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Pathways for Regional Environmental Cooperation in the Gulf

Edited by

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Cover Photo Credit: NASA image by Jeff Schmaltz. "Dust Over the Persian Gulf." LANCE/EOSDIS *Rapid Response*. February 19, 2017. <https://earthobservatory.nasa.gov/images/89705/dust-over-the-persian-gulf>

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Introduction

Mehran Haghirian¹ and Aisha Al-Sarihi²

The Gulf states – Bahrain, Iran, Iraq, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates (UAE) – are facing acute risks from climate change.³ With its arid and semi-arid climatic conditions, the Gulf region is already grappling with grave environmental issues including water scarcity, severe sand and dust storms (SDS), exposure to cyclones, heatwaves, and pollution. The regional countries are paying heavy human and financial costs for the mounting consequences of these challenges – shutting down factories, announcing emergency public holidays, cutting water and electricity supplies, and even losing tourists.

The region is heating up twice as fast as the rest of the world. Heat records have been already experienced in Kuwait and Iraq (54 °C in 2016),⁴ Saudi Arabia (52 °C in 2010),⁵ the UAE (51°C in 2023),⁶ and Iran (53 °C in 2022).⁷ On Iran’s Gulf coast the heat index reached 70 °C in August

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 - 3 The term Gulf is used for consistency in all chapters to abbreviate the Persian Gulf, the term used by the United Nations. The term ‘Gulf states’ is used throughout this volume to refer to the eight littoral states surrounding the body of water: Bahrain, Iran, Iraq, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates.
 - 4 United Nations. 2016. “Temperature in Kuwait hits 54 Celsius, sets possible record amid Middle East heatwave.” July 26, 2016. UN. <https://news.un.org/en/story/2016/07/535422>
 - 5 Saunders, Toby. 2023. “Top 10 hottest places on Earth, ranked.” July 12, 2023. BBC Science Focus. <https://www.sciencefocus.com/planet-earth/hottest-place-on-earth>
 - 6 Arabian Business. 2023. “UAE records hottest day of year as scorching temperature hits 50.8 °C.” August 26, 2023. *Arabian Business*. <https://www.arabianbusiness.com/latest-news/uae-records-hottest-day-of-year-as-scorching-temperature-hits-50-8c>
 - 7 Sky News. 2023. “Iran announces nationwide shutdown due to soaring heat.” August 1, 2023. *Sky News*. <https://news.sky.com/story/iran-announces-nationwide-shutdown-due-to-soaring-heat-12931849>

2023.⁸ Oman, meanwhile, registered the hottest night-time temperature ever recorded in 2018, hitting 42 °C.⁹

Climatic changes are also exacerbating water scarcity in the Gulf. The Gulf states, aside from Iraq, are among the 16 most water-stressed countries in the world, with Qatar ranking first on the list, followed by Iran as 4th, Kuwait as 7th, Saudi Arabia as 8th, the UAE as 10th, Bahrain as 12th, and Oman as 16th. Iraq is ranked as 42nd most water-stressed country.¹⁰ Moreover, approximately 90% of the population of some Gulf countries live along the coastlines, which often have a high concentration of buildings, roads, infrastructure, and industry, increasing the exposure to climate hazards.¹¹ At the same time, many species of wildlife and their natural habitats throughout the region are under threat from improper exploitation, human activities, environmental degradation and climate change. The Convention on the Conservation of Wildlife and their Natural Habitats in GCC states has listed 95 animal species threatened by extinction.¹²

The intensity and frequency of extreme weather events such as SDS, tropical cyclones, and floods are increasing all around the region. SDS often cause damage to buildings, powerlines, vital infrastructure, and crops, all while reducing visibility for drivers and interrupting air, rail, and water transportation.¹³ The United Nations has estimated that the Middle East and North Africa (MENA) region is losing around US\$13 billion in gross domestic product (GDP) every year because of the damages inflicted by SDS.¹⁴ On the other hand, Oman, with an Arabian Sea coast, has been hit by at least four cyclones over the last 12 years alone.¹⁵ Cyclone Shaheen, which hit the country in October 2021, caused at least a dozen deaths and an estimated \$500 million of damage.¹⁶

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- 8 Livingston, Ian. 2023. "Hot-tub-like Persian Gulf fuels 158-degree heat index in Iran." August 9, 2023. *The Washington Post*. <https://www.washingtonpost.com/weather/2023/08/09/iran-persian-gulf-extreme-heat/>
- 9 Rice, Doyle. 2018. "A city in Oman may have just had the hottest night ever recorded on Earth." June 28, 2018. *USA Today*. <https://eu.usatoday.com/story/news/world/2018/06/28/heat-record-city-oman-may-have-just-had-hottest-night-ever-recorded/743345002/#>
- 10 Mala, Alisa. 2022. "The 10 Most Water-Stressed Countries In The World." December 30, 2022. *World Atlas*. <https://www.worldatlas.com/natural-disasters/the-10-most-water-stressed-countries-in-the-world.html>
- 11 Alam, Tanzeed and Leela Evans. 2022. "Climate Change Adaptation in the GCC: Implementation Gaps." In Al-Sarihi, Aisha, ed. *COP 27 and the Middle East*. Singapore: Middle East Institute, National University of Singapore. https://mei.nus.edu.sg/wp-content/uploads/2022/11/Climate-Change_Compiled-Volume.pdf
- 12 Gulf Cooperation Council. 2003. *Convention on the Conservation of Wildlife and Their Natural Habitats in the Countries of the Gulf Co-operation Council*. Gulf Cooperation Council. <https://www.gcc-sg.org/en-us/CognitiveSources/DigitalLibrary/Lists/DigitalLibrary/Forests%20pastures%20and%20wildlife/1274593978.pdf>
- 13 Alarabiya News. 2022. "Iraq sandstorm forces closure of airports, schools, public administrations." May 16, 2022. *Alarabiya News*. <https://english.alarabiya.net/News/middle-east/2022/05/16/Iraq-sandstorm-forces-closure-of-airports-schools-public-administrations>
- 14 Claire Parker and Kasha Patel. "Sandstorm wave sweeps Middle East, sending thousands to hospitals." *The Washington Post*. May 26, 2022. <https://www.washingtonpost.com/world/2022/05/26/sand-storms-middle-east-climate-change/>
- 15 Al-Manji, Suad. 2022. "Building Resilience to Extreme Weather Events in Oman. Insight." In Al-Sarihi, Aisha, ed. *COP 27 and the Middle East*. Singapore: Middle East Institute, National University of Singapore. https://mei.nus.edu.sg/wp-content/uploads/2022/11/Climate-Change_Compiled-Volume.pdf
- 16 Ibid.

Aside from Iran and Iraq, the rest of the Gulf states import much of their food: Qatar, Bahrain, and the UAE import 80-90% of their food, Oman approximately 50%, and Kuwait and Saudi Arabia sometimes up to 70%.¹⁷ The impacts of climate change on agriculture can disrupt supply chains, much like the COVID-19 pandemic, directly affecting food security in the region. Simultaneously, rising temperatures, reduced rainfall, and sea level rises that cause saltwater intrusion into aquifers – will narrow the scope for local agriculture production.

Given that hydrocarbon resources contribute significantly to their economies, the Gulf countries face a common challenge in implementing climate response measures. Advanced global climate policies, especially those targeting reduced demands for hydrocarbons, could impose direct economic losses on the Gulf economies, limiting the scope for economic diversification.

With less coping capacity, climate change amplifies pre-existing vulnerabilities stemming from conflict, including tension over resources like water and food, thus exacerbating human security challenges and forcing the displacement of people in search for better living conditions, the implications of which often transcend national borders. Thus, these interconnected problems are poised to get worse.

Countries in the region have started to feel these consequences of climate change that transcend national borders. These environmental issues are inducing endemic internal migration of communities due to the decline of water resources and agricultural activity. They are also exacerbating existing tensions or create new ones throughout the region. While hydrocarbon profits have helped some Gulf countries to weather these climate challenges, the looming spectre of peak oil demand and the eventual end of national reserves impact these countries' abilities to counter climate challenges in the long-term. Local strategies will no longer be sufficient to fully solve these escalating environmental concerns. A concerted effort to address pressing environmental issues in the region is integral to mitigating the detrimental impacts of climate change.

The Gulf region has long been viewed as a theatre of conflict and tensions between neighbouring states. It has also often served as an arena for competition between global powers. In 2019, the region was close to all-out war, with numerous direct and indirect military attacks taking place in and around the Gulf.¹⁸ With rising risks and costs, the region has witnessed a gradual shift in the neighbourhood policy of most regional players. For example, the blockade that was imposed on Qatar in 2017 by Saudi Arabia, the UAE, Bahrain, and Egypt ended after the Al Ula Summit in January 2021, closing one of the biggest rifts within the Gulf Cooperation Council (GCC). At the same time, Qatar and Oman have continuously expanded their engagement with Iran, and the UAE and Kuwait restored full diplomatic and economic ties with Tehran in 2021. After a series of negotiations in Iraq and Oman, Saudi and Iranian officials re-established ties after seven years in March 2023 by signing a Chinese-mediated

17 Ghazaly, Salim, Roger Rabbat, and Ahmed Mokhtar. 2020. "How GCC countries can ensure their food security?" August 2020. *Gulf Business*. <https://www.strategyand.pwc.com/ml/en/articles/2020/how-gcc-countries-can-ensure-their-food-security.html>

18 Hubbard, Ben, Palko Karasz, and Stanley Reed. 2019. "Two Major Saudi Oil Installations Hit by Drone Strike, and U.S. Blames Iran." September 14, 2019. *The New York Times*.

agreement in Beijing.¹⁹ Through an Iraqi effort, regional countries have also been meeting at the Baghdad Conference for Cooperation and Partnership, so far held twice, aiming to identify areas for multilateral cooperation.²⁰ The regional countries have engaged in bilateral and multilateral diplomatic efforts to increase trust and confidence building measures that could pave the way for further cooperation, and eventually integration.

But long periods of weak alignment and cooperation as well as strong antagonism and confrontation have prevented the region from tackling shared challenges. The GCC, for instance, the only regional organisation in the Gulf, is deliberately built to be non-inclusive, as it was formed in the shadow of the Iran–Iraq war to enhance regional security against Iran. While its goal is to accelerate regional economic and security integration, competition and focus on respective economic development and priorities have kept the bloc weak as an organisation. It is important not to treat the GCC states as monolithic or aligned on all policy matters. Doing so would also limit cooperation and integration in the Arabian Peninsula, as opposed to an all-encompassing regional integration in the Gulf.

In 2021, Haghirian argued that because of recent shifts in the regional outlook and approach of key players in the Gulf, there are new horizons for inclusive regional cooperation between neighbouring states, particularly in the economic and environment spheres.²¹ Dassa Kaye and Vakil have also observed that ‘a historic opportunity to build sustainable multilateralism in the MENA region is emerging.’²² There is a growing understanding that key players in the Gulf have been keen on testing the new diplomatic openings to further their respective national interests. The myriad of bilateral agreements signed between regional countries, including within the GCC as well as between, for example, Iran and the UAE, Iran and Kuwait, and Kuwaiti investments inside Iraq, are all signs that finding solutions to shared environmental challenges is itself part of the national security strategy of each country. Moreover, the growing participation of key regional players in environmental conferences, meetings, and exchanges is a sign that environmental issues are an entry point for closer state-to-state, company-to-company, and people-to-people exchanges, both bilaterally and multilaterally. New and recurring conflicts might affect the pace of cooperation but not the importance of effectuating a cooperative future in the region, especially on shared environmental challenges.

This edited volume is a result of a collaboration between the Bourse & Bazaar Foundation and the Middle East Institute at the National University of Singapore. The publication seeks to identify areas for regional environmental cooperation and explore practical regional

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- 19 Haghirian, Mehran and Jacopo Scita. 2023. “The Broader Context Behind China’s Mediation Between Iran and Saudi Arabia.” March 14, 2023. *The Diplomat*. <https://thediplomat.com/2023/03/the-broader-context-behind-chinas-mediation-between-iran-and-saudi-arabia/>
- 20 Haghirian, Mehran. 2022. “Regional Economic Integration Comes into Focus at Second Baghdad Conference.” December 23, 2022. *Bourse and Bazaar*. <https://www.bourseandbazaar.com/articles/2022/12/23/regional-economic-integration-comes-into-focus-at-second-baghdad-conference>
- 21 Haghirian, Mehran. 2022. “New Horizons for Regional Economic Diplomacy in the Persian Gulf.” March 9, 2022. *Bourse and Bazaar*. <https://www.bourseandbazaar.com/research-1/2022/03/09/new-horizons-for-regional-economic-diplomacy-in-the-persian-gulf>
- 22 Dassa Kaye, Dalia, and Sanam Vakil. 2023. “Seizing MENA’s moment.” September 26, 2023. Chatham House. <https://www.chathamhouse.org/2023/09/seizing-menas-moment/introduction-menas-moment>

approaches to address such shared challenges. Water scarcity, marine environments, extreme weather events, food security, and the energy transition were identified as key topics for a project exploring the untapped potential of regional cooperation on shared environmental challenges. The experts who contributed come from diverse backgrounds, but all agree that the Gulf region is facing devastating impacts from climate change, which will only grow if there are no holistic and inclusive mitigation strategies implemented.

This volume adds a layer of practicality to the growing conversations and debates on shared environmental challenges in the Gulf. The nine chapters aim to move past rhetoric and talking points on the need to fight climate change and present practical proposals and recommendations to regional governments and external stakeholders, as well as academic institutions, companies, and individuals involved in climate action.

Chapter 1, by Mohammad Al-Saidi, research associate professor at the Center for Sustainable Development in Qatar University, highlights the critical environmental challenges facing the Gulf's marine ecosystem, emphasising the need for enhanced regional cooperation. Under the title 'Collective Environmental Action to Preserve the Gulf's Marine Ecosystem,' Al-Saidi argues that the Gulf's unique biodiversity and ecosystems are at risk, impacting economies and supply chains. Climate change, population growth, urbanisation, pollution, and desalination activities threaten the Gulf's marine ecosystems. The chapter argues that the existing Regional Organization for the Protection of the Marine Environment (ROPME) is a useful platform, but should broaden its mandate to address contemporary issues, including climate change, and strengthen cooperation. Despite historical rivalries, recent diplomatic developments may offer an opportunity for improved environmental cooperation in the region, provided that key players, including Iran and Iraq, are included. Al-Saidi calls for the expansion of ROPME's role to encompass marine spatial planning, integrated coastal zone management, and address climate change. Additionally, he looks at the role of science diplomacy and peer networks of scientists in facilitating regional cooperation and addressing common environmental challenges in the Gulf. Ultimately, this chapter underscores the importance of multilateral institutions and collaborative efforts to protect the Gulf's unique environment.

