJ Climate and Atmospheric Science*, 4, 20 (2021), last accessed December 8 2021, at: <https://www.nature.com/articles/s41612-021-00178-7>; Jeremy S. Pal, Elfatih A. B. Eltahir, “Future temperature in southwest Asia projected to exceed a threshold for human adaptability”, *Nature Clim Change*, 6, 197 - 200 (2016), last accessed December 8 2021, at: <https://www.nature.com/articles/nclimate2833>

30 Robert Kennedy, “Extreme hotspot: What 60C means for the Middle East”, *Al Jazeera*, November 8 2021, last accessed December 8 2021, at: <https://www.aljazeera.com/news/2021/11/8/climate-hotspot-what-60c-means-for-the-middle-east>; Katharina Waha, Linda Krummenauer, Sophie Adams, Valentin Aich, Florent Baarsch, Dim Coumou, Mariana Fader, Holger Hoff, Guy Jobbins, Rachel Marcus, Matthias Mengel, Ilona M. Otto, Mahé Perrette, Marcia Rocha, Alexander Robinson, Carl-Friedrich Schleussner, “Climate change impacts in the Middle East and Northern Africa (MENA) region and their implications for vulnerable population groups”, *Regional Environmental Change*, 17, 6 (2017), last accessed December 8 2021, at: <https://research.csiro.au/foodglobalsecurity/wp-content/uploads/sites/63/2017/12/Waha-et-al-2017-Climate-change-impacts-in-the-Middle-East-and-Northern-Africa-MENA-region-and-their-implications-for-vulnerable-population-groups.pdf>

their ability to manage existing water resources, which have been essential for human health and hygiene, agriculture and livestock, transportation, and energy production.

Home to 5-6% of the global population, the MENA region holds only 1% of the world's freshwater resources and 2% of its renewable water resources, with 17 countries in the region below the UN water poverty line.³¹ The slightest shift in climate conditions and access to water could lead to catastrophic consequences to communities that already undergo dire conditions. By 2025, 80 - 90 million people are expected to be exposed to water stress.³²

Added to extreme temperatures, ancient water sources and resource-sharing systems are also threatened by geopolitics, corruption, and armed conflict, as water is often weaponized or leveraged in the context of the region's ongoing turmoil. Climate change is certain to increase the impact of water in conflict and politics, with more and more communities facing hardship as access to freshwater decreases. Rivers, in particular, have long fueled tensions in the region. The most prominent recent example is the construction of Ethiopia's Renaissance Dam on the Nile river, affecting the flow of freshwater into Egypt. The Egyptian government has expressed the strongest possible opposition to the dam's construction, even threatening war, arguing concerns over increased water shortages as droughts are expected to increase with rising temperatures.³³ Similarly, Turkey's dam construction in the Euphrates and Tigris rivers has severely reduced downstream water levels in Syria and in Iraq. Turkey's dam construction is estimated to have reduced water flows into Iraq by up to 80% since 1975.³⁴ Iraq is estimated to have lost 25,000 thousand hectares of arable land annually as a result of declining water supplies, desertification and mismanagement. Turkish dams have also reduced the flow of freshwater into Syria by around 40%, paralyzing irrigation systems across the country and affecting livelihoods of millions of Syrians.³⁵ Scientific projections predict that, throughout this century, warming and changes in precipitation patterns will result in a decrease in snowfall in the region's mountainous areas (namely in Morocco, Lebanon and Turkey), which in turn will drastically reduce water supplies in downstream river systems even more.³⁶

31 World Bank, "Beyond Scarcity: Water Security in the Middle East and North Africa", MENA Development Report (Washington DC, World Bank, 2018), last accessed December 8 2021, at: <https://openknowledge.worldbank.org/handle/10986/27659>; Khaled Sulaiman, "After Cop26, it is time for na 'Arab Climate Summit'", The National News, October 15 2021, last accessed December 8 2021, at: <https://www.thenationalnews.com/opinion/comment/2021/10/15/after-cop26-it-is-time-for-an-arab-climate-summit/>; "Water Scarcity", UN Water, United Nations, last accessed December 8 2021, at: <https://www.unwater.org/water-facts/scarcity/>.

32 Yasmine El-Geressi, "Climate Change, Water Woes, and Conflict Concerns in the Middle East: a Toxic Mix", Earth Day, September 8 2020, last accessed December 8 2021, at: <https://www.earthday.org/climate-change-water-woes-and-conflict-concerns-in-the-middle-east-a-toxic-mix/>

33 Yasmine El-Geressi, "Climate Change, Water Woes, and Conflict Concerns in the Middle East: a Toxic Mix", Earth Day, September 8 2020, last accessed December 8 2021, at: <https://www.earthday.org/climate-change-water-woes-and-conflict-concerns-in-the-middle-east-a-toxic-mix/>

34 Connor Dilleen, "Turkey's Dam-Building Could Create a New Middle East Conflict", The Maritime Executive, November 6 2019, last accessed December 8 2021, at: <https://www.maritime-executive.com/editorials/turkey-s-dam-building-could-create-new-middle-east-conflict>

35 Connor Dilleen, "Turkey's Dam-Building Could Create a New Middle East Conflict", The Maritime Executive, November 6 2019, last accessed December 8 2021, at: <https://www.maritime-executive.com/editorials/turkey-s-dam-building-could-create-new-middle-east-conflict>; Khaled Sulaiman, "After Cop26, it is time for an 'Arab Climate Summit'", The National News, October 15 2021, last accessed December 8 2021, at: <https://www.thenationalnews.com/opinion/comment/2021/10/15/after-cop26-it-is-time-for-an-arab-climate-summit/>

36 Katharina Waha, Linda Krummenauer, Sophie Adams, Valentin Aich, Florent Baarsch, Dim Coumou, Marianela Fader, Holger Hoff, Guy Jobbins, Rachel Marcus, Matthias Mengel, Ilona M. Otto, Mahé Perrette, Marcia Rocha, Alexander Robinson, Carl-Friedrich Schuessner, "Climate change impacts in the