Chapter 2, by Tobias Zumbrägel, is titled 'Towards Common and Sustainable Resource Management in the Gulf.' This chapter delves into the pressing environmental challenges facing the Gulf region, including climate change, environmental degradation, and resource scarcity. As leaders in the region recognise the need to transition away from fossil fuels, Zumbrägel analyses the complex environmental interconnections among these countries, and the urgency of increasing collective action to address shared environmental challenges. The chapter discusses the shortcomings of existing regional environmental organisations, environmental challenges such as extreme weather and SDS, as well as the importance of resource management, and offers policy recommendations for enhanced environmental cooperation among Gulf states. Zumbrägel is a postdoctoral researcher at the University of Heidelberg in Germany.

Chapter 3, 'Joint Efforts to Combat Extreme Weather Events in the Gulf,' is by Said Al-Sarmi, Climate Change Affairs Expert at Oman's Environment Authority, and Suad Al-Manji, the head of the risk management department at Oman's Ministry of Education. They underscore the escalating frequency and intensity of extreme weather events in the Gulf region over the

past two decades, attributing this trend to a significant climate shift in 1998, which led to higher temperatures and reduced rainfall. They delineate the distinctive impacts of climate change on non-monsoonal and monsoonal regions in the Gulf, such as increased dust storms and more intense tropical cyclones. The chapter highlights the diverse challenges and damages faced by different countries in the region due to these climatic shifts, emphasising the importance of targeted strategies. It discusses the transboundary nature of climate impacts and the imperative need for regional cooperation to address these challenges, proposing several areas for expanded cooperation: strengthening early warning systems, enhancing collaborative climate research, facilitating knowledge exchange, creating joint funding mechanisms, harmonising climate policies, collaborating on public health strategies, and raising climate awareness. While there have been regional initiatives, the authors acknowledge limitations and advocate for more efficient coordination.

Chapter 4, by Glada Lahn, Senior Research Fellow of Chatham House's Environment and Society Centre, and Adnan Tabatabai, the CEO of the Center for Applied Research in Partnership with the Orient (CARPO), discusses the potential for regional cooperation in the Gulf to address common environmental and climate challenges, with a focus on SDS as a shared threat. This chapter, titled 'Tackling Sand and Dust Storms to Build on Regional Détente in the Gulf,' discusses the evolving dynamics in the Gulf region, highlighting a shift from longstanding rivalries to a more constructive trajectory of de-escalation and cooperation. The authors argue that addressing shared environmental challenges can serve as a practical starting point for building trust and promoting domestic reforms necessary for climate adaptation. The chapter highlights the increasing severity and frequency of SDS and their impact on human health, infrastructure, agriculture, and solar energy generation. It outlines ongoing initiatives and studies related to SDS, including afforestation and land regeneration projects in southern Iraq. The chapter also underscores the potential for regional and international organisations, such as the United Nations, to facilitate cooperation and knowledge exchange. The authors suggest that practical cooperation should continue and expand, focusing on control, preparedness, institutional facilitation, and land regeneration. They conclude by highlighting the economic incentives for Gulf countries to work together to address SDS and related environmental challenges, fostering a more collaborative and constructive regional approach to climate and environmental issues.

Chapter 5, 'Cooperation Opportunities for the Gulf in the Energy Transition,' is by Robin Mills, founder of Qamar Energy. Mills discusses the opportunities for cooperation and collaboration in the Gulf region in the context of the energy transition. Despite political differences and sanctions, there is potential for complementarity between the GCC states and their neighbours, Iran and Iraq. The GCC states have capital, technical expertise, and experience in the field of energy transition, which can be harnessed for cooperation. The chapter explores various opportunities, including aligned positions in international negotiations and trade, common policies on standards and carbon pricing, cross-border infrastructure like electricity lines and pipelines, cross-border investments, and cooperation on environmental protection, climate adaptation, and disaster readiness. The chapter also looks at the importance of a regional framework for cooperation to address challenges in energy, climate, and security.

Chapter 6 is by Malak Altaeb, Non-Resident Scholar in the Climate and Water Program at the Middle East Institute in Washington, DC, who discusses the critical issue of food security in the Gulf region under the title 'Boosting Food Security in the Gulf through Regional Cooperation.' She highlights the challenges posed by factors such as water scarcity, financial volatility, and heavy reliance on food imports, compounded by climate change and outdated farming methods. The chapter emphasises the necessity of regional cooperation among GCC states, Iran, and Iraq to address these challenges. Altaeb explores opportunities for collaboration between GCC countries and Iran in the food sector, acknowledging their intertwined histories and trade relationships. She also discusses the potential for multilateral cooperation on food security in Iraq, offering recommendations for enhancing food production and security through infrastructure development and capacity building platforms. Ultimately, the chapter underscores the importance of fostering regional cooperation to ensure long-term food security in the Gulf and enhance resilience against various foreseen and unforeseen challenges.

Chapter 7, by Maha Yassin, is titled 'Bolstering Iraq's Climate Response through Regional Environmental Cooperation.' It looks at the severe environmental challenges facing Iraq due to climate change, including water scarcity, desertification, and rising temperatures, which are already causing economic losses, population displacement, and instability. The chapter particularly looks at how Iraq can serve as an arena for regional cooperation between the Gulf states. The chapter assesses a number of regional multilateral initiatives, such as the Baghdad Conference for Cooperation and Partnership and the Middle East Green Initiative to find areas for regional cooperation. Yassin argues that these initiatives provide a platform for addressing shared environmental challenges in the region, and Iraq should focus on securing funding and capacity building, in addition to establishing joint projects relating to shared water resources, desalination, irrigation, and solar energy. Yassin is an independent researcher and a Climate Fellow at the Institute of Regional and International Studies of the American University of Sulaymaniyah in Iraq.

Chapter 8, titled 'Addressing Shared Environmental Challenges in the Gulf with European Support,' is by Mehran Haghirian, Director of Regional Initiatives at the Bourse & Bazaar Foundation and one of the editors of this volume. He explores Europe's role in supporting regional environmental cooperation in the Gulf, emphasising the urgent need to address shared challenges in the region, including water scarcity, heatwaves, and SDS. This chapter argues that the region requires external support, particularly from Europe, to effectively tackle these challenges. Europe can contribute through diplomatic engagement, co-investments, technological transfer, and sharing know-how and expertise. The chapter further calls for inclusive approaches to tackle shared environmental challenges and offers recommendations for Europe's involvement in addressing these critical issues.

The final chapter, Chapter 9 is titled 'Examining Gulf-Southeast Asia Interregional Environmental Cooperation' and is by Aisha Al-Sarihi, this volume's other editor, and Muhammad Shidiq. Al-Sarihi is a Research Fellow on policy and politics of climate and environment at the National University of Singapore's (NUS) Middle East Institute (MEI), as well as an Associate Fellow at Chatham House, and Shidiq is a Senior Research Analyst for ASEAN Climate Change and Energy Project (ACCEPT) and Senior Researcher at Energy Modelling and Policy Planning (MPP) Department, ASEAN Centre for Energy (ACE). The

chapter examines the current state of regional environmental cooperation in the Gulf and its implication to inter-regional environmental cooperation. Using the Association of Southeast Asian Nations (ASEAN) as a case study, the chapter provides a comparative analysis in regional environmental cooperation. Slow regional integration in the Gulf, compounded with weak arrangements for environmental cooperation, has led to minimal meaningful cooperation with other regional organisations such as ASEAN. This chapter suggests that enhancing Gulf regional integration can create more strategic space for cooperation with ASEAN which, in comparison, presents advanced frameworks and institutions to address shared environmental challenges. Regionalism opens windows of opportunity for both sides to collaborate and complement one another in different areas such as low-carbon technologies, knowledge exchange, finance, innovation, and research and development.

Taken together, these nine chapters make clear that missed opportunities for cooperation due to political differences across the Gulf have not only delayed environmental mitigation but have also limited economic integration as well. While trust and political will remain prerequisites for enhanced regional environmental cooperation, this volume highlights the importance of joint climate science and research programs, knowledge sharing, capacity building, finance leveraging, and policy coordination as key areas to improve regional environmental cooperation in the Gulf region. Opportunities abound for the Gulf states to cooperate in tackling shared environmental challenges.



Chapter 1

Collective Environmental Action to Preserve the Gulf's Marine Ecosystem

*Mohammad Al-Saidi*¹

Abstract

The Gulf's marine ecosystems are vital for economic activities and the security of food and other necessities for tens of millions of people. The environmental footprint arising from the use of the Gulf's environmental resources is becoming larger. With climate change and the expansion of coastal infrastructure, mitigating the environmental challenges that face the Gulf requires collective action and transboundary cooperation. In 1978, the littoral states of the Gulf formed the Regional Organization for the Protection of the Marine Environment (ROPME) as a collective action platform towards enhancing the health of the Gulf – for example, through common measures to reduce pollution from oil and other substances. However, this organisation does not tackle many of the contemporary challenges facing marine ecosystems. Regional environmental cooperation also needs to be expanded to other issues, such as climate change impacts and the mitigation of environmental risks. This chapter explains the need for expanding and enhancing cooperation and provides examples and future directions for Gulf-wide environmental cooperation.

Introduction

The land around the shared body of water that borders Bahrain, Iran, Iraq, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates (UAE) had a population of about 190 million people in 2021. Some of the world's largest and most rapidly expanding cities are located on the Gulf's coasts, particularly cities in the countries of the Gulf Cooperation Council

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(GCC). Coastal cities in the Emirates, Bahrain, and Qatar have expanded from a few thousand in the 1970s to modern urban agglomerations with millions of inhabitants.² For all littoral countries, the Gulf is of high economic importance as a trade hub. It is also a key source of food and clean water through desalination. The Strait of Hormuz, the only sea passage to the Gulf, is one of the most important global energy chokepoints, transiting one-third of the global seaborne-traded oil and one-quarter of the global liquefied natural gas in 2018.³ The expansion of the coastal built environment, desalination activities, and the production and transport of carbon fuel resources have meant more pollution and the destruction of vital marine ecosystems in the Gulf. Future pressures on the Gulf, including climate change, will require the enhancement of cooperative mechanisms to capture synergies and effectively mitigate environmental impacts.

Environmental pressures on the Gulf result from internal factors such as population and economic growth and external effects such as climate change. They are not adequately addressed because of low levels of environmental regulation and the lack of effective regional cooperation. This chapter argues that Gulf countries need to enhance regional environmental cooperation by strengthening current institutions – particularly the mandate and instruments of ROPME – and expanding the cooperation areas, including climate action. First, it will briefly outline the mounting pressures on Gulf waters, including pollution, the destruction of ecosystems, and climate change as an aggravator. Next, it will explain the legacies of Gulf-wide cooperation and the priorities so far. This contribution will then explain the need for expanded and enhanced cooperation, and it will provide examples and future directions for Gulf-wide environmental cooperation.

A microcosm of biodiversity and environmental change

The Gulf is endowed with a great biodiversity of ecosystems, including wetlands, mangroves, and coral reefs that are home to fish, turtles, and marine mammals, particularly dolphins and whales. The exceptional conditions of the Gulf as a semi-closed body of water with high salinity and temperature fluctuations have created unique marine ecosystems that have adapted to extreme climatic conditions.⁴ Large islands in the Gulf, such as Qeshm and Kish in Iran, exhibit rich biodiversity that makes them popular touristic destinations in the Middle East.⁵ For GCC countries, the eco-tourism sector is growing, with whale and turtle-watching

2 Jong M de, Hoppe T, Noori N. City Branding, Sustainable Urban Development and the Rentier State. How Do Qatar, Abu Dhabi and Dubai Present Themselves in the Age of Post Oil and Global Warming? *Energies* 2019;12(9):1657. <https://doi.org/10.3390/en12091657>

3 US Energy Information Administration. The Strait of Hormuz is the world's most important oil transit chokepoint; 2019. <https://www.eia.gov/todayinenergy/detail.php?id=39932>

4 Bayani N. Ecology and Environmental Challenges of the Persian Gulf. *Iranian Studies* 2016;49(6):1047–63. <https://doi.org/10.1080/00210862.2016.1241569>

5 Khodadadi M. The emergence of cruise tourism in Iran. *JTF* 2018;4(3):275–81. <https://doi.org/10.1108/JTF-04-2018-0012>

attracting both locals and foreigners.^{6,7} Importantly, these marine ecosystems are of the utmost importance for the cultural identity of cities in the Gulf. Global cities such as Doha, Abu Dhabi, and Dubai pride themselves on their pre-oil history of fishery and pearl diving.

Two groups of drivers are negatively impacting the Gulf's ecosystems. First, the internal factors of environmental change related to coastal development, sea-based infrastructure (including carbon fuel extraction and shipping), and land-based pollution (including the ever-growing problem of plastics). Coastal urbanisation has damaged coastal ecosystems such as mangroves and coral reefs, making the Gulf the most degraded marine ecosystem in the world.⁸ With urbanisation comes the need for the expansion of desalination at a significant environmental cost. For example, desalination produces highly saline rejected water (called desalination brine), which is disposed of in the Gulf, endangering marine ecosystems.⁹ Plastic litter is also an increasing transboundary problem, starting to be tackled through regulations and bans.¹⁰ All of these disturbances should also be seen alongside the traditional risk of oil spills that occurred in 1980, 1983, and 1991.

Second, the external factor of climate change and variability is exacerbating the environmental problems of the Gulf. Global warming means a higher evaporation rate in the Gulf, while climate disasters like heatwaves are particularly concerning.¹¹ Higher temperatures can lead to coral bleaching and the loss of fish stock. Some of the major warming events of 1996, 1998, 2001, and 2010 have increased seawater temperatures beyond 35°C, leading to mass fish deaths.¹² Sand and dust storms have closed marine terminals for oil exports, and they could impact new infrastructure for aquaculture or fisheries.¹³

When the Gulf's ecosystems are damaged, there are severe impacts on economies and supply chains. The increased salinity and pollution of the Gulf can threaten desalination activities, which already require advanced technologies. Traditionally, the GCC states relied on distillation technologies for desalinating seawater because of the high salinity and

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- 6 Lambert E, Hunter C, Pierce GJ, MacLeod CD. Sustainable whale-watching tourism and climate change: towards a framework of resilience. *Journal of Sustainable Tourism* 2010;18(3):409–27. <https://doi.org/10.1080/09669581003655497>
 - 7 Busaidi MA, Bose S, Claereboudt M, Tiwari M. Sea turtles tourism in Oman: Current status and future prospects. *Tourism and Hospitality Research* 2019;19(3):321–36. <https://doi.org/10.1177/1467358417751026>
 - 8 Burt JA. The environmental costs of coastal urbanization in the Arabian Gulf. *City* 2014;18(6):760–70. <https://doi.org/10.1080/13604813.2014.962889>
 - 9 Hosseini H, Saadaoui I, Moheimani N, Al Saidi M, Al Jamali F, Al Jabri H et al. Marine health of the Arabian Gulf: Drivers of pollution and assessment approaches focusing on desalination activities. *Marine Pollution Bulletin* 2021;164:112085. <https://doi.org/10.1016/j.marpolbul.2021.112085>
 - 10 Stöfen-O'Brien A, Naji A, Brooks AL, Jambeck JR, Khan FR. Marine plastic debris in the Arabian/Persian Gulf: Challenges, opportunities and recommendations from a transdisciplinary perspective. *Marine Policy* 2022;136:104909. <https://doi.org/10.1016/j.marpol.2021.104909>
 - 11 Ben-Hasan A, Christensen V. Vulnerability of the marine ecosystem to climate change impacts in the Arabian Gulf—an urgent need for more research. *Global Ecology and Conservation* 2019;17:e00556. <https://doi.org/10.1016/j.gecco.2019.e00556>
 - 12 Al-Saidi M. Coastal Development and Climate Risk Reduction in the Persian/Arabian Gulf: The Case of Qatar. In: Harris PG, editor. *Climate Change and Ocean Governance: Politics and Policy for Threatened Seas*. Cambridge: Cambridge University Press; 2019, p. 60–74.
 - 13 Al-Hemoud A, Al-Sudairawi M, Neelamanai S, Naseeb A, Behbehani W. Socioeconomic effect of dust storms in Kuwait. *Arabian Journal of Geosciences* 2017;10(1):18. <https://doi.org/10.1007/s12517-016-2816-9>

turbidity of the Gulf. Only recently could they install the worldwide common technology using membranes, after this technology advanced to accommodate the Gulf's water quality.¹⁴ Membrane-based technologies are more efficient in terms of water recovery and energy use, but they produce more dense and salty brine. Membrane desalination accounts for more than 60% of produced desalination water globally, but this figure is only 6% in the Gulf – the other 94% are distillation-based technologies.¹⁵ However, newer plants in the GCC region are deploying membrane technologies using reverse osmosis. If this trend of expanding membrane-based technologies continues, any deterioration of the quality of the Gulf may have severe impacts on desalination because these membranes have limited filtration capacities.

With more desalination, pollution, and climate impacts, some speculate that the Gulf will reach a point of “peak salt,” in which desalination is hardly possible.¹⁶ Another traditional but growing threat is the presence of harmful algae blooms, also known as red tide. The algae arrive on shipping vessels from the Gulf of Oman or the Arabian Sea and can disrupt desalination. The last major incidents were in 2008 and 2009.¹⁷ Other coastal infrastructure for food – including the increasing number of aquaculture installations – and energy production are also at risk from environmental change.¹⁸ For example, the degradation of the Gulf threatens more than half a billion dollars of fishery activities annually.¹⁹

Larger marine animals in the Gulf – called charismatic species – might be more tolerant to variations in sea temperature and salinity compared to other stressors they face, such as pollution, loss of habitat, military exercises, or boat traffic.²⁰ These charismatic species include dolphins, dugongs, and green and hawksbill turtles, all of which are highly important for biodiversity and as cultural resources for Gulf societies. In fact, the temperature tolerance rates of marine species might be changing worldwide and in the Gulf, the world's hottest sea. Therefore, some scholars regard the Gulf as a “natural laboratory” to understand how marine ecosystems adapt to extreme conditions caused by climate change.^{21,22}

14 Moossa B, Trivedi P, Saleem H, Zaidi SJ. Desalination in the GCC countries- a review. *Journal of Cleaner Production* 2022;357:131717. <https://doi.org/10.1016/j.jclepro.2022.131717>

15 Hosseini et al. Marine health of the Arabian Gulf, 112085.

16 Leahy S, Purvis K. Peak salt: is the desalination dream over for the Gulf states? *Guardian* 2016, 29 September 2016; Available from: <https://www.theguardian.com/global-development-professionals-network/2016/sep/29/peak-salt-is-the-desalination-dream-over-for-the-gulf-states> [September 26, 2023].

17 Al Shehhi MR, Gherboudj I, Ghedira H. An overview of historical harmful algae blooms outbreaks in the Arabian Seas. *Marine Pollution Bulletin* 2014;86(1):314–24. <https://doi.org/10.1016/j.marpolbul.2014.06.048>

18 Al-Saidi M, Saliba S. Water, Energy and Food Supply Security in the Gulf Cooperation Council (GCC) Countries—A Risk Perspective. *Water* 2019;11(3):455. <https://doi.org/10.3390/w11030455>

19 Burt. The environmental costs of coastal urbanization in the Arabian Gulf, 760–70.

20 Wabnitz CCC, Lam VWY, Reygondeau G, Teh LCL, Al-Abdulrazzak D, Khalfallah M et al. Climate change impacts on marine biodiversity, fisheries and society in the Arabian Gulf. *PLoS One* 2018;13(5):e0194537. <https://doi.org/10.1371/journal.pone.0194537>

21 Riegl BM, Purkis SJ (eds.). *Coral Reefs of the Gulf: Adaptation to Climatic Extremes*. Dordrecht: Springer Netherlands; 2012.

22 Bouwmeester J, Riera R, Range P, Ben-Hamadou R, Samimi-Namin K, Burt JA. Coral and Reef Fish Communities in the Thermally Extreme Persian/Arabian Gulf: Insights into Potential Climate Change Effects. In: Rossi S, Bramanti L, editors. *Perspectives on the Marine Animal Forests of the World*. Cham: Springer International Publishing; 2020, p. 63–86.

The cooperation imperative despite rivalry and competition

Regional environmental cooperation in the Gulf is underwhelming compared with benchmark regions. Cooperation among regions in Asia (for example, ASEAN countries) or Europe exhibits more multilateral agreements, supranational delegation, common targets, and investment commitments,²³ despite the Gulf littoral countries having more in common in terms of shared resources, history, and culture than other regions. Besides the focus on marine protection and pollution issues, ROPME does not have any other clear mandate. There are also no other major institutional arrangements for inclusive Gulf-wide environmental cooperation. The failure to advance cooperation despite the increased urgency of environmental issues can be attributed to the status quo of mistrust and latent conflicts, particularly among the regional rivals of Iran and Saudi Arabia.²⁴ Recent diplomatic developments and reconciliations across the region suggest a new horizon for environmental cooperation.

Even within the GCC, environmental cooperation has been below expectations. It has largely followed a narrow path of the smallest common denominator, mainly focusing on harmonising policies in the areas of marine life, water production, agriculture, and energy.²⁵ The GCC cooperation legacies have also exhibited periods of competition and discord, such as the 2017 Gulf crisis or the failure of joint projects, such as a GCC-wide nuclear program. Recent diplomatic developments around the region also extend to the mending of ties within the GCC itself, and closer cooperation on environmental issues could be expected. While it is important to strengthen integration among GCC states, regional environmental challenges can succeed only if Iran and Iraq are included as well.

Iran has the longest Gulf coast, with important terrestrial and marine ecosystems as well as industrial sites. The Gulf coastline harbours the majority of Iran's desalination capacity, which is expected to increase through new plants and water transfer infrastructure to counteract the country's growing water crisis.²⁶ A large expansion of supply infrastructure on the Gulf's coastline in Iran increases the need for coordination and collaboration. Desalination activities across Iran's Gulf coast is negligible compared with the GCC states. Iran has 75 desalination plants with a total capacity of 450,000 cubic metres per day, and 92% of them are located

23 Al-Saidi M. Cooperation or competition? State environmental relations and the SDGs agenda in the Gulf Cooperation Council (GCC) region. *Environmental Development* 2021;37:100581. <https://doi.org/10.1016/j.envdev.2020.100581>

24 Al-Saidi M. Regional Environmental Cooperation: The (Lost) Potential for a Sustainable Future in the Arabian/Persian Gulf. In: Standish K, Devere H, Suazo A, Rafferty R, editors. *The Palgrave Handbook of Positive Peace*. Singapore: Springer Singapore; 2022, p. 813–831.

25 Al-Saidi. Cooperation or competition?

26 Keynoush B. With the Hope Line, Iran aims to boost seawater transfer to fight growing drought; 2021. Middle East Institute. <https://www.mei.edu/publications/hope-line-iran-aims-boost-seawater-transfer-fight-growing-drought>

in the southern provinces of Hormozgan, Bushehr, Sistan-Baluchistan, and Khuzestan.^{27,28} The whole region has about 850 desalination plants, predominantly in the GCC countries, which have about 50% of the world's desalination capacity of 95 million cubic metres per day.^{29,30} Along the Gulf coast, some of the large desalination sites in GCC states exceed Iran's entire desalination capacity, such as Jubail in Saudi Arabia, which has a capacity of 1.15 million cubic metres per day, and Jabal Ali in the UAE, which has a capacity of 2 million cubic metres per day.³¹

Similarly, Iraq faces a water crisis, with a decreasing flow and deteriorating quality of the Tigris and Euphrates rivers because of upstream damming.³² Iran and Iraq are the only sources of freshwater in the Gulf, thus influencing the salinity and quality of Gulf waters.

ROPME: Legacies and shortcomings

ROPME was established in 1978, one year after the adoption of the Kuwait Regional Convention for Cooperation on the Protection of the Marine Environment from Pollution. ROPME was seen as an implementation instrument of the Kuwait Convention, and it was thought of as an initial step for region-wide environmental cooperation. As a single-issue organisation, ROPME has largely focused on marine pollution issues, and it helped with the adoption of several accompanying protocols to the Kuwait Convention, namely on pollution from oil and other harmful substances (1978), pollution from the exploration of the continental shelf (1989), pollution from land-based sources (1990), as well as marine movements and the disposal of hazardous waste (1998). No new protocol has been adopted since.

ROPME has advanced environmental cooperation in the Gulf, although the institutional arrangements have not progressed beyond technical cooperation on the issue of marine protection. Most of ROPME's work focuses on promoting joint activities through action plans (lately the 2011–2020 Strategic Plan for Biodiversity). Also, ROPME's Marine Emergency Mutual Aid Centre (MEMAC) in Bahrain, which was established in 1982, aims to combat pollution by oil and other harmful resources. Cooperation through MEMAC can prevent serious incidents. The centre provides technical assistance to ROPME member states

27 Financial Tribune. Desalination Capacity to Reach 650,000 cm/d by 2025. Financial Tribune 2023, 8 January 2023; Available from: <https://financialtribune.com/articles/energy/116780/desalination-capacity-to-reach-650000-cm-d-by-2025#:~:text=%E2%80%9CThe%20plans%20are%20estimated%20to,quoted%20as%20saying%20by%20IRNA> [October 02, 2023].

28 Tehran Times. 75 water desalination plants operating across Iran. Tehran Times 2022, 2 August 2022; Available from: <https://www.tehrantimes.com/news/475292/75-water-desalination-plants-operating-across-Iran> [October 02, 2022].

29 Keynoush. With the Hope Line, Iran aims to boost seawater transfer to fight growing drought.

30 Jones E, Qadir M, van Vliet MTH, Smakhtin V, Kang S-M. The state of desalination and brine production: A global outlook. *Sci Total Environ* 2019;657:1343–56. <https://doi.org/10.1016/j.scitotenv.2018.12.076>

31 Al-Saidi and Saliba. Water, Energy and Food Supply Security in the GCC Countries, 455.

32 France 24. Twilight of the Tigris: Iraq's mighty river drying up 2022, 31 October 2022; Available from: <https://www.france24.com/en/live-news/20221031-twilight-of-the-tigris-iraq-s-mighty-river-drying-up> [September 26, 2022].

and, in exceptional cases, conducts operations to compact pollution incidents. The centre has reacted to incidents in the past, such as the fire on MT *Stolt Valor* in 2012 (no spillage reported) or the oil spill from MT *Desh Shanti* in 2013. In such instances, MEMAC monitors the incidents and coordinates with member states and regional and international private actors that do the actual rescue or clean-up. Its operational mandate also includes capacity building and nonbinding guidelines for member states.

ROPME has promoted the exchange of experiences among Gulf littoral countries through organising encounters on various environmental challenges, including convening scientists and officials on issues beyond its narrow scope on marine protection and pollution issues. For example, ROPME published a comprehensive report on marine climate change impacts. Many of the reviewed impacts have been shown to affect sectors such as power plants, tourism, and desalination.³³ It has also been engaged in partnerships with several international organisations, such as the Regional Seas Programme (RSP) of the United Nations Environment Programme (UNEP) and with nongovernmental organisations (NGOs), including the regional office of the World Wide Fund for Nature (WWF) and regional networks of marine scientists. Many of these partnerships focus on capacity building and studies quantifying risks and action fields. For example, because ROPME is affiliated with the Regional Seas Programme of UNEP, it has received support from UNEP in conducting regional studies and workshops.

Observers of ROPME's work applaud its role in advocating joint action and sustainability in the Gulf. At the same time, they criticise the failure to broaden formal cooperative frameworks to include contemporary challenges related to the management of the Gulf's ecosystems in a more coordinated manner, or to establish comprehensive (that is, longer-term and better-funded) protection measures, including instruments for monitoring and valuation.^{34,35}

It is telling that important protocols from the Convention of Biological Diversity and the Establishment of Protected Areas have been discussed since the early 2000s but have not yet been adopted by the Gulf countries. This demonstrates how political tensions, particularly in the context of Iran's nuclear program and inner rifts among GCC states, have stalled effective environmental cooperation in the Gulf.