The rise in temperatures, decrease in rainfall and reduction of freshwater sources are all but certain to devastate the region's agriculture and food sector, further contributing to the region's ongoing plight. Around 70% of the MENA region's agriculture is rain-fed, rendering the sector – which employs over 35% of the region's population and contributes 13% to its GDP – highly vulnerable to changes in temperature and precipitation.³⁷ Crop yields are expected to decrease by around half its current amounts before 2050, which will also impact the production of livestock due to change in quantity and quality of available feed and drink, shifts in grazing season and increase in animal diseases.³⁸ The impact of droughts in the livestock sector was recently experienced in northeastern Syria, where 85% of livestock was lost due to droughts between 2005 and 2010. Aid groups describe Syria's ongoing drought – the worst in 70 years – as an “unprecedented catastrophe”.³⁹ In 2018, protests in Jordan broke out over water and food shortages, leading to the resignation of the Prime Minister.⁴⁰ Water scarcity is expected to cost MENA governments up to 14% of their GDPs by 2050.⁴¹ Communities across the region are highly reliant on local agriculture as a source of food and employment, and the impacts of climate change have already resulted in social consequences because of food insecurity and loss of livelihoods. While the specific impacts may vary between countries and subregions, it is typically rural, poorer communities that bear the brunt of the losses.

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37 Katharina Waha, Linda Krummenauer, Sophie Adams, Valentin Aich, Florent Baarsch, Dim Coumou, Marianela Fader, Holger Hoff, Guy Jobbins, Rachel Marcus, Matthias Mengel, Ilona M. Otto, Mahé Perrette, Marcia Rocha, Alexander Robinson, Carl-Friedrich Schleussner, “Climate change impacts in the Middle East and Northern Africa (MENA) region and their implications for vulnerable population groups”, *Regional Environmental Change*, 17, 6 (2017), last accessed December 8 2021, at:

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38 Katharina Waha, Linda Krummenauer, Sophie Adams, Valentin Aich, Florent Baarsch, Dim Coumou, Marianela Fader, Holger Hoff, Guy Jobbins, Rachel Marcus, Matthias Mengel, Ilona M. Otto, Mahé Perrette, Marcia Rocha, Alexander Robinson, Carl-Friedrich Schleussner, “Climate change impacts in the Middle East and Northern Africa (MENA) region and their implications for vulnerable population groups”, *Regional Environmental Change*, 17, 6 (2017), last accessed December 8 2021, at:

<https://research.csiro.au/foodglobalsecurity/wp-content/uploads/sites/63/2017/12/Waha-et-al-2017-Climate-change-impacts-in-the-Middle-East-and-Northern-Africa-MENA-region-and-their-implications-for-vulnerable-population-groups.pdf>

39 Katharina Waha, Linda Krummenauer, Sophie Adams, Valentin Aich, Florent Baarsch, Dim Coumou, Marianela Fader, Holger Hoff, Guy Jobbins, Rachel Marcus, Matthias Mengel, Ilona M. Otto, Mahé Perrette, Marcia Rocha, Alexander Robinson, Carl-Friedrich Schleussner, “Climate change impacts in the Middle East and Northern Africa (MENA) region and their implications for vulnerable population groups”, *Regional Environmental Change*, 17, 6 (2017), last accessed December 8 2021, at:

<https://research.csiro.au/foodglobalsecurity/wp-content/uploads/sites/63/2017/12/Waha-et-al-2017-Climate-change-impacts-in-the-Middle-East-and-Northern-Africa-MENA-region-and-their-implications-for-vulnerable-population-groups.pdf>

40 Yasmine El-Geressi, “Climate Change, Water Woes, and Conflict Concerns in the Middle East: a Toxic Mix”, *Earth Day*, September 8 2020, last accessed December 8 2021, at: <https://www.earthday.org/climate-change-water-woes-and-conflict-concerns-in-the-middle-east-a-toxic-mix/>

41 Robert Kennedy, “Extreme hotspot: What 60C means for the Middle East”, *Al Jazeera*, November 8 2021, last accessed December 8 2021, at: <https://www.aljazeera.com/news/2021/11/8/climate-hotspot-what-60c-means-for-the-middle-east>

Rising water levels, storms and floods

On the flipside of the droughts and desertification occurring in much of the MENA region, coastal areas are vanishing under rising water levels as a result of inundations from slow-onset sea-level rise, floods caused by storms, salination of groundwater, and erosion of river banks.⁴² Much of the region's population is concentrated on the coast, with coastal cities accounting for around 60 million people in 2010, and expected to reach 100 million by 2030.⁴³ A 2016 World Bank report identified the MENA region among the most vulnerable places on earth to rising sea levels, warning about "particular risks" to "low-lying coastal areas in Tunisia, Qatar, Libya, UAE, Kuwait and particularly Egypt".⁴⁴ Notably, Egypt's Nile Delta – an area comprising just 2% of the country's total area – is home to approximately 41% of its population.⁴⁵

Experts found that a one-meter sea-level rise would directly affect 3.2% of MENA's population and result in the loss of 13% of Egypt's agricultural area alone.⁴⁶ The human impact of such a loss is difficult to fathom, especially in a country that already struggles to meet the nutrition needs of parts of its population. Egypt's Nile Delta is said to be the region's most threatened area, as river banks have already begun to erode and sink into seawater, submerging vast areas of agricultural land, displacing communities and potentially displacing millions more.⁴⁷ A UN report predicts a decrease of up to 47% in Egypt's agricultural sector by 2060 as a result of inundations, potentially leading to a loss of about 2 to 6% of the country's future GDP.⁴⁸ In the Nile Delta's principal urban center – Alexandria – high water levels have flooded some of the city's basements and led to fatal collapses.⁴⁹