With the lack of broad regional frameworks, transboundary cooperation has largely taken place either among GCC states themselves or through occasional encounters facilitated by the membership of Gulf littoral countries in international environmental conventions. The participation of Gulf states in these conventions has proliferated since the late 1970s, with Iraq recently joining many of these agreements as well.³⁶ While conventions on biodiversity and marine pollution have been around for many decades, Gulf states are increasingly interested

33 ROPME. ROPME Marine Climate Change Impacts: Evidence Report; 2020.

34 Al-Saidi. Regional Environmental Cooperation, 813–831.

35 Sale PF, Feary DA, Burt JA, Bauman AG, Cavalcante GH, Drouillard KG et al. The Growing Need for Sustainable Ecological Management of Marine Communities of the Persian Gulf. *AMBIO* 2011;40(1):4–17. <https://doi.org/10.1007/s13280-010-0092-6>

36 Al-Saidi M, Zaidan E, Hammad S. Participation modes and diplomacy of Gulf Cooperation Council (GCC) countries towards the global sustainability agenda. *Development in Practice* 2019;29(5):545–58. <https://doi.org/10.1080/09614524.2019.1597017>

in the full scope of the global sustainability agenda, including issues such as climate change action, renewable energy, and circular economies.^{37,38}

Towards greater regional environmental cooperation

Regional institutions for environmental cooperation, such as ROPME, should be strengthened beyond the technical focus on quantification of the status quo of marine protection. Adopting additional protocols, such as the pending biodiversity protocol with significant commitments on Marine Protected Areas (MPAs) – including transboundary ones – will boost the mandate of ROPME.

Ideas such as marine spatial planning using ecosystem-based management and integrated coastal zone management can be better promoted through ROPME.³⁹ Many of the MPAs in the Gulf are not effective because they do not include marine spatial plans with designed zones and uses.⁴⁰ ROPME's potential is far from being fully exploited in terms of catalysing expertise and participation from the Gulf countries and the international marine research community.⁴¹

Regional environmental cooperation requires bold plans with significant commitments in terms of common targets and funds for marine protection. Such plans are required to better understand the risks facing the Gulf, develop coordinated monitoring systems, connect MPAs, and design restoration measures to sustain marine ecosystems. Some scholars have suggested GCC states to lead the regional efforts to integrate coastal management because of their active role in coastal development – the UAE, for example.⁴² In fact, the GCC states have been the most active users of the Gulf's coasts, and they should contribute more towards protection commitments. As an organisation, the GCC has experience and has established mechanisms to promote biodiversity and protection efforts, such as through the GCC Convention on the Conservation of Wildlife and their Natural Habitats and its follow-up instruments.

37 Al-Saidi et al. Participation modes and diplomacy of Gulf Cooperation Council (GCC) countries towards the global sustainability agenda, 545–58.

38 Al-Saidi M, Das P, Saadaoui I. Circular Economy in Basic Supply: Framing the Approach for the Water and Food Sectors of the Gulf Cooperation Council Countries. *Sustainable Production and Consumption* 2021;27:1273–85. <https://doi.org/10.1016/j.spc.2021.03.004>

39 Burt JA, Ben-Hamadou R, Abdel-Moati MA, Fanning L, Kaitibie S, Al-Jamali F et al. Improving management of future coastal development in Qatar through ecosystem-based management approaches. *Ocean & Coastal Management* 2017;148:171–81. <https://doi.org/10.1016/j.ocecoaman.2017.08.006>

40 van Lavieren H, Klaus R. An effective regional Marine Protected Area network for the ROPME Sea Area: Unrealistic vision or realistic possibility? *Marine Pollution Bulletin* 2013;72(2):389–405. <https://doi.org/10.1016/j.marpolbul.2012.09.004>

41 Sale et al. The Growing Need for Sustainable Ecological Management of Marine Communities of the Persian Gulf, 4–17.

42 Ibid.

There is also a need to expand regional environmental cooperation beyond marine protection. Climate change is a common challenge that requires catalysing regional expertise and data. Some of the climate change issues concerning the marine environment can be mainstreamed within the work of ROPME. In fact, ROPME has a long history of deliberating marine climate change, such as the 1994 climate change report prepared by UNEP and ROPME or the 2020 report. However, climate impacts extend to other sectors, including energy and supply infrastructure.

Regional cooperation can improve knowledge of the regional-level climate impacts. Within the GCC, the idea of establishing a regional climate change centre together with an environmental monitoring centre was agreed upon more than a decade ago, but the centres did not materialise.⁴³ In 2023, Saudi Arabia established a regional climate change centre within its Middle East Green Initiative, although its mandate is not clear yet.⁴⁴ In 2019, the UAE established a regional cooperation centre on climate change for the Middle East, North Africa, and South Asia, but it did not include Iran.

Another collaboration topic is the growing problem of plastic debris. ROPME's activities on this topic have been limited, and there is a need for a regional action plan to tackle land-based waste and to develop clear consumption, prevention, and recycling targets.⁴⁵ Furthermore, the scientific community should be more engaged in regional cooperation efforts to provide necessary advice and facilitate trust among Gulf countries.⁴⁶

In 2023, a coalition of Gulf scientists called for using science diplomacy as a way to build trust, share knowledge, and address common environmental risks facing the Gulf littoral countries.^{47,48} Instead of waiting for formal diplomatic measures or international agreements, peer networks of scientists can lead some projects related to knowledge co-production using multiple case studies, area-based conservation measures, and informing ocean protection strategies. To make this happen, the Gulf scientists have asked for more regional research funding, data sharing, and support for science-policy networks, as well as enhancing the work of ROPME or neutral boundary organisations in catalysing international science diplomacy efforts.^{49,50}

43 Al-Saidi M. Cooperation or competition?

44 Arab News. Saudi Cabinet approves regional center for climate change; 2023. <https://www.arabnews.com/node/2264641/business-economy>

45 Stöfen-O'Brien et al. Marine plastic debris in the Arabian/Persian Gulf.

46 Fieseler CM, Al-Mudaffar Fawzi N, Helmuth B, Leitão A, Al-Ainsi M, Al Mukaimi M et al. Expanding ocean protection and peace: a window for science diplomacy in the Gulf. *Royal Society Open Science* 2023;10(9):230392. <https://doi.org/10.1098/rsos.230392>

47 Fieseler et al. Expanding ocean protection and peace.

48 Fawzi NA-M, Fieseler CM, Helmuth B, Leitão A, Al-Ainsi M, Al Mukaimi M et al. Diplomacy for the world's hottest sea. *Science* 2022;376(6600):1389–90. <https://doi.org/10.1126/science.add1555>

49 Fieseler et al. Expanding ocean protection and peace.

50 Fawzi et al. Diplomacy for the world's hottest sea, 1389–90.

Conclusion

Gulf water is a common environmental resource that requires the regulation of its use to halt deteriorating environmental conditions. Populations of the Gulf states face an environmental predicament caused by the lack of coordinated action on the protection of this unique body of water and ineffective national regulations. The environmental issues of the Gulf should be shielded from political conflicts, which can happen only through strengthening multilateral institutions.

With the increasing complexity of environmental change facing the Gulf, regional environmental cooperation is more important than ever. As regional tensions have seemed to decrease after the restoration of relations between Iran and Saudi Arabia, this opportunity should be used to expand environmental cooperation in the Gulf. This means reinvigorating platforms such as ROPME and encouraging the participation of scientists and non-state actors in regional cooperation frameworks.



Chapter 2

Towards Common and Sustainable Resource Management in the Gulf

Tobias Zumbärgel¹

Abstract

The Gulf is currently at a critical juncture. Fossil fuels have long been the backbone of welfare and economic growth in the region. However, their combustion has led to human-induced greenhouse gas emissions, which are largely responsible for the present climate change effects. These effects are particularly evident among the states of the Gulf Cooperation Council (GCC), Iran and Iraq. The leaders of these countries have come to a common understanding on the necessity of abandoning the burning of fossil fuels, which means that they must undergo a fundamental change in their roles as major suppliers of such resources. Simultaneously, these countries face high vulnerability and increasing impacts of environmental degradation and climate change. These challenges could significantly affect and limit the scope of economic diversification efforts and hinder the implementation of long-term policies towards achieving carbon neutrality. This chapter provides an overview of shared environmental challenges and examines existing environmental cooperation initiatives in the Gulf. Drawing inspiration from concepts of climate, environmental, and resource geopolitics, the chapter emphasises the complex and multi-dimensional environmental interconnections and interdependencies that necessitate greater collective action to address these pressing challenges.

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Introduction

The region that spans West Asia and the Arabian Peninsula – Bahrain, Iraq, Iran, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates (UAE) – is at a critical juncture. Fossil fuels have long been the backbone of the region’s welfare and economic growth, but the combustion of these resources has also caused human-induced greenhouse gas emissions that are largely responsible for climate change. Given the region’s geographic location and arid climatic conditions, the eight countries around the Gulf are witnessing the significantly severe effects of climate change.

As regional and world leaders agree to decrease reliance on fossil fuels, a fundamental change in the Gulf countries’ role as major suppliers of fossil fuels is required. At the same time, the high vulnerability and growing impact of environmental degradation and climate change could considerably affect and limit the scope of economic diversification efforts and impede long-term policies towards carbon neutrality.

Emerging climate, environmental, and resource challenges stress the region’s complex and multi-dimensional environmental interconnections and interdependencies. Environmental issues highlight that a selective spatial focus on the nation-states (for example, in terms of climate security) cannot adequately address the unprecedented challenges posed by new environmental problems in our globalised and “borderless” world.² Consequently, environmental cooperation in the Gulf is needed to tackle the various challenges of climate change, environmental degradation, and sustainable resource management. This chapter provides avenues towards mitigating such threats through coordinated, collective, substantial, and robust climate action among the Gulf countries. This brief first offers an overview of shared environmental challenges and existing environmental cooperation initiatives in the Gulf. It later explores contentious issues related to climate change, which require collaborative efforts from all Gulf states, before concluding with practical policy recommendations.

The status quo of environmental cooperation in the Gulf

The Gulf region has already worked toward a level of regional environmental cooperation. While there is still a need to create new regional frameworks to fight these accelerating problems of climate change, resource scarcity, and environmental degradation, platforms do

2 Noel Castree, “The Geopolitics of Nature,” in *A Companion to Political Geography*, ed. Gerard Toal, C. Cartier, and John Agnew, 2003; Simon Dalby, *Climate Change and Geopolitics*, vol. 1 (Oxford University Press, 2017), <https://doi.org/10.1093/acrefore/9780190228620.013.642>

exist but need to be revitalised and expanded.³ Regional environmental organisations include the Council of Arab Ministers Responsible for the Environment (CAMRE), the Committee on Climate Change within the Gulf Cooperation Council (GCC), and the Regional Organization for the Protection of the Marine Environment (ROPME), among others.⁴

Another example is the Oman-based Middle East Desalination Research Centre (MEDRC), established in 1996. This organisation engages in research and training activities and fosters collaboration on transboundary water initiatives. In 2021, Saudi Arabia created a platform called the Middle East Green Initiative to promote sustainability and climate-specific actions in the region. The Saudi initiative has already put forth several actions, including the establishment of a regional hub for climate change, the creation of a circular carbon economy platform, and the implementation of a regional cloud-seeding programme. Additionally, it suggests the establishment of various regional centres with specific roles, such as early weather warnings, carbon sequestration measures, and the sustainable development of fisheries. Several countries, both within and beyond the Middle East, have endorsed this initiative. However, important neighbouring countries such as Iran have not yet joined the Saudi-led initiative, so questions persist regarding the tangible regional impact. Until today, much remains on a planning and rhetorical level.

ROPME is the only organisation that includes all Gulf states, but the limited degree of cooperation among the regional countries remains a challenge (for more on ROPME, read chapter 1 of this volume).⁵ This can be attributed to historical weaknesses in regional institutions; the absence of clearly defined implementation goals, roles, and monitoring mechanisms; inadequate transparency and accountability in governance activities; a restricted emphasis on mitigation; and an isolated approach within and among institutions.⁶ The central question that arises is whether institutionalisation is a crucial requirement for environmental cooperation in the Gulf.

This question gains significance when considering the case of the unprecedented sand and dust storms (SDS) that affected the Levant and Gulf in May 2022. This incident sheds light on the ability of Middle Eastern states to swiftly respond and forge alliances in the face of urgent challenges. In direct response to the sand and dust storms, Iran, Iraq, Kuwait, and Syria promptly announced a coalition called “sand diplomacy” but implementation of

3 Fatameh Aman, “Finding Common Ground: Fostering Environmental Cooperation in the Persian Gulf” (Middle East Institute, February 4, 2021), <https://www.mei.edu/publications/finding-common-ground-fostering-environmental-cooperation-persian-gulf>; Emma Bentley, “What Could Environmental Cooperation between Iran and the GCC Look Like?” (Middle East Institute, December 10, 2020), <https://www.mei.edu/publications/what-could-environmental-cooperation-between-iran-and-gcc-look>; Cinzia Bianco, “A New Climate for Peace: How Europe Can Promote Environmental Cooperation between the Gulf Arab States and Iran,” Policy Brief (Berlin: European Council on Foreign Relations (ECFR), 2022), <https://ecfr.eu/publication/a-new-climate-for-peace-how-europe-can-promote-environmental-cooperation-between-the-gulf-arab-states-and-iran/>; Tobias Zumbrägel, “Environmental Cooperation in the Gulf Region: Why It Matters and Why It Is Failing,” in *Stepping Away from the Abyss: A Gradual Approach Towards a New Security System in the Persian Gulf*, ed. Luigi Narbone and Abdolrasool Divsallar (European University Institute, 2021), 175–85.

4 Aisha Al-Sarihi and Mari Luomi, *Climate Change Governance and Cooperation in the Arab Region*, EDA Insight (Emirates Diplomatic Academy, 2019). https://www.agda.ac.ae/docs/default-source/Publications/eda-insight_gear-i_climate-change_en_web-v2.pdf

5 Ibid.

6 Al-Sarihi and Luomi, *Climate Change Governance and Cooperation in the Arab Region*.

concrete measures from this initiative is still lacking.⁷ Also in September 2023, Iran organised a specific international summit to the growing threats on SDS.⁸ These examples underscore the importance of prioritising tangible avenues for environmental cooperation instead of engaging in debates about the ideal structure of a regional institutional framework.

The current trend towards increased involvement in regional de-escalation and reconciliation has provided opportunities for informal cooperation. Noteworthy examples include the efforts of Gulf states to mend their relationship with Qatar and the diplomatic normalisation between Iran and Saudi Arabia. Within this context, the subsequent section delves into the potential of environmental cooperation to assume a significant role in driving this positive trajectory.

Shared environmental challenges in the Gulf

Changes in climate can trigger conflict or cooperation across borders in two primary ways: gradual environmental shifts and rapid occurrences of natural hazards. Regions around the world are experiencing more frequent and intense temperature extremes. Many places have witnessed both unprecedented periods of heat and extreme cold. For instance, while countries such as Kuwait and the UAE reached high temperatures exceeding 50°C⁹, Iran has suffered from extremely cold winters when the temperature dropped to -32°C.¹⁰ The seasons are also changing, leading to extended winters and summers that feature exceptionally high or low temperatures. Consequently, the windows for cultivation are shorter, impacting agricultural output and, ultimately, food security. The Gulf region is witnessing more frequent and prolonged droughts, which further exacerbate the pressures in one of the most water-scarce parts of the world. Urban centres in particular are already grappling with increased summertime humidity, surpassing the human-tolerable wet-bulb temperature of 35°C.¹¹

The effects of escalating temperatures are already evident in shared water bodies, including in the Gulf and the Red Sea, such as the formation of “dead zones” where oxygen levels are insufficient to support marine flora and fauna,¹² further contributing to resource scarcity. Additionally, sea-level rise is a prolonged consequence of climate change. Projections suggest that the region might have a sea-level increase of 0.2 to 0.5 metres by the end of the century, posing a threat to the densely populated urban hubs in low-lying coastal

7 Al-Monitor, “Iran, Iraq, Kuwait, Syria embark on sand diplomacy,” *Al-Monitor* (May 2022), <https://www.al-monitor.com/originals/2022/05/iran-iraq-kuwait-syria-embark-sand-diplomacy#ixzz7UkmK9r11>

8 Islamic Republic News Agency, “Iran to host int’l conference on sand, dust storms,” IRNA (September 2023), <https://en.irna.ir/news/85220764/Iran-to-host-int-l-conference-on-sand-dust-storms>

9 Jumana Khamis, “How Gulf nations are responding to the age of record-breaking extreme temperatures,” *Arab News* (July 19, 2023), <https://www.arabnews.com/node/2340131/middle-east>

10 World Meteorological Organization, “Extremely cold winter in the Islamic Republic of Iran” (2008), <https://public.wmo.int/en/media/news-from-members/extremely-cold-winter-islamic-republic-of-iran-0>

11 Jeremy S. Pal and Elfatih A. B. Eltahir, “Future Temperature in Southwest Asia Projected to Exceed a Threshold for Human Adaptability,” *Nature Climate Change*, 2015, <https://doi.org/10.1038/nclimate2833>

12 Glada Lahn and Greg Shapland, “Cascading Climate Risks and Options for Resilience and Adaptation in the Middle East and North Africa” (Chatham House, 2022), 22, <https://www.cascades.eu/publication/cascading-climate-risks-and-options-for-resilience-and-adaptation-in-the-middle-east-and-north-africa/>

areas.¹³ Furthermore, sea-level rise contributes to heightened groundwater salinity, further impeding water security and food production.¹⁴

Natural hazards constitute another threat. Extreme weather such as dust storms, cyclones, and sudden floods occurs more frequently, resulting in the loss of lives and extensive damage to essential infrastructure, as evidenced in Oman, Saudi Arabia, and Yemen.¹⁵ Additionally, the coastal states bordering the Gulf of Aden and Oman face elevated risks from tropical monsoons (for more on extreme weather events in the Gulf, read chapter 3 of this volume).¹⁶

The Gulf region has also experienced more frequent and severe SDS, and a major reason is human-induced climate change, which adds anthropogenic sources to the natural phenomenon (for more on SDS, read chapter 4 of this volume).¹⁷ Excessive dust inflicts significant negative effects on people and ecosystems. They include power outages because of damage to electricity infrastructure, disruptions in water supply because of sand accumulation in irrigation channels, and the disturbance of crucial trade routes and transportation systems, leading to flight cancellations.¹⁸ There are also severe economic implications, as many shops temporarily close during SDS. Clean-up operations further strain the state's budget.

Moreover, these storms have the potential to undermine food security, as the accumulation of sand and dust particles on plant foliage or arable land adversely impacts soil fertility, potentially resulting in soil erosion and the destruction or drying up of wells and streams,

13 Joe Y. Battikh, "Climate Change in the Arab World: How can the region turn its environmental challenges into opportunities?", *Fiker Institute* (2022), <https://fikerinstitute-uploads.s3.eu-west-1.amazonaws.com/wp-content/uploads/2022/12/30111455/ClimateChangeintheArabWorld-FikerInstitute.pdf>

14 Dennis Kumetat, "Climate Change on the Arabian Peninsula: Regional Security, Sustainability Strategies, and Research Needs," in *Climate Change, Human Security and Violent Conflict*, ed. Jürgen Scheffran et al., SpringerLink Bücher (Heidelberg: Springer VS, 2012), 373–86; Mohamed A. Raouf, "Climate Change Threats, Opportunities, and the GCC Countries," *The Middle East Institute Policy Brief*, 2008; Colette C. C. Wabnitz et al., "Climate Change Impacts on Marine Biodiversity, Fisheries and Society in the Arabian Gulf," ed. Maura (Gee) Geraldine Chapman, *PLOS ONE* 13, no. 5 (May 2, 2018): e0194537, <https://doi.org/10.1371/journal.pone.0194537>

15 Khalid Al-Akwa and Tobias Zumbrägel, "The Disaster of Yemen's Flash Floods. Impact of and Local Responses to the Torrential Rains and Flooding in 2020," *CARPO*; Institute of Oriental and Asian Studies University Bonn; Gender Development and Research Center Sana'a University, (2021), <https://carpo-bonn.org/the-disaster-of-yemens-flash-floods-impact-of-and-local-responses-to-the-torrential-rains-and-flooding-in-2020/>; Muhammad Tauhidur Rahman et al., "Vulnerability of Flash Flooding in Riyadh, Saudi Arabia", *Natural Hazards* 84, no. 3 (2016): 1807–30, <https://doi.org/10.1007/s11069-016-2521-8>

16 Kumetat, "Climate Change on the Arabian Peninsula: Regional Security, Sustainability Strategies, and Research Needs"; Raouf, "Climate Change Threats, Opportunities, and the GCC Countries"; Neda A. Zawahri, "The Multidimensional Aspect of Water Security in the Middle East and North Africa," in *Routledge Handbook on Middle East Security*, ed. Anders Jägerskog, Michael Schulz, and Ashok Swain (New York: Routledge, 2019), 168–81.

17 World Bank, "Sand and Dust Storms in the Middle East and North Africa (MENA) Region: Sources, Costs, and Solutions", *World Bank* (2019), <https://www.worldbank.org/en/region/mena/publication/sand-and-dust-storms-in-the-middle-east-and-north-africa-mena-region-sources-costs-and-solutions>

18 *Ibid.*

ultimately diminishing the amount of arable land.¹⁹ Welfare losses because of SDS cost about US\$150 billion and more than 2.5% of the gross domestic product (GDP) on average in the Middle East and North Africa.²⁰

The impacts are not only ecological and economical but also social. During dust and sand storms, the wind carries harmful toxic materials, including pesticides, herbicides, heavy metals, and even radioactive substances. As a result, the dispersed particles can have grave health implications, leading to an escalating death toll. They can trigger skin and eye irritation and harm respiratory passages. Moreover, the presence of dust can make organisms more susceptible to bacterial and fungal infections. Finer particles have the potential to enter the bloodstream, elevating the risk of cardiovascular and respiratory ailments, lung inflammation, and asthma.²¹ These concerns highlight the transboundary threat and the complex challenge posed by the increasing occurrence of larger sand and dust storms.

At the same time, cross-border conflicts and friction over the access and distribution of natural resources have been common among Gulf states, notably around energy resources. Despite the recent reconciliation between Iran and Saudi Arabia, the countries remain divided over the exploitation of the Durra/Arash Gas Field in the north-western Gulf.²² In the past, resource scarcity has also become a political instrument. When several Gulf countries disrupted most of their land, sea, and air traffic routes to Qatar during a blockade in 2017, they also weakened the country's material supply networks, especially its food logistics.²³ Threats by the Iranian regime to close the important trade chokepoint of the strait of Hormuz is another concern.

Water scarcity is an increasing threat in the Gulf, which has an arid and semiarid climate. Increasing demand, poor water management and regulation, pollution, and climate change are exacerbating the situation. Iraqi officials often attribute the country's water scarcity crisis to the water policies of Iran and Turkey. They express concerns that Iran constructs dams that alter the course of rivers that flow across borders, including the Tigris, the Little

19 Ali Al-Dousari, Domenico Doronzo, and Modi Ahmed, "Types, Indications and Impact Evaluation of Sand and Dust Storms Trajectories in the Arabian Gulf," *Sustainability* 9, no. 9 (August 27, 2017): 1526, <https://doi.org/10.3390/su9091526>; Tahereh Maleki et al., "Impact of Dust Storm on Agricultural Production in Iran," *International Journal of Agricultural Science, Research and Technology in Extension and Education Systems* (7, no. 1 (2017): 19–26; A. Pahlavanravi et al., "The Impacts of Different Kinds of Dust Storms in Hot and Dry Climate, A Case Study in Sistan Region," *Desert* 17, no. 1 (June 2012), <https://doi.org/10.22059/jdesert.2012.32007>

20 World Bank, "Sand and Dust Storms in the Middle East and North Africa (MENA) Region: Sources, Costs, and Solutions" *World Bank* (2019), <https://www.worldbank.org/en/region/mena/publication/sand-and-dust-storms-in-the-middle-east-and-north-africa-mena-region-sources-costs-and-solutions>.

21 Seyyed Jamal Aldin Ebrahimi et al., "Effects of Dust Storm Events on Emergency Admissions for Cardiovascular and Respiratory Diseases in Sanandaj, Iran," *Journal of Environmental Health Science and Engineering* 12, no. 1 (December 2014): 110, <https://doi.org/10.1186/s40201-014-0110-x>; Maleki et al., "Impact of Dust Storm on Agricultural Production in Iran."

22 Giorgio Cafiero, "Iran-Arab reconciliation challenged by competing claims to natural gas in the Persian Gulf, Stimson Center," 2023, URL: <https://www.stimson.org/2023/iran-arab-reconciliation-challenged-by-competing-claims-to-natural-gas-in-the-persian-gulf/>

23 Natalie Koch, "Food as a Weapon? The Geopolitics of Food and the Qatar–Gulf Rift," *Security Dialogue* 52, no. 2 (April 2021): 118–34, <https://doi.org/10.1177/0967010620912353>

Zab, and the Diyala.²⁴ A hidden conflict could erupt on the Arabian Peninsula as Saudi Arabia controls and increasingly exploits most of the transboundary aquifers. One vivid example is the ongoing utilisation of the Disi aquifer, which is a shared resource between Jordan and Saudi Arabia. These cross-border underground water reservoirs are finite, and water extraction is occurring at an accelerated rate. Projections indicate that these water reserves could be entirely depleted within the next 15 to 20 years. Such an outcome would result in Amman facing a severe water supply crisis.²⁵

Human-made pollution further reduces the Gulf's limited natural resources. The sale of oil and gas brought economic prosperity and political influence but also resulted in extensive pollution of land, air, and ocean environments. Oil spillages, leakages, sewage discharges, and industrial effluents (especially from the oil-refining and petrochemical industries) contaminate water resources. Dredging and reclamation efforts in coastal areas further increase heavy metal pollution in the Gulf. The proliferation of desalination plants has also led to more CO₂ emissions and pollution through the discharge of brine and other chemicals.²⁶ This exacerbates issues of food security in the region, where all coastal states are already grappling with saltwater intrusion and diminishing fish populations, which in turn has adverse effects on local fishing sectors.²⁷

Avenues for common and sustainable resource management in the Gulf

The shared threats facing the region compel Gulf leaders to work on a common resource pool or network that integrates sustainable management programmes and initiatives. This includes measures of responsible and efficient use of natural resources to meet current needs without compromising the ability of future generations to meet their needs. The comprehensive and long-term approach of sustainable resource management encompasses aspects of (a) resource conservation, (b) waste management, (c) environmental protection, (d) economic development without overexploitation of resources, as well as (e) guaranteeing a fair and equal distribution of natural resources among different social groups and future generations.

24 Bianco, "A New Climate for Peace: How Europe Can Promote Environmental Cooperation between the Gulf Arab States and Iran."

25 M. Müller, M. Müller-Itten and S. Gorelick, "How Jordan and Saudi Arabia are avoiding a tragedy of the commons over shared groundwater", in *Water Resources Research*, volume 53, number 7, July 2018; <https://www.ifri.org/en/publications/etudes-de-lifri/geopolitics-seawater-desalination>, p. 13; D. Kumetat, "Climate Change on the Arabian Peninsula: Regional Security, Sustainability Strategies, and Research Needs", in *Climate Change, Human Security and Violent Conflict*, ed. J. Scheffran, M. Brzoska, H. Brauch and P. Link, Springer 2012, p. 374.

26 A. Ben-Hasan and V. Christensen, "Vulnerability of the Marine Ecosystem to Climate Change Impacts in the Arabian Gulf—an Urgent Need for More Research," *Global Ecology and Conservation* 17 (January 2019): e00556, <https://doi.org/10.1016/j.gecco.2019.e00556>; Mohamed A. Dawoud, "Environmental Impacts of Seawater Desalination: Arabian Gulf Case Study," *International Journal of Environment and Sustainability* 1, no. 3 (August 5, 2012), <https://doi.org/10.24102/ijes.v1i3.96>; Gökçe Günel, "The Infinity of Water: Climate Change Adaptation in the Arabian Peninsula," *Public Culture* 28, no. 2 79 (2016): 291–315, <https://doi.org/10.1215/08992363-3427463>.

27 Waleed Hamza and Mohiuddin Munawar, "Protecting and Managing the Arabian Gulf: Past, Present and Future," *Aquatic Ecosystem Health & Management* 12, no. 4 (November 30, 2009): 429–39, <https://doi.org/10.1080/14634980903361580>

The GCC has already initiated legislation to better protect and conserve natural resources,²⁸ but comprehensive plans need to include Iran and Iraq as well. Considering the interconnectedness of ecosystems and communities in the region, policy coordination and cooperation should aim to manage the natural resources in a manner that is environmentally, socially, and economically sustainable.

Littoral states of the Gulf should work on frameworks that protect the natural resources of the region, including better regulation and monitoring systems for industrial pollution and resource extraction. Standardised environmental impact assessments should be mandatory for new construction projects. More efficient and cleaner desalination plants are already planned in some areas; however, it must be ensured that all states have access to improved technologies that lower the plants' emissions and brine discharge.