42 Katharina Waha, Linda Krummenauer, Sophie Adams, Valentin Aich, Florent Baarsch, Dim Coumou, Marianela Fader, Holger Hoff, Guy Jobbins, Rachel Marcus, Matthias Mengel, Ilona M. Otto, Mahé Perrette, Marcia Rocha, Alexander Robinson, Carl-Friedrich Schleussner, "Climate change impacts in the Middle East and Northern Africa (MENA) region and their implications for vulnerable population groups", *Regional Environmental Change*, 17, 6 (2017), last accessed December 8 2021, at: <https://research.csiro.au/foodglobalsecurity/wp-content/uploads/sites/63/2017/12/Waha-et-al-2017-Climate-change-impacts-in-the-Middle-East-and-Northern-Africa-MENA-region-and-their-implications-for-vulnerable-population-groups.pdf>

43 Katharina Waha, Linda Krummenauer, Sophie Adams, Valentin Aich, Florent Baarsch, Dim Coumou, Marianela Fader, Holger Hoff, Guy Jobbins, Rachel Marcus, Matthias Mengel, Ilona M. Otto, Mahé Perrette, Marcia Rocha, Alexander Robinson, Carl-Friedrich Schleussner, "Climate change impacts in the Middle East and Northern Africa (MENA) region and their implications for vulnerable population groups", *Regional Environmental Change*, 17, 6 (2017), last accessed December 8 2021, at: <https://research.csiro.au/foodglobalsecurity/wp-content/uploads/sites/63/2017/12/Waha-et-al-2017-Climate-change-impacts-in-the-Middle-East-and-Northern-Africa-MENA-region-and-their-implications-for-vulnerable-population-groups.pdf>

44 "Adaptation to Climate Change in the Middle East and North Africa Region", World Bank, last accessed December 8 2021, at: http://web.worldbank.org/archive/website01418/WEB/0__C-152.HTM

45 E. Underwood, "How Fast Is the Nile Delta Sinking?", *Eos*, 99 (2018), last accessed December 8 2021, at: <https://eos.org/research-spotlights/how-fast-is-the-nile-delta-sinking>

46 Katharina Waha, Linda Krummenauer, Sophie Adams, Valentin Aich, Florent Baarsch, Dim Coumou, Marianela Fader, Holger Hoff, Guy Jobbins, Rachel Marcus, Matthias Mengel, Ilona M. Otto, Mahé Perrette, Marcia Rocha, Alexander Robinson, Carl-Friedrich Schleussner, "Climate change impacts in the Middle East and Northern Africa (MENA) region and their implications for vulnerable population groups", *Regional Environmental Change*, 17, 6 (2017), last accessed December 8 2021, at: <https://research.csiro.au/foodglobalsecurity/wp-content/uploads/sites/63/2017/12/Waha-et-al-2017-Climate-change-impacts-in-the-Middle-East-and-Northern-Africa-MENA-region-and-their-implications-for-vulnerable-population-groups.pdf>

47 Yasmine El-Geressi, "Climate Change, Water Woes, and Conflict Concerns in the Middle East: a Toxic Mix", *Earth Day*, September 8 2020, last accessed December 8 2021, at: <https://www.earthday.org/climate-change-water-woes-and-conflict-concerns-in-the-middle-east-a-toxic-mix/>

48 Yasmine El-Geressi, "Climate Change, Water Woes, and Conflict Concerns in the Middle East: a Toxic Mix", *Earth Day*, September 8 2020, last accessed December 8 2021, at: <https://www.earthday.org/climate-change-water-woes-and-conflict-concerns-in-the-middle-east-a-toxic-mix/>

49 Mohamed Shaltout, Kareem Tonbol, Anders Omstedt, "Sea-level change and projected future flooding along the Egyptian Mediterranean coast", *Oceanologia*, 57, 4 (2015), 293-307, last accessed December 8 2021, at:

Other low-lying coastal cities in the region are predicted to face similar consequences. In Iraq, rising water levels could lead to the destruction of southern urban and rural centers such as Basra, Maysan and Dhi Qar.⁵⁰

Climate change is also expected to result in a greater intensity of storms.⁵¹ Combined with higher sea levels, more intense storms are said to result in more powerful storm surges, potentially putting at risk over half of the coastal population of Kuwait, the UAE and Yemen, as well as millions in Alexandria, Egypt.⁵² In late 2018, at least two deadly storms killed over 30 people and led to the evacuation of thousands in Saudi Arabia, Oman and Yemen.⁵³ Many of these areas – which are historically some of the driest parts of the region – have suffered from floods in the past decades. Research indicates that rapid urban expansion worsened the situation, as routes through which water used to escape have been built over.⁵⁴ While the flooding and loss of human life may not be solely attributable to climate change, it does highlight the vulnerability of even the most prosperous parts of the region to extreme weather events, and the need to implement effective climate mitigation measures.

Climate change, conflict and migration

The effects of climate change on the health and livelihoods of MENA societies are set to create and exacerbate conflicts across the region. With much of the region already devastated by war and sectarianism, MENA is particularly unprepared to respond to the threats posed by extreme heat, droughts, rising sea levels and floods. Lack of resources and unlivable conditions are set to fuel new and ongoing conflicts, likely resulting in growing waves of migration.

The Center for Naval Analysis has designated climate change as a “threat multiplier” in the region by causing (or adding to) widespread political instability, unemployment, pressure on water

<https://www.sciencedirect.com/science/article/pii/S0078323415000895>; “Building collapse in Alexandria leaves 3 dead, 1 injured”, Egypt Independent, February 18 2019, last accessed December 8 2021, at: <https://www.egyptindependent.com/building-collapse-in-alexandria-leaves-3-dead-1-injured/>

⁵⁰ Khaled Sulaiman, “After Cop26, it is time for na ‘Arab Climate Summit””, The National News, October 15 2021, last accessed December 8 2021, at: <https://www.thenationalnews.com/opinion/comment/2021/10/15/after-cop26-it-is-time-for-an-arab-climate-summit/>

⁵¹ Katharina Waha, Linda Krummenauer, Sophie Adams, Valentin Aich, Florent Baarsch, Dim Coumou, Marianela Fader, Holger Hoff, Guy Jobbins, Rachel Marcus, Matthias Mengel, Ilona M. Otto, Mahé Perrette, Marcia Rocha, Alexander Robinson, Carl-Friedrich Schleussner, “Climate change impacts in the Middle East and Northern Africa (MENA) region and their implications for vulnerable population groups”, *Regional Environmental Change*, 17, 6 (2017), last accessed December 8 2021, at: <https://research.csiro.au/foodglobalsecurity/wp-content/uploads/sites/63/2017/12/Waha-et-al-2017-Climate-change-impacts-in-the-Middle-East-and-Northern-Africa-MENA-region-and-their-implications-for-vulnerable-population-groups.pdf>

⁵² Katharina Waha, Linda Krummenauer, Sophie Adams, Valentin Aich, Florent Baarsch, Dim Coumou, Marianela Fader, Holger Hoff, Guy Jobbins, Rachel Marcus, Matthias Mengel, Ilona M. Otto, Mahé Perrette, Marcia Rocha, Alexander Robinson, Carl-Friedrich Schleussner, “Climate change impacts in the Middle East and Northern Africa (MENA) region and their implications for vulnerable population groups”, *Regional Environmental Change*, 17, 6 (2017), last accessed December 8 2021, at: <https://research.csiro.au/foodglobalsecurity/wp-content/uploads/sites/63/2017/12/Waha-et-al-2017-Climate-change-impacts-in-the-Middle-East-and-Northern-Africa-MENA-region-and-their-implications-for-vulnerable-population-groups.pdf>

⁵³ Douglas Broom, “How the Middle East is suffering on the front lines of climate change”, *World Economic Forum*, April 5 2019, last accessed December 8 2021, at: <https://www.weforum.org/agenda/2019/04/middle-east-front-lines-climate-change-mena/>

⁵⁴ Faouzi Ameur, “Floods in Jeddah, Saudi Arabia: Unusual Phenomenon and Huge Losses. What Prognoses”, *E3S Web of Conferences*, 7, 04019 (2016), last accessed December 8 2021, at: https://www.researchgate.net/publication/309345158_Floods_in_Jeddah_Saudi_Arabia_Unusual_Phenomenon_and_Huge_Losses_What_Prognoses

and food availability, and increasing the likelihood of diseases.⁵⁵ This, in turn, is set to result in increasingly desperate communities in search of alternatives for survival, such as migration or enticement by armed groups.

Migration within and from MENA countries has become common in the past decade, with armed conflict and environmental degradation ravaging much of the region. With the increase of communities affected by climate change and ensuing conflict, the number of migrants is also set to grow. Most migration in the MENA is internal, as predominantly rural communities typically seek alternative life and employment conditions in cities in their own or in neighboring countries.⁵⁶ As climate change is likely to immediately directly affect rural livelihoods, the trend towards urban migration is set to continue. In Syria, for example, the prolonged dry spell led the country's total urban population to grow by 50% between 2002 and 2010.⁵⁷ However, with the increase of the effects of climate change, traditional migration patterns may change, with communities searching for the most livable destinations and potentially unable to return to their original homes due to unlivable conditions. This already occurs with many Syrians in Lebanon who are unable to return home because of increasing droughts and desertification in Syria's principal agricultural regions.⁵⁸

Despair and migration are likely to fuel internal conflict in the region. With water shortages already blamed for igniting disputes, conflict over resources is likely to escalate as extreme temperatures and droughts intensify.⁵⁹ In Iraq, food and water shortages are said to have encouraged rural farmers to support the so-called Islamic State in Iraq and the Levant (ISIL), which enticed impoverished villagers with money, food and adequate living conditions for their communities.⁶⁰

Climate adaptation and capacity

In light of the consequences arising from climate change in the midst of economic poverty and conflict, MENA countries – like the world at large – require swift and effective climate response

55 “National Security and the Threat of Climate Change”, Center for Naval Analysis (2007), last accessed December 8 2021, at: https://www.cna.org/cna_files/pdf/national%20security%20and%20the%20threat%20of%20climate%20change.pdf

56 Katharina Waha, Linda Krummenauer, Sophie Adams, Valentin Aich, Florent Baarsch, Dim Coumou, Marianela Fader, Holger Hoff, Guy Jobbins, Rachel Marcus, Matthias Mengel, Ilona M. Otto, Mahé Perrette, Marcia Rocha, Alexander Robinson, Carl-Friedrich Schleussner, “Climate change impacts in the Middle East and Northern Africa (MENA) region and their implications for vulnerable population groups”, *Regional Environmental Change*, 17, 6 (2017), last accessed December 8 2021, at: <https://research.csiro.au/foodglobalsecurity/wp-content/uploads/sites/63/2017/12/Waha-et-al-2017-Climate-change-impacts-in-the-Middle-East-and-Northern-Africa-MENA-region-and-their-implications-for-vulnerable-population-groups.pdf>

57 Yasmine El-Geressi, “Climate Change, Water Woes, and Conflict Concerns in the Middle East: a Toxic Mix”, *Earth Day*, September 8 2020, last accessed December 8 2021, at: <https://www.earthday.org/climate-change-water-woes-and-conflict-concerns-in-the-middle-east-a-toxic-mix/>

58 Hussein A. Amery, “Climate, not conflict, drove many Syrian refugees to Lebanon”, *The Conversation*, December 3 2019, last accessed December 8 2021, at: <https://theconversation.com/climate-not-conflict-drove-many-syrian-refugees-to-lebanon-127681>