The transition to clean energy offers new opportunities for collaboration. The UAE and Saudi Arabia have established themselves as key suppliers of low-carbon energy, and their local companies such as Masdar Power and ACWA Power are big investors and operators of renewable energy plants inside and outside the Gulf.²⁹ The technological expertise and know-how could also help transform other countries in the region. Both companies have already pioneered renewable energy projects in Oman, and Masdar Power plans to build multiple solar projects in Iraq. These promising signs of clean technology transfer and development should be expanded to facilitate more cooperation and exchange among more regional countries. In the Iranian region of Khuzestan, the UAE is already developing a solar project with a capacity of 300 MW.³⁰ This is a promising sign of how frontrunners in the clean energy transition can assist nearby countries (for more on the energy transition in the Gulf, read chapter 5 of this volume). However, ongoing sanctions against Iran might inhibit further meaningful clean energy cooperation efforts.

The growth of renewable energy will lead to a heightened reliance on resources for constructing the necessary infrastructure, such as solar photovoltaic panels and wind turbines, necessitating specialised production and access to rare earth elements. The manufacturing and trade of these elements could yield substantial economic gains, potentially influencing the formation of domestic institutions in a manner similar to the impact of the oil and gas industry. For example, lithium is a vital element in lithium-ion batteries, which are essential for the majority of electric vehicles, portable gadgets, and renewable energy storage setups. Given the increasing need for electric vehicles and renewable energy sources, the acquisition of lithium has gained strategic significance for countries that aspire to wield substantial influence in the realm of green energy transformation.

28 GCC official homepage, Cooperation in the field of Human and Environment Affairs, URL: <https://www.gcc-sg.org/en-us/CooperationAndAchievements/Achievements/CooperationinthefieldofHumanandEnvironmentAffairs/Pages/EnvironmentalCooperation.aspx>

29 Official website of Masdar, <https://masdar.ae/>; Official website ACWA Power, <https://acwapower.com>

30 Press TV, "UAE to build 300 MW power projects in Iran's Khuzestan", December 8, 2022, <https://www.presstv.ir/Detail/2021/12/08/672236/Iran-renewables-power-plant-UAE-Khuzestan>

Vast lithium deposits were discovered in Iran in March, which might substantially change the supply chains and geopolitics of renewable energy in the region.³¹ Saudi Arabia has also established plans to further expand its mining of key minerals, such as lithium, aluminium, and cobalt.³² It is widely believed that the region is rich in critical minerals that are expected to be in greater demand in light of a low-carbon transition. If the Gulf states succeed in establishing a unified mineral production market, they could achieve greater sovereignty and reduce dependence on other dominant players, such as China, which currently controls the global value chain.³³

At the same time, a one-sided focus on technological fixes could also increase problems. For instance, cloud-seeding initiatives could considerably affect weather patterns and variability. In the worst cases, it can even increase droughts in other places. At present, there is simply too little knowledge about the potential consequences if humanity intervenes too strongly in nature. It once more shows that sustainability transformation and climate action are complex issues and require a comprehensive, coordinated, and collective assessment. To avoid negative side effects, countries should transparently disclose their sustainable development plans concerning the attainability, progress, and forthcoming trajectories and closely coordinate them with other countries in geographic proximity. In addition, climate governance in the region needs a more inclusive approach that also considers various stakeholders beyond the elite level. The needs and demands of civil society actors, local communities, and vulnerable and marginalised groups need to be considered also.

Policy recommendations

The shared environmental challenges discussed above illustrate the significance of neighbouring countries collaborating closely. Both slow-onset climate change and short-period natural hazards reveal the transnational interdependence and need of urgent joint action. Considering their mutual interests in collaborating on environmental issues, countries in this region need to take advantage of existing platforms to engage in bilateral and multilateral climate efforts. Based on the aforementioned challenges shared across the region, this chapter provides the following policy recommendations to expand environmental cooperation among the Gulf states:

31 Zhang, Marina Yue, "Iran's lithium lode: A potential strategic game-changer," *The Interpreter* (2023) URL: <https://www.lowyinstitute.org/the-interpreter/iran-s-lithium-lode-potential-strategic-game-changer>

32 Al-Mudaifer, Khalid Saleh, "Mining: Building the Third Pillar of Industry in Saudi Arabia," *Al Arabiya English* (2021), URL: <https://english.alarabiya.net/views/2021/06/30/Mining-Building-the-third-pillar-of-industry-in-Saudi-Arabia>

33 Mills, Robin, "Why it might be time to create the Opec model for mineral producers," *The National* (2023), URL: <https://www.thenationalnews.com/business/comment/2023/09/04/why-it-might-be-time-to-create-the-opec-model-for-mineral-producers/>

Regional climate hub

It is important to strengthen an existing regional centre for natural hazards to act as a key hub to collect relevant and up-to-date information on natural risks and coordinate among the countries. This could be through the Saudi-led Middle East Initiative, but it needs to be inclusive of Iran and Iraq as well. There is a need to enhance the availability of widely used monitoring tools, coupled with increased collaboration among research institutions and universities. The hub can help countries embrace remote sensing technologies such as satellite systems and drones, along with implementing Geographic Information System (GIS) technology for mapping and observing environmental shifts. Moreover, through such a hub, installing cross-border early warning measures and assessment systems against natural hazards such as flash floods or SDS could be explored.

Regional resource management

The creation of a regional resource pool or platform to facilitate collaboration and information sharing in terms of sustainable practices for resource extraction, usage, and management is essential. The proposed hub, comprising diverse stakeholders from the government, private sector, civil society, academia, and local communities, should be designed with three primary objectives in mind. Firstly, it should aim to collect data concerning the region's resources. Secondly, it should focus on developing solutions for the environmentally and socially responsible extraction of these resources. This is particularly vital for raw materials that are presently abundant in the region and play a pivotal role in the promotion of low-carbon development. Thirdly, the platform should promote closer cooperation among neighbouring states.

Policy coordination

Gulf state governments should harmonise their national and regional policies to establish a coordinated strategy for addressing climate change, including emissions reduction targets and regulations. Establishing a regional carbon market with different price levels that consider the respective prosperity of the country to facilitate emission trading and encourage carbon-reduction initiatives would send a significant message.

Climate financing

A serious challenge is the uneven distribution of wealth among Gulf states. The creation of a specific climate fund dedicated to reconstruction efforts following natural disasters and the development of climate-friendly and climate-resilient solutions should be designed. The fund's financing could be proportionally linked to the income derived from the sale of oil and

gas in each country. A key role could be attributed to the Islamic Development Bank, which is already now increasingly financing climate-related projects.

Natural habitat protection

The environmental ministries of each Gulf country should collaborate on efforts to conserve and rehabilitate natural habitats such as mangroves and coral reefs. These habitats play a crucial role in mitigating the effects of rising sea levels and in promoting biodiversity. Collaborative planning enhances resilience to climate-related challenges, including extreme weather events and sea-level rise, and ensures water conservation in the Gulf and other areas. Revitalising the activities and the role of ROPME is of the utmost importance to attain these objectives.

Capacity building

Financial support alone is not sufficient. Financially and technologically well-endowed countries, such as Saudi Arabia, Qatar, and the UAE, should take more proactive steps in aiding neighbouring countries in their pursuit of sustainability. Expanding the export of climate-friendly solutions, such as cleaner and more efficient energy and desalination technologies, as already initiated by companies such as ACWA Power and Masdar Power, should be prioritised.

Knowledge generation and dissemination

Facilitating collaboration among diverse national research centres, institutions, and universities engaged in climate change research is required. Sharing climate data and research to enhance knowledge of regional climate patterns and formulate effective mitigation strategies is imperative, as is joint action in innovative technologies for carbon sequestration, energy efficiency, and sustainable agriculture. To initiate this knowledge exchange, diverse stakeholders should organise a series of workshops that address region-specific climate challenges.

Public awareness

Climate governance in the Gulf states has been marked by a top-down, state-led approach, but developing public awareness and education of climate change and the significance of sustainable practices are crucial components of effective climate action. Climate

organisations, activists, and youth associations should aim to enhance their collaboration beyond national boundaries, using platforms such as social media to do so.

Conclusion

In the past few decades, the Gulf region's identity revolved around ensuring the stability of regimes and safeguarding national sovereignty and territorial integrity against external threats while ensuring a steady flow of oil and gas exports. Significant geopolitical changes, including the three Gulf Wars, the establishment of the GCC as an anti-Iran coalition, and recent internal conflicts within the GCC, have had adverse repercussions on cooperative endeavours concerning regional environmental governance. All Gulf states face high vulnerability and the increasing impacts of environmental degradation and climate change. These challenges could significantly affect and limit the scope of economic diversification efforts and hinder the implementation of long-term policies towards achieving carbon neutrality.

However, the last few years in particular have shown promising signs of overcoming these deeply entrenched geopolitical dynamics of conflict and competition. Countries have disclosed ambitious targets to achieve climate goals committed to in the Paris Agreement. The intertwined challenges and effects of climate change, environmental degradation, and resource scarcity make it a difficult task, but promising solutions are being developed. However, national policy alone does not offer sufficient solutions. Transboundary climate challenges and risks demand joint efforts and full support of all countries surrounding the Gulf.

Stakeholders including institutions, private companies, universities, and scientific institutes could start joint programmes and initiatives to foster environmental cooperation in the region. Guiding topics include the integration of climate research and economic and social-scientific disciplines to better assess human-nature relationships and their effects. Developing more advanced technologies to fix some of the problems is as important as clearer policies and procedures in terms of sustainable resource management in the region.

To achieve a just and comprehensive approach, it must be ensured that sanctioned countries, such as Iran, and conflict-prone countries, such as Iraq, receive more support and assistance so that they can also achieve their sustainable development goals while also contributing to regional environmental security. The climate summit in the UAE (COP28) is an excellent opportunity to raise and address some of the following points mentioned here. A robust and collective response from the Gulf states to address the severe effects of the looming climate crisis would be a strong signal from the region that it has overcome its past frictions.



Chapter 3

Joint Efforts to Combat Extreme Weather Events in the Gulf

Said Al-Sarmi¹ and Suad Al-Manji²

Abstract

The Gulf region is increasingly vulnerable to the frequency and intensity of extreme weather events, a trend that has become more apparent over the past two decades. This chapter emphasises the critical need for an enhanced, interconnected regional approach to bolster early warning systems and climate resilience. Building on existing infrastructure, the focus is on fortifying these early warning centres through collaborative research initiatives and shared funding mechanisms, all of which should be underpinned by transparency and mutual trust. Practical actions such as improving disaster preparedness, developing a regional risk registry, and the swift implementation of cooperative plans are identified as crucial. These steps are not only aimed at mitigating the immediate impacts of extreme weather events but also at fostering a sustainable and resilient future for the region.

Introduction

The Arabian Peninsula (AP) and its surrounding regions, encompassing the Gulf Cooperation Council (GCC) states as well as neighbouring Iran, Iraq, and Yemen, are confronting an escalating trend in extreme weather events.³ These events have increased in frequency

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3 Alsarmi, S.H., and R. Washington. 2014. "Changes in Climate Extremes in the Arabian Peninsula: Analysis of Daily Data." *International Journal of Climatology* 34 (5). <https://doi.org/10.1002/joc.3772>

and also have intensified in severity over the last two decades.⁴ Concern about intensified climate change extremes and their consequences is increasing. With its dry climate, extreme temperatures, limited seasonal rainfall, and vast expanse of desert, the Gulf region is susceptible to multiple climatic hazards, which can be seen in cycles of droughts, heatwaves, flash floods, sand and dust storms (SDS), and cyclones.⁵ Extreme weather events such as cyclones and SDS have increased in frequency and intensity over the period in question. Notable cyclones of the past two decades include Guno (2007), Chapala (2015), Sagar (2018), Gati (2020), and Shaheen (2021).⁶

There has been a notable shift in climate extremes in the region, particularly since the climate jump of 1998,⁷ which marked a significant and abrupt change in the Arabian Peninsula's climate. The region saw a 1-degree Celsius temperature rise and a 30-millimetre decrease in rainfall, trends that have persisted. This shift is considered a strong indicator of ongoing climate change in the region. Since then, cold temperature extremes have been decreasing, while warm temperature extremes are on the rise, especially in the northern regions during the daytime and in the southern regions at night.⁸ Additionally, although overall precipitation is declining, the frequency of extreme rainfall events is showing an upward trend,⁹ suggesting the need for targeted climate resilience measures. There are also distinct weather patterns between the monsoonal areas of Oman and Yemen, and the non-monsoonal areas which encompass the rest of the region.¹⁰

In light of these challenges, this chapter aims to thoroughly investigate the factors contributing to the rise in extreme weather events in the Gulf region. We argue that enhanced regional cooperation is indispensable to effectively tackling the complex impacts of these climatic phenomena. The chapter therefore explores specific policy objectives tailored to the regional context, pinpointing concrete and actionable initiatives where collaboration

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- 4 IPCC, 2021: Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Masson-Delmotte, V., P. Zhai, A. Pirani, S.L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M.I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J.B.R. Matthews, T.K. Maycock, T. Waterfield, O. Yelekçi, R. Yu, and B. Zhou (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, 2391 pp. <https://doi.org/10.1017/9781009157896>
- 5 Zittis, George, Panos Hadjinicolaou, Mansour Almazroui, Edoardo Bucchignani, Fatima Driouech, Khalid El Rhaz, Levent Kurnaz, et al. 2021. "Business-as-Usual Will Lead to Super and Ultra-Extreme Heatwaves in the Middle East and North Africa." *npj Climate and Atmospheric Science* 4 (1). <https://doi.org/10.1038/s41612-021-00178-7>; Zittis, G., M. Almazroui, P. Alpert, P. Ciais, W. Cramer, Y. Dahdal, M. Fnais, et al. 2022. "Climate Change and Weather Extremes in the Eastern Mediterranean and Middle East." *Reviews of Geophysics* 60 (3). <https://doi.org/10.1029/2021RG000762>
- 6 Al-Sarihi, A. 2022. "Cop27 and Climate Action in the Middle East." *Insights* 290: 82-93. [Insights: COP 27 and Climate Action in the Middle East - NUS - Middle East Institute](https://doi.org/10.1007/978-98-99-10-000-0_5)
- 7 AlSarmi, S.H., and R. Washington. 2011. "Recent Observed Climate Change over the Arabian Peninsula." *Journal of Geophysical Research Atmospheres* 116 (11). <https://doi.org/10.1029/2010JD015459>; AlSarmi, S.H., and R. Washington. 2014. "Changes in Climate Extremes in the Arabian Peninsula: Analysis of Daily Data." *International Journal of Climatology* 34 (5). <https://doi.org/10.1002/joc.3772>
- 8 Ibid.
- 9 Almazroui, Mansour. 2020. "Changes in Temperature Trends and Extremes over Saudi Arabia for the Period 1978-2019." *Advances in Meteorology* 2020. <https://doi.org/10.1155/2020/8828421>
- 10 AlSarmi, S., and R. Washington. 2011. "Recent Observed Climate Change over the Arabian Peninsula." *Journal of Geophysical Research Atmospheres* 116 (11). <https://doi.org/10.1029/2010JD015459>

can make a significant impact, laying the groundwork for a sustainable and resilient future.¹¹ Drawing upon examples of successful environmental coordination from other regions, we offer insights into the potential advantages of more robust inter-governmental, non-governmental, and international partnerships. These initiatives, including enhancing interconnected early warning systems, collaborative research, and shared funding strategies, are aimed at bolstering the region's climate resilience.