59 Robert Kennedy, “Extreme hotspot: What 60C means for the Middle East”, *Al Jazeera*, November 8 2021, last accessed December 8 2021, at: <https://www.aljazeera.com/news/2021/11/8/climate-hotspot-what-60c-means-for-the-middle-east>

60 Jamal Saghir, “Climate Change and Conflict in the Middle East and North Africa”, *Issam Fares Institute for Public Policy and International Affairs* (Beirut, 2019), last accessed December 8 2021, at: https://www.aub.edu.lb/ifi/Documents/publications/working_papers/2018-2019/20190724_climate_change_and_conflicts_in_the_middle_east_and_north_africa.pdf

and adaptation if it is to mitigate the looming social disaster. Much of the region is uniquely vulnerable to the effects of climate change, particularly due to its current incapacity to handle unrest. As resources decrease and the need for relief efforts increases, long-term planning and investment for adaptation is likely to become more difficult.⁶¹

The MENA is one of the most economically diverse regions of the world, and the most immediate direct impacts of climate change in the absence of adaptation are already felt by poorer nations.⁶² Yemen, Sudan and Morocco, for example, respectively rank 182nd, 179th and 130th in a 195-country World Bank GDP per capita list, while Qatar, the UAE and Bahrain rank 11th, 26th and 40th.⁶³ This differential in economic power is perhaps one of the most determining factors in assessing a country's adaptive capacity to climate change, and poorer countries have already begun to witness the disorder over lack of access to water, food and electricity. Added to their climate vulnerability, most vulnerable MENA nations already suffer from ineffective governments and foreign interference that deepen structural deficiencies and hinder the promotion of initiatives required for equitable climate adaptation.⁶⁴

In armed conflict situations, the powerlessness of some governments in the face of external interference significantly hinders their capacity for climate adaptation. The case of Palestine is particularly noteworthy in this context due to its complete paralysis to address climate vulnerability. The Palestinian government has little to no control over its natural resources, land or economy as a result of Israel's prolonged military occupation. A UN report found that the Israeli occupation was as much a risk for Palestinian climate vulnerability as environmental factors.⁶⁵ Food insecurity is already a problem for a third of Palestinians, and access to water is fully dependent on the Israeli government.⁶⁶ The UN further describes how Israeli policies in Palestine "frustrate the development of Palestinian resilience to climate hazards" and identifies the Israeli occupation as the most significant constraint to the development of an effective Palestinian climate adaptation plan. Similarly, Yemen's protracted war has plunged its water crisis to unmanageable depths, with Yemen's annual per capita share of water reaching a mere 120 cubic meters (with the global average at 7,500 cubic meters).⁶⁷ War and lack of resources have crippled the country's ability to even consider adaptation despite its particular vulnerability.

61 Sagatom Saha, "How climate change could exacerbate conflict in the Middle East", Atlantic Council, May 14 2019, last accessed December 8 2021, at: <https://www.atlanticcouncil.org/blogs/menasource/how-climate-change-could-exacerbate-conflict-in-the-middle-east/>

62 Anchal Vohra, "The Middle East is Becoming Literally Uninhabitable", Foreign Policy, August 24 2021, last accessed December 8 2021, at: <https://foreignpolicy.com/2021/08/24/the-middle-east-is-becoming-literally-uninhabitable/>

63 GDP per capita (current US\$), The World Bank, last accessed December 8 2021, at: https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?most_recent_value_desc=true

64 Anchal Vohra, "The Middle East is Becoming Literally Uninhabitable", Foreign Policy, August 24 2021, last accessed December 8 2021, at: <https://foreignpolicy.com/2021/08/24/the-middle-east-is-becoming-literally-uninhabitable/>

65 "Climate Change Adaptation Strategy and Programme of Action for the Palestinian Authority", United Nations Development Programme, Programme of Assistance to the Palestinian People (2010), last accessed December 8 2021, at: http://eprints.lse.ac.uk/30777/1/PA-UNDP_climate_change.pdf

66 Palestine, World Food Programme, last accessed December 8 2021, at: <https://www.wfp.org/countries/palestine>

67 Anchal Vohra, "The Middle East is Becoming Literally Uninhabitable", Foreign Policy, August 24 2021, last accessed December 8 2021, at: <https://foreignpolicy.com/2021/08/24/the-middle-east-is-becoming-literally-uninhabitable/>

So, what now?

MENA states should focus on reducing to the extent possible their GHG emissions and general contributions to climate change, while immediately addressing the need for effective climate adaptation and resilience of its population. This will be key not only to the development, but to the very survival of much of the region's populations.

A fundamental step for any government seeking to address these issues is the ratification of the Paris Agreement. While Iraq and Turkey have both recently ratified the Paris Agreement in 2021, Iran, Libya, Eritrea, and Yemen are the only UN member-states that have not ratified the agreement.⁶⁸ It is alarming that three of these four countries are part of the MENA region.

Emissions reduction

Although many of the region's economic powers have announced plans for GHG reduction and economic diversification, the region's general mitigation commitments remain unambitious at best.⁶⁹ Saudi Arabia recently announced its aim to reach "net zero" GHG emissions by 2060 through the Saudi Green Initiative, namely by planting 450 million trees, rehabilitating degraded land by 2030, and investing in a so-called "carbon circular economy" approach.⁷⁰ This approach has been criticized by climate activists as it depends on unreliable carbon capture methods instead of phasing out of the fossil fuel market and does not account for oil and gas produced in the kingdom and exported for use in other countries. The UAE and Bahrain have also pledged to reach net zero by 2050 and 2060, respectively, while Qatar recently announced plans to cut GHG emissions by 25% by 2030.⁷¹ Many of these pledges have been labeled as "greenwashing" and an attempt to conceal an otherwise negative environmental record.⁷²

⁶⁸ Paris Agreement, United Nations Treaty Collection, last accessed December 8 2021, at: https://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVII-7-d&chapter=27&clang=_en

⁶⁹ Anna Schneider, "How the Arabian Gulf's oil producers expect to reach zero emission", Sustainability Times, September 27 2021, last accessed December 8 2021, at: <https://www.sustainability-times.com/low-carbon-energy/how-the-arabian-gulfs-oil-producers-expect-to-reach-zero-emissions/>

⁷⁰ Aya Batrawy, "Saudi Arabia pledges 2060 target of net-zero emissions", AP News, October 23 2021, last accessed December 8 2021, at: <https://apnews.com/article/climate-business-middle-east-dubai-united-arab-emirates-1335e47922965f7db43f5e7057cf7265>; "The Saudi Green Initiative aims to improve the quality of life", Saudi Green Initiative, last accessed December 8 2021, at: <https://www.saudigreeninitiative.org/about-saudi-green-initiative/>; Circular Carbon Economy, ARAMCO, last accessed December 8 2021, at: <https://www.aramco.com/en/sustainability/climate-change/managing-our-footprint/circular-carbon-economy#>

⁷¹ Anna Schneider, "How the Arabian Gulf's oil producers expect to reach zero emission", Sustainability Times, September 27 2021, last accessed December 8 2021, at: <https://www.sustainability-times.com/low-carbon-energy/how-the-arabian-gulfs-oil-producers-expect-to-reach-zero-emissions/>; Andrew Mills, "Qatar targets 25% cut in greenhouse gas emissions by 2030 under climate plan", Reuters, October 28 2021, last accessed December 8 2021, at: <https://www.reuters.com/business/cop/qatar-targets-25-cut-greenhouse-gas-emissions-by-2030-climate-change-plan-2021-10-28/>

⁷² Anthony Harwood, "Don't let COP26's 'greenwashers' ruin the world's climate pledges", The New Arab, November 5 2021, last accessed December 8 2021, at: <https://english.alaraby.co.uk/opinion/cop26s-greenwashers-are-polluting-climate-narrative>

Jordan's recent investment in renewable energy – presumably triggered by its dependence on increasingly expensive imported fuel – has had a positive impact in its emissions reduction.⁷³ MENA is perhaps the region with the highest wind and solar energy potentials in the world, and electricity demand is set to dramatically increase in the region as the effects of climate change worsen.⁷⁴ Transitioning into these kinds of renewable energies may be key to desalinate seawater or generate energy for cooling down during the increasingly hot and longer summers.⁷⁵

Moving forward, it is paramount for countries that have not yet ratified the Paris Agreement to do so. In no case is this more true than with Iran, which is MENA's principal GHG emitter and the eighth largest in the world.⁷⁶ Even countries that have ratified the Paris Agreement need to be more ambitious – especially countries that can afford it. Reaching net zero emissions by 2060 is too little, too late, and radical GHG reduction by countries able to finance green transitions is essential. Similarly, oil-producing nations adopting carbon-intensive crude oil pumping – such as Iran, Iraq, and Oman – should consider transitioning to less intensive extraction methods in the short term, while focusing on fully transitioning away from fossil fuel production altogether.⁷⁷ While transitioning away from fossil fuels may seem like a utopic ask – especially for countries overwhelmed in conflict, economic crisis and sanctions – this could be done with support from other states in and out of the region. Realistically, such support could start with conditionally lifting parts of economic sanctions as a means for investment in greener energies, as well as halting protracted military interference the region, which has proven to be devastating to its environment and its population alike.

Much of the burden must also fall on the world's greatest polluters – China, the US and the EU – which together contribute over 41% of global GHG emissions, despite making up just 27% of the world's population,⁷⁸ while the 100 least polluting countries account for only 3.6% of total emissions. Climate change does not recognize borders, and the damage caused by the world's most polluting countries produces effects across the globe. In fact, it tends to disproportionately affect those that least contributed to the global climate devastation.⁷⁹ Climate change affects everyone but not

⁷³ Louise Sarant, "Changing CO2 emission patterns in the Middle East", *Nature Middle East*, December 7 2015, last accessed December 8 2021, at: <https://www.natureasia.com/en/nmiddleeast/article/10.1038/nmiddleeast.2015.233>

⁷⁴ Climate Change in the Middle East & North Africa, The World Bank, last accessed December 8 2021, at: <https://www.worldbank.org/en/programs/mena-climate-change>

⁷⁵ Yasmine El-Geressi, "Climate Change, Water Woes, and Conflict Concerns in the Middle East: a Toxic Mix", *Earth Day*, September 8 2020, last accessed December 8 2021, at: <https://www.earthday.org/climate-change-water-woes-and-conflict-concerns-in-the-middle-east-a-toxic-mix/>

⁷⁶ CO2 emissions (kt) – Middle East and North Africa, The World Bank, last accessed December 8 2021, at: https://data.worldbank.org/indicator/EN.ATM.CO2E.KT?locations=ZQ&most_recent_value_desc=true&view=map

⁷⁷ Claudia Carpenter, "Middle East is a mixed bag as investors weigh oil's role in climate change", *S&P Global*, November 9 2020, last accessed 8 December 2021, at: <https://www.spglobal.com/platts/en/market-insights/latest-news/oil/110920-middle-east-is-a-mixed-bag-as-investors-weigh-oils-role-in-climate-change>

⁷⁸ Johannes Friedrich, Mangpin Ge, Andrew Pickens, "This Interactive Chart Shows Changes in the World's Top 10 Emitters", *World Resources Institute*, December 10 2020, last accessed December 8 2021, at: <https://www.wri.org/insights/interactive-chart-shows-changes-worlds-top-10-emitters>

⁷⁹ "Poverty and Climate Change Reducing the Vulnerability of the Poor through Adaptation", African Development Bank, Asian Development Bank, United Kingdom Department for Development, The Netherlands Directorate General for International Cooperation, Germany Federal Ministry for Economic Cooperation and Development, European Commission, OECD, UNDP, UNEP, The World Bank (2002), last accessed December 8 2021, at: <https://www.oecd.org/env/cc/2502872.pdf>

equally. Rich, climate resilient major emitters have a responsibility to support vulnerable regions by cutting emissions and supporting mitigation and adaptation initiatives.