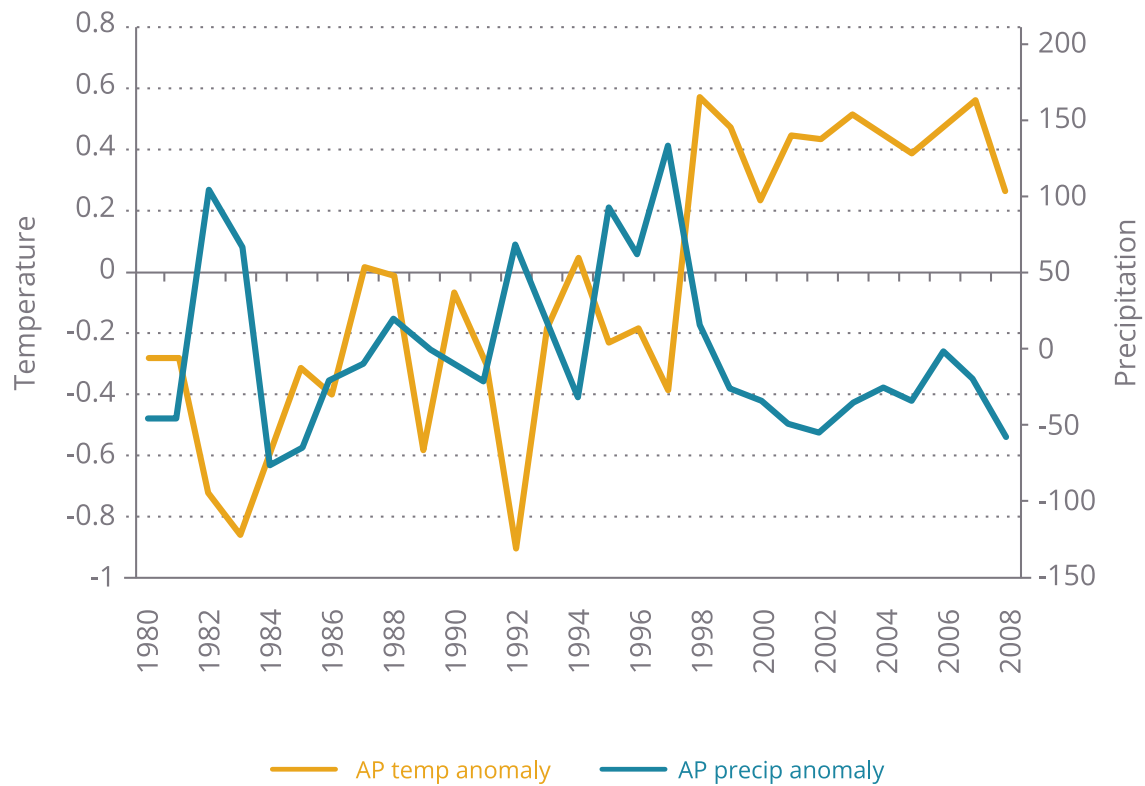
Varying extreme weather events in the Gulf: A need for regional coordination and cooperation

The increasing frequency and intensity of climate change extremes are raising serious concerns. The Gulf countries are especially vulnerable to these climate shifts, given their arid conditions, extreme heat, scarce rainfall, and vast desert terrains.¹² The region is experiencing a rate of warming that exceeds the global average.¹³ The climate jump of 1998 is a crucial turning point in the climate patterns of the region, as evidenced by both global datasets and local observations from the GCC meteorological stations. As shown in Figure 1, since 1998, there has been a persistent trend of reduced precipitation coupled with increased temperatures in the region.

Figure 1 is derived from data collected from GCC meteorological stations. It clearly illustrates the climate shift around 1998, and simultaneously shows both temperature and precipitation variability. Scientifically, this synchrony between decreasing rainfall and rising temperature signifies an accelerated aridification process. Less rainfall exacerbates soil dryness, leading to higher surface temperatures, which further intensifies dry conditions in a feedback loop. The impacts of this climate shift are wide-ranging: increased stress on agriculture due to reduced water availability, challenges to water resources, and heightened public health risks from heatwaves and SDS. While the graph does not include data on Iran and Iraq, the southern parts of both countries are facing similar patterns.

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- 11 Alotaibi, Bader Alhafi, Mirza Barjees Baig, Mohamed M.M. Najim, Ashfaq Ahmad Shah, and Yosef A. Alamri. 2023. "Water Scarcity Management to Ensure Food Scarcity through Sustainable Water Resources Management in Saudi Arabia." *Sustainability (Switzerland)* 15 (13). <https://doi.org/10.3390/su151310648>; Almazroui, Mansour. 2019. "Assessment of Meteorological Droughts over Saudi Arabia Using Surface Rainfall Observations during the Period 1978–2017." *Arabian Journal of Geosciences* 12 (22). <https://doi.org/10.1007/s12517-019-4866-2>
- 12 Zittis, George, Panos Hadjinicolaou, Mansour Almazroui, Edoardo Bucchignani, Fatima Driouech, Khalid El Rhaz, Levent Kurnaz, et al. 2021. "Business-as-Usual Will Lead to Super and Ultra-Extreme Heatwaves in the Middle East and North Africa." *npj Climate and Atmospheric Science* 4 (1). <https://doi.org/10.1038/s41612-021-00178-7>; Zittis, G., M. Almazroui, P. Alpert, P. Ciais, W. Cramer, Y. Dahdal, M. Fnais, et al. 2022. "Climate Change and Weather Extremes in the Eastern Mediterranean and Middle East." *Reviews of Geophysics* 60 (3). <https://doi.org/10.1029/2021RG000762>
- 13 Zittis, G., M. Almazroui, P. Alpert, P. Ciais, W. Cramer, Y. Dahdal, M. Fnais, et al. 2022. "Climate Change and Weather Extremes in the Eastern Mediterranean and Middle East." *Reviews of Geophysics* 60 (3). <https://doi.org/10.1029/2021RG000762>

Figure 1: GCC annual mean temperature (red) and annual precipitation anomalies (1980–2008).¹⁴
AP: Arabian Peninsula



In addition to the climate shift of 1998, there are notable variations in climate change impacts between the non-monsoonal and monsoonal regions of the GCC. Aside from Oman and Yemen, the rest of the region has seen a concerning decrease in precipitation and rise in daytime temperatures.¹⁵ The increasing frequency of SDS,^{16,17} particularly in the spring months, compounds these challenges (for more on SDS, read chapter 4 of this volume). Sand and dust storms, generated with fine-grained materials such as loess,¹⁸ alluvium, silt,

14 Alsarmi, S., and R. Washington. 2011. "Recent Observed Climate Change over the Arabian Peninsula." *Journal of Geophysical Research Atmospheres* 116 (11). <https://doi.org/10.1029/2010JD015459>

15 Almazroui, Mansour, M. Nazrul Islam, Ramzah Dambul, and P.D. Jones. 2014. "Trends of Temperature Extremes in Saudi Arabia." *International Journal of Climatology* 34 (3): 808–26. <https://doi.org/https://doi.org/10.1002/joc.3722>

16 Deshpande, Medha, Vineet Kumar Singh, Mano Kranthi Ganadhi, M.K. Roxy, R. Emmanuel, and Umesh Kumar. 2021. "Changing Status of Tropical Cyclones over the North Indian Ocean." *Climate Dynamics* 57 (11–12): 3545–67. <https://doi.org/10.1007/s00382-021-05880-z>

17 Alobaidi, Meshari, Mansour Almazroui, Abdulwahab Mashat, and Philip Douglas Jones. 2017. "Arabian Peninsula Wet Season Dust Storm Distribution: Regionalization and Trends Analysis (1983–2013)." *International Journal of Climatology* 37 (3): 1356–73. <https://doi.org/https://doi.org/10.1002/joc.4782>

18 Al-Maamary, H. M., H.A. Kazem, and M.T. Chaichan. 2017. "Climate change: the game changer in the Gulf Cooperation Council Region." *Renewable and Sustainable Energy Reviews* 76: 555–576. <https://doi.org/10.1016/j.rser.2017.03.048>

clay, and other outwash sediments, typically peak between May and August, exacerbated by daytime solar radiation.¹⁹

In contrast, the monsoonal areas of the Gulf have experienced a significant uptick in the frequency and intensity of tropical cyclones, particularly those in categories 4 and 5.²⁰ Evan and Camargo's 2011 findings indicate a marked rise in such cyclonic events during May, June, and November in recent decades.²¹ The Intergovernmental Panel on Climate Change (IPCC) AR6 report also confirms that climate change critically increases the intensity of global weather extremes such as tropical cyclones.²² Southern and eastern parts of the Arabian Peninsula are expected to experience more intense extreme precipitation events by the end of the 21st century.²³ At the same time, night-time temperatures in Oman and Yemen, especially in coastal areas, are reaching alarming levels, often exceeding 35°C to 40°C, creating substantial stress and threatening human survival.²⁴

Rising temperatures and diminished rainfall in Oman have led to water shortages and declining soil fertility, adversely affecting agricultural yields.²⁵ Al-Manji and Watson have recorded stories about the impact of prolonged drought on agriculture, both farming and animal grazing.²⁶ An elderly woman in Oman, for instance, explains the effect of prolonged drought on her animals: "I lost tens of goats because there was no rain for a long time. We moved from one place to another looking for water and graze for the animals, then a disease spread between the goats and they died due to weakness."²⁷

Conversely, the escalation in the intensity of cyclones has resulted in widespread flooding and soil erosion, severely hampering farming activities. Cyclone Shaheen, as an example, caused significant losses for farmers in northern Oman in 2021, including the destruction of hundreds of trees and livestock. In a comparable vein, Yemen faced substantial losses when

19 Middleton, N. J. 1986. "A geography of dust storms in South-west Asia." *Journal of Climatology* 6 (2): 183-196. <https://doi.org/10.1002/joc.3370060207>

20 IPCC, 2021: Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Masson-Delmotte, V., P. Zhai, A. Pirani, S.L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M.I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J.B.R. Matthews, T.K. Maycock, T. Waterfield, O. Yelekçi, R. Yu, and B. Zhou (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, 2391 pp. <https://doi.org/10.1017/9781009157896>

21 Evan A.T. and S.J. Camargo. 2011. "A climatology of Arabian Sea cyclonic storms." *Journal of Climate* 24 (1): 140-158. <https://doi.org/10.1175/2010JCLI3611.1>

22 Faranda, D., S. Bourdin, M. Ginesta, M. Krouma, R. Noyelle, F. Pons, and G. Messori. 2022. "A climate-change attribution retrospective of some impactful weather extremes of 2021." *Weather and Climate Dynamics* 3 (4): 1311-1340. <https://doi.org/10.5194/wcd-3-1311-2022>

23 Almazroui, Mansour. 2020. "Changes in Temperature Trends and Extremes over Saudi Arabia for the Period 1978-2019." *Advances in Meteorology* 2020. <https://doi.org/10.1155/2020/8828421>

24 Ntoumos, Athanasios, Panos Hadjinicolaou, George Zittis, Yiannis Proestos, and Jos Lelieveld. 2022. "Projected Air Temperature Extremes and Maximum Heat Conditions Over the Middle-East-North Africa (MENA) Region." *Earth Systems and Environment* 6 (2): 343-59. <https://doi.org/10.1007/s41748-022-00297-y>

25 Al-Manji, S., and J.C. Watson. 2022. "Climatic Disasters and Stories of Resilience in Southern and Northern Oman." *Language and Ecology in Southern and Eastern Arabia* 213. [A-Botanical-and-Etymological-Approach-to-Plant-Names-in-Southern-Arabia.pdf \(researchgate.net\)](https://doi.org/10.1017/9781009157896)

26 Ibid.

27 Ibid.

Cyclone Chapala in 2015 decimated hundreds of fishing boats in Hadramout.²⁸ Early flood warning systems, particularly in areas prone to flash floods and lacking ground observatories, can be crucial to this cooperation. The Gulf states need to develop these further to reduce the impact of the flood risk, especially in urban areas where the risk is greater.

The damage caused by extreme weather events can be significant. For example, tropical cyclones in Oman and Yemen caused massive damage to the infrastructure, estimated at millions of Omani Rials. Cyclone Mekuno, in May 2018, inflicted considerable damage on both Oman and Yemen, with estimated costs reaching 1.5 billion.²⁹ Tropical Cyclone Shaheen, in 2021, has already been mentioned for its impact on farmers – it also had a significant impact on Oman’s infrastructure, damaging nearly 1,000 homes and resulting in losses estimated at US\$500 million by the Ministry of Finance.³⁰ In a single week in 2015, Yemen was hit by two super cyclones, Chapala and Megh. These storms caused extensive damage to infrastructure and buildings.³¹ Chapala laid waste to Socotra’s main airport and destroyed hundreds of homes across Yemen. The other Gulf states rarely face this kind of havoc.

Given the stark differences in climate impacts across the region, targeted strategies are essential. Focusing on water management and urban planning for the non-monsoonal countries can mitigate the effects of reduced precipitation and higher temperatures. Roads, bridges, and buildings in the north need to be designed for resilience against SDS, which can affect visibility, air quality, and structural integrity. In contrast, the monsoonal countries demand a concerted focus on disaster preparedness and mitigation. Coastal and inland infrastructure must be built with the capability to withstand the powerful winds and heavy rainfall associated with tropical cyclones. Sharing knowledge, technical expertise, and resources in infrastructure planning and design can greatly benefit all Gulf countries as they seek to address these diverse challenges.