Support for adaptation

Even with radical, immediate global action towards cutting GHG emissions, extreme weather conditions and environmental consequences arising from the shifting climate in MENA are close to inevitable at this point. The question now is whether governments and key stakeholders are willing to mitigate the intensity of climate change and its impacts through adaptive measures and institutional resilience. Governments in the region have so far done little to integrate climate mitigation and adaptation strategies into their policies.⁸⁰ Ignoring the problem will amplify its effects as state capacity weakens, resources diminish, and social unrest intensifies. Jamal Saghir, a former World Bank director, defends the need for “transformative” policies to address the new climate reality in the region and globally.⁸¹ In particular, Saghir speaks of “preventative measures that anticipate and mitigate exacerbated risks to avoid insecurity driven by food, water, and energy scarcities”.

Governments, with the support of key stakeholders – such as foreign governments and institutions promoting green finance initiatives – need to focus on improving water management, city planning and agricultural methods as a means to address the upcoming climate reality and arising social consequences.⁸² Importantly, climate adaptation and mitigation in the MENA is highly reliant on improved social awareness of its population and local and national governance, as well as on regional and international cooperation.

The acceptance of climate change as an important issue on the political agenda requires social environmental awareness, and could entail work with communities, educational institutions, civil society, religious leaders and journalists. In recent years, journalists in Egypt have faced government crackdowns for reporting on environmental matters.⁸³ Freedom of research and information on matters relevant to climate is of particular importance, as climate policies should be informed by objective, scientific data, and its impacts assessed through a local lens capable of determining its real-life implications. This kind of local environmental journalism requires funding to cover investigations and associated risks incurred by journalists. While institutions like the Pulitzer Center for Crisis Reporting and the Earth Journalism Network have funded several such initiatives, others must join suit to support independent environmental journalism in MENA.

⁸⁰ Sagatom Saha, “How climate change could exacerbate conflict in the Middle East”, Atlantic Council, May 14 2019, last accessed December 8 2021, at: <https://www.atlanticcouncil.org/blogs/menasource/how-climate-change-could-exacerbate-conflict-in-the-middle-east/>

⁸¹ Yasmine El-Geressi, “Climate Change, Water Woes, and Conflict Concerns in the Middle East: a Toxic Mix”, Earth Day, September 8 2020, last accessed December 8 2021, at: <https://www.earthday.org/climate-change-water-woes-and-conflict-concerns-in-the-middle-east-a-toxic-mix/>

⁸² Green Financing, UN Environment Programme, last accessed December 8 2021, at: <https://www.unep.org/regions/asia-and-pacific/regional-initiatives/supporting-resource-efficiency/green-financing>

⁸³ Peter Schwartzstein, “The Authoritarian War on Environmental Journalism”, The Century Foundation, July 7 2020, last accessed December 8 2021, at: <https://tcf.org/content/report/authoritarian-war-environmental-journalism/>

Cooperation

Cutting emissions and prioritizing climate adaptation in MENA requires cooperation with international actors, as well as integrated coordination within the region. Most climate issues in the region are common to several countries, as its effects take place along natural contours and landscapes that transcend national boundaries.

Integrated regional cooperation on climate within MENA could benefit from existing structures such as the League of Arab States and the Gulf Cooperation Council (GCC). While these institutions' effectiveness has been mostly discredited due to their inability to address some of the region's key issues and to members' political infighting, the common risks associated to the escalating climate crisis could inject new life to their purpose. While the League of Arab States established the Arab Environment Facility in an effort to finance environmental projects and provide technical support in member-states, its work has had little impact in relation to national development strategies and plans.⁸⁴ In early 2022, the UAE will host the first-ever Middle East and North Africa Climate Week intended to kick-off collaboration and integrated climate action in the region.⁸⁵

One way of approaching collaboration and integrated action is through the development of resource-sharing agreements across the region. Resource mismanagement – particularly water – is a major factor diminishing many MENA countries' capacity for climate adaptation. Although most countries in the region share water sources and surface water with their neighbors, there are few transboundary agreements on water use and management.⁸⁶ While the League of Arab States did draft a regional convention on shared water resources, the agreement was never ratified.⁸⁷ Regional cooperation could mitigate the water crisis and the region's carbon footprint.⁸⁸ By agreeing on the shared use and management of increasingly scarce water resources, governments can maximize existing water sources and promote energy-efficient uses for agriculture and drinking water.

MENA governments can also approach integrated climate cooperation on other matters of common interest – namely national security and post-conflict recovery. As described above, the risks posed by climate change are certain to undermine social stability and are a catalyst for conflict and population displacement. Climate cooperation should be perceived as a common priority for

⁸⁴ Arab Environmental Facility, UN Economic and Social Commission for Western Asia, last accessed December 8 2021, at: <https://archive.unescwa.org/arab-environment-facility>; Michael Mason, "Climate Change in the Middle East: A Source of Cooperation or Conflict?", European Institute of the Mediterranean, February 25 2021, last accessed December 8 2021, at: <https://www.iemed.org/publication/climate-change-in-the-middle-east-a-source-of-cooperation-or-conflict/>

⁸⁵ Middle East and North Africa Climate Week 2022, UN Climate Change, last accessed December 8 2021, at: <https://unfccc.int/MENA-CW2022>

⁸⁶ Johan Schaar, "What the World Can Do about the Middle East's Coming Environmental Crisis", The Century Foundation, December 14 2020, last accessed December 8 2021, at: <https://tcf.org/content/report/world-can-middle-east-coming-environmental-crisis/?session=1&session=1&agreed=1&session=1>

⁸⁷ Anchal Vohra, "The Middle East is Becoming Literally Uninhabitable", Foreign Policy, August 24 2021, last accessed December 8 2021, at: <https://foreignpolicy.com/2021/08/24/the-middle-east-is-becoming-literally-uninhabitable/>

⁸⁸ Anchal Vohra, "The Middle East is Becoming Literally Uninhabitable", Foreign Policy, August 24 2021, last accessed December 8 2021, at: <https://foreignpolicy.com/2021/08/24/the-middle-east-is-becoming-literally-uninhabitable/>

governments across the region as a mitigator of cross-border and domestic unrest. Similarly, peace agreements and stabilization programs should preempt potential conflicts arising from resource conflict and population displacement, namely by establishing frameworks that are informed by and address arising environmental conflicts.⁸⁹

Beyond the region's borders, the international community should also step-up as an integral partner in the MENA's efforts to curtail carbon emissions and investment in climate adaptation. The international community has long failed MENA societies as equal partners. From military interventions to abusive developmental relationships, foreign powers and international institutions have often played a key role in the region's instability and economic precarity. It is no wonder that MENA governments and populations are at times skeptical about issues on the international agenda requiring structural changes in their countries, as they may be perceived as just another form of foreign interventionism.⁹⁰ Nevertheless, the international community has a role to play in supporting climate justice in the MENA region while respecting countries' sovereignty.

As stated by Sagatom Saha, the international community can invest in the region's climate resilience of water, riparian coastal resistance and arid irrigated agriculture through an expansion of the Green Climate Fund's projects.⁹¹ The same applies with the World Bank's Global Environmental Facility Trust Fund and the CGIAR consortium, which fund sustainability and resource management projects, and share global research on food security.⁹² Across much of the region, commitments to reduce GHGs and adoption of adaptation measures are reliant on international financial and technological support. For instance, Lebanon's plan to increase renewable energy use by 20% is fully conditional on external financing.⁹³

The role of foreign actors must be construed through an integrated regional approach, rather than contributing to regional fragmentation.⁹⁴ The political, cultural and environmental interconnectedness of many of the MENA subregions requires a holistic approach that, rather than engaging with individual countries based on their strict national or ruling interests, mobilizes resources towards an integrated adaptation plan. In this regard, external actors can promote dialogue and logistical

⁸⁹ Johan Schaar, "What the World Can Do about the Middle East's Coming Environmental Crisis", The Century Foundation, December 14 2020, last accessed December 8 2021, at: <https://tcf.org/content/report/world-can-middle-easts-coming-environmental-crisis/?session=1&session=1&agreed=1&session=1>

⁹⁰ Neeshad Shafi, "The Arab world's best weapon against climate change? Its young people", World Economic Forum, January 18 2019, last accessed December 8 2021, at: <https://www.weforum.org/agenda/2019/01/the-arab-worlds-best-weapon-against-climate-change-its-youth/>

⁹¹ Sagatom Saha, "How climate change could exacerbate conflict in the Middle East", Atlantic Council, May 14 2019, last accessed December 8 2021, at: <https://www.atlanticcouncil.org/blogs/menasource/how-climate-change-could-exacerbate-conflict-in-the-middle-east/>; About GCF, Green Climate Fund, last accessed December 8 2021, at: <https://www.greenclimate.fund/about>

⁹² Global Environmental Facility (GEF), Financial Intermediary Funds (FIF), The World Bank, last accessed December 8 2021, at: <https://fiftrustee.worldbank.org/en/about/unit/dfi/fiftrustee/fund-detail/gef>; The CGIAR Portfolio Prospectus, CGIAR, last accessed December 8 2021, at: <https://www.cgiar.org/>

⁹³ Michael Mason, "Climate Change in the Middle East: A Source of Cooperation or Conflict?", European Institute of the Mediterranean, February 25 2021, last accessed December 8 2021, at: <https://www.iemed.org/publication/climate-change-in-the-middle-east-a-source-of-cooperation-or-conflict/>

⁹⁴ Johan Schaar, "What the World Can Do about the Middle East's Coming Environmental Crisis", The Century Foundation, December 14 2020, last accessed December 8 2021, at: <https://tcf.org/content/report/world-can-middle-easts-coming-environmental-crisis/?session=1&session=1&agreed=1&session=1>

support to MENA governments and stakeholders, as well as technical support in developing and implementing climate-progressive models of resource governance and resilience.

Perhaps most importantly, foreign powers and institutions must reassess their role in the so-called security and development of the region. Military and abusive financial incursions by external governments and private actors have devastated many of the regions' communities and landscapes, and are likely major contributors to MENA's current vulnerable situation. While corrupt local governments, internal conflicts and transboundary carbon emissions have surely played major roles in the region's current plight, unsolicited foreign intervention must end if the region is to stand a chance in responding to the climate emergency. International institutions should however support stabilization and humanitarian programs to ensure the security and livelihoods of those affected and displaced by climate change and environmental degradation. Failing to respond to the humanitarian emergency will lead to further destabilization and may perpetuate instability.⁹⁵

While MENA societies did not create the climate crisis, they are certainly one of its most immediate victims. Across the region, vulnerable communities are already suffering the effects of climate change, be it through extreme temperatures, water scarcity, food insecurity, rising water levels and storms. The thought of what will happen to the region at large with the worsening of extreme weather conditions, resource scarcity and conflict is a frightening one. MENA governments and key stakeholders, as well as the international community must cooperate to ensure support for an equitable and socially just transition away from GHG emissions, while investing in climate adaptation and mitigation plans that protect – to the extent possible – the livelihoods of the region's population and future generations. Adaptation is a fundamental step towards survival and should be tackled immediately. The problem of climate change is upon us and ignoring it will not make it go away.

⁹⁵ Johan Schaar, "What the World Can Do about the Middle East's Coming Environmental Crisis", The Century Foundation, December 14 2020, last accessed December 8 2021, at: <https://tcf.org/content/report/world-can-middle-east-coming-environmental-crisis/?session=1&session=1&agreed=1&session=1>