The implications of these climate extremes are not confined within individual country borders; they have transboundary impacts. In light of this bleak situation across the Gulf region, regional cooperation becomes imperative, especially when such extreme weather events exceed the Safe Wet-Bulb Globe Temperature (SWBGT) limit,³² leading to human health-related casualties. The wealthier Gulf states, such as Qatar, Kuwait, Saudi Arabia, and the UAE, may possess advanced infrastructure to mitigate climate risks, but are not immune to the far-reaching impacts of extreme weather. Conversely, Oman and Yemen, as well as

28 “Yemen: Cyclone Chapala Flash Update 2 | 4 November 2015.” United Nations Office for the Coordination of Humanitarian Affairs. Retrieved 20 Sep 2023, from <https://reliefweb.int/report/yemen/yemen-cyclone-chapala-flash-update-2-4-november-2015>

29 Al-Manji, S. 2022. “Building Resilience to Extreme Weather Events in Oman.” *INSIGHTS* 290: 82-93. [Insights: COP 27 and Climate Action in the Middle East – NUS – Middle East Institute](https://doi.org/10.1007/s41748-022-00297-y)

30 Ibid.

31 “Yemen: Cyclone Chapala Flash Update 2 | 4 November 2015.” United Nations Office for the Coordination of Humanitarian Affairs. Retrieved 20 Sep 2023, from <https://reliefweb.int/report/yemen/yemen-cyclone-chapala-flash-update-2-4-november-2015>

32 Ntoumos, Athanasios, Panos Hadjinicolaou, George Zittis, Yiannis Proestos, and Jos Lelieveld. 2022. “Projected Air Temperature Extremes and Maximum Heat Conditions Over the Middle-East-North Africa (MENA) Region.” *Earth Systems and Environment* 6 (2): 343-59. <https://doi.org/10.1007/s41748-022-00297-y>

Iran and Iraq, face increased vulnerability due to fewer resources. Sharing expertise and best practices can offer a holistic approach to resilience.

Current regional initiatives and their limitations

Regional countries, with an understanding of the importance of collaborative efforts, have actively sought measures to respond to the adverse effects of extreme weather events in recent years. The GCC states have taken commendable strides. The GCC has established crucial institutions such as the Permanent Committee for Meteorology and Climatology (PCMC),³³ the GCC Centre for Disaster Management,³⁴ and the Gulf Marine Centre in Qatar.³⁵ Saudi Arabia has also initiated the establishment of a regional sand and dust storm centre³⁶ and a regional climate change centre.³⁷ Oman also hosts the 7th global Centre of Excellence for Meteorological Satellite Applications,³⁸ which trains specialists in meteorology sciences in the Sultanate, Gulf countries and the Middle East on modern methods of satellite applications and tracking of weather conditions.

The PCMC has played an essential role in combating extreme weather events. Among its significant accomplishments are integrating weather radars across the Gulf region³⁹ and synchronising earthquake stations, albeit without the inclusion of Iran and Iraq. Five subcommittees under its jurisdiction address various aspects of the issue, including strategy and policy, media services, early warning and disaster reduction, development and scientific research, and observing systems and communication facets. The Committee has formulated a five-year strategic and operational plan for 2021-2025 to strengthen its strategy further.

Moreover, the PCMC is also seeking international collaboration. For example, it has been formulating a Memorandum of Understanding (MoU) with the China Meteorological Agency (CMA) for many years. The Committee has also renewed its MoU with the World Meteorological Organisation (WMO) for a second term. These international collaborations

33 Permanent Committee for Meteorology and Climatology. Retrieved 2023, from <https://www.gccmet.net/#radar/gcc>

34 About GCC, Organizational Structure. Retrieved 2023, from <https://www.gcc-sg.org/ar-sa/AboutGCC/Pages/OrganizationalStructure.aspx>

35 WMO. 2016. "Gulf Marine Center GMC of Qatar Meteorology Department kicked of its Marine Meteorological (MMS) & GMDSS related services." August 1, 2016. Retrieved 2023, from <https://public.wmo.int/en/media/news-from-members/gulf-marine-center-gmc-of-qatar-meteorology-department-kicked-of-its-marine>

36 "WMO gives accreditation to Saudi Arabia's Sand and Dust Storm Warning Regional Center." July 9, 2023. *Saudi Gazette*. Retrieved 2023, from <https://www.saudigazette.com.sa/article/634084/SAUDI-ARABIA/WMO-gives-accreditation-to-Saudi-Arabias-Sand-and-Dust-Storm-Warning-Regional-Center>

37 "Saudi Cabinet approves regional center for climate change." March 8, 2023. *Arab News*. Retrieved 2023, from <https://www.arabnews.com/node/2264641/business-economy>

38 Centre of Excellence for Satellite Applications-Muscat. Retrieved 2023, from <https://wmo-sat.info/vlab/oman/>

39 WMO. 2016. "Gulf Marine Center GMC of Qatar Meteorology Department kicked of its Marine Meteorological (MMS) & GMDSS related services." August 1, 2016. Retrieved 2023, from <https://public.wmo.int/en/media/news-from-members/gulf-marine-center-gmc-of-qatar-meteorology-department-kicked-of-its-marine>

are designed to foster the sharing of knowledge, expertise, and best practices, thus enriching the region's capacity to deal with extreme weather events.

Apart from the Committee, the GCC Centre for Disaster Management's role is to assist any member country in responding to natural or human-made disasters, promoting unity and shared resources during crises. Additionally, the Gulf Marine Centre in Qatar, recognised by the WMO as a regional entity, plays a significant role in maritime safety by providing marine weather forecasts and warnings for the Gulf and the Northern Arabian Sea. In line with these efforts, the GCC Climate Outlook Forum, collaborating closely with the League of Arab States, WMO, and United Nations Economic and Social Commission for Western Asia (ESCWA), convenes biannually to produce regional seasonal forecasts for both winter and summer.

However, despite these considerable strides, the region's approach to extreme weather events has limitations and challenges. There is often a disconnect between the conception of policies and their execution. This gap is particularly noticeable in the GCC climate change monitoring project initiated in 2018 but is still under discussion without concrete implementation. Moreover, the lack of a dedicated budget for projects, human resource limitations, and cooperation issues often undermine the efficiency of these institutions and initiatives. There are also validity concerns with some centres operating regionally but lacking approval from the WMO. This lack of recognition can pose challenges to their operations and effectiveness.

The limited awareness of and engagement with the region's climate projects from local communities pose significant obstacles to their effectiveness and relevance. When policies are formulated without grassroots input, there is a risk they will not align with the real needs of the community. Similarly, the GCC Climate Outlook Forum is constrained by inadequate capacity building, which hampers its impact. These challenges not only stifle the forum's potential but also jeopardise long-term climate resilience in the region. Tackling these interconnected issues is essential for crafting climate initiatives that resonate with the community's needs and are poised for success.

Identifying areas for expanded regional cooperation

Across the Gulf, extreme weather events have been wreaking havoc and leading to significant human and financial costs. The diverse climate of the Gulf region necessitates a nuanced approach characterised by enhanced awareness, comprehensive early warning systems, collaborative climate research, and policy harmonisation, among other measures. Below are examples of initiatives for regional cooperation in tackling shared environmental challenges in the Gulf.

Enhancing collaborative climate research and modelling

The Gulf region can capitalise on recent climate change projects such as the Regional Initiative for the Assessment of Climate Change Impacts on Water Resources and Socio-

Economic Vulnerability in the Arab Region (RICCAR)⁴⁰ and engage entities such as the Climate Change Centre of Excellence at King Abdulaziz University to expand the research domain beyond Saudi Arabia. Implementing the strategic goal of the scientific research subcommittee to build or establish a regional climate model and encouraging specialised centres and universities in the region to share their works and initiate regional projects can enhance our understanding of regional climate dynamics.⁴¹

The Gulf region is challenged by a lack of comprehensive analyses and updated data. The involvement of specialised centres and universities within the GCC region in creating a regional climate model can offer invaluable insights and expertise in understanding local climate dynamics and fill the gaps in information and scientific data. These institutions often have advanced research facilities, data analytics capabilities, and scholarly expertise that are pivotal for such complex tasks. By collaborating on regional projects, they can pool resources, harmonise methodologies, and share findings more efficiently, accelerating the pace of research. Moreover, these collaborations could serve as the foundation for a unified regional approach to climate change, which can be integrated into broader policy and governance frameworks. Establishing a regional climate model through collective academic and scientific effort can thus significantly advance the region's preparedness and resilience against climatic extremes.

For example, the Center of Excellence for Climate Change at King Abdulaziz University in Saudi Arabia could partner with the Kuwait Institute for Scientific Research (KISR) to investigate the evolving patterns and impacts of SDS in the Gulf due to climate change. Similarly, Sultan Qaboos University in Oman could join forces with New York University in the UAE to examine shifts in tropical cyclone patterns and enhance early warning systems. There are a number of leading international institutions operating in the Gulf that could be at the forefront of such multilateral regional cooperation on environmental issues.

Strengthening early warning systems and disaster preparedness

There is a significant potential to enhance the work of the GCC Centre for Disaster Management. This enhancement can be achieved by building a comprehensive regional risk registry and conducting regular drills involving the meteorological centres of each member state, to improve the centres' abilities for issue-tailored and advanced warnings for the public.⁴² A

40 United Nations Economic and Social Commission for Western Asia (ESCWA) et al. 2017. Arab Climate Change Assessment Report – Main Report. Beirut, E/ESCWA/SDPD/2017/RICCAR/Report. Retrieved 2023, from <https://www.unescwa.org/publications/riccar-arab-climate-change-assessment-report>

41 Almazroui, Mansour, Osama Tayeb, Abdulfattah S. Mashat, Ahmed Yousef, Yusuf A. Al-Turki, M. Adnan Abid, Abdullah O. Bafail, et al. 2017. "Saudi-KAU Coupled Global Climate Model: Description and Performance." *Earth Systems and Environment* 1 (1): 1–23. <https://doi.org/10.1007/s41748-017-0009-7>; Zittis, G., M. Almazroui, P. Alpert, P. Ciaia, W. Cramer, Y. Dahdal, M. Fnais, et al. 2022. "Climate Change and Weather Extremes in the Eastern Mediterranean and Middle East." *Reviews of Geophysics* 60 (3). <https://doi.org/10.1029/2021RG000762>;

42 Atif, Rana Muhammad, Mansour Almazroui, Sajjad Saeed, Muhammad Adnan Abid, M. Nazrul Islam, and Muhammad Ismail. 2020. "Extreme Precipitation Events over Saudi Arabia during the Wet Season and Their Associated Teleconnections." *Atmospheric Research* 231 (February 2019): 104655. <https://doi.org/10.1016/j.atmosres.2019.104655>

collective effort in data collection, technological collaboration, and expertise sharing could facilitate this endeavour, further reinforcing the region's disaster preparedness and response capabilities. This could also be done by expanding such institutions to be more inclusive.

Facilitating knowledge exchange and sharing of best practices

Strengthening the GCC Climate Outlook Forum and learning from efficient forums in Africa, Europe, and Asia can enhance the exchange of best practices. Building relationships with global centres such as the National Aeronautics and Space Administration (NASA) and the European Centre for Medium-Range Weather Forecasts (ECMWF) can further enrich the exchange of knowledge. NASA's Climate and Resilience program and the ECMWF both actively work on climate resilience through various initiatives. NASA focuses on leveraging Earth observations to provide comprehensive data and models for global communities, aiding in decision-making related to food security and community preparedness. On the other hand, ECMWF operates multiple projects such as CLIMAAX, which helps European regions enhance their climate risk management plans, and TRIGGER, which aims to mitigate climate-induced health risks. These projects offer toolboxes for implementation and platforms for citizen engagement, aiming to establish evidence-based connections between climate change and its impacts.

Building on existing regional initiatives can further enhance climate resilience in the Gulf. To this end, partnerships with global centres like NASA and ECMWF can offer significant benefits. For instance, the PCMC, which has already made strides in integrating weather radars and synchronising earthquake stations across the Gulf, could collaborate with NASA's Climate and Resilience program to refine its early warning systems. The program's comprehensive data models could greatly assist in this effort. Similarly, Saudi Arabia's planned regional climate change centre could partner with the ECMWF's CLIMAAX project to enhance their climate risk management plans. This collaboration could provide these Gulf institutions with state-of-the-art toolboxes and methodologies for implementing effective climate strategies. Additionally, Oman's 7th Centre of Excellence for Meteorological Satellite Applications could benefit from ECMWF's work in training specialists, thereby expanding its capacity to include modern methods of satellite applications and weather tracking. These synergies can fill gaps in the region's climate resilience strategies and enhance the effectiveness of existing GCC institutions, ensuring a more integrated and robust response to the challenges of climate change.

Establishing joint funding mechanisms and allocating sufficient funds for projects

The GCC states, being among the wealthiest in the world, need to invest more in weather and climate actions. To make joint funding more effective, the GCC Secretariat should set up a specialised climate action fund. This fund, partially sourced from annual member contributions, would be managed by the PCMC, and would focus on high-priority regional projects. Collaboration with financial institutions, such as the World Bank, Asian Development Bank, and regional sovereign wealth funds, including Qatar Investment Authority, UAE's Mubadala Investment Company, and Saudi Arabia's Public Investment Fund, could

supplement local contributions. Specialised financial instruments like green bonds could be issued to attract international capital. This multifaceted approach would accelerate the implementation of climate resilience efforts throughout the Gulf region. A key consideration is leveraging external funds, especially for projects with a regional outlook or those situated in other countries within the region. This could supplement local resources and encourage collaborative efforts.

Harmonising climate policies and regulatory frameworks

Finalising the GCC guiding law for meteorological practices is vital, a process that has taken many years. The completion of the GCC guiding law for meteorological practices is crucial for several reasons. First, it will serve as a unified regulatory blueprint, ensuring that all member states adhere to a standardised set of practices and protocols in meteorological operations and climate action. This ensures efficiency and coherence in regional initiatives, thereby enhancing collective climate resilience. Second, having a harmonised framework simplifies cross-border coordination and resource allocation, making it easier to launch joint projects and share vital data. Third, this unified framework can provide the foundation upon which additional policies and agreements can be layered, facilitating more comprehensive and nuanced approaches to tackling climate change impacts in the future. Finally, such harmonisations could also pave the way for broader regional involvement and thus even more efficiency in the future. This harmonised framework would ensure a consistent basis for climate action, ensuring that each member state's efforts contribute effectively to the collective goal of climate resilience.

Engage on joint health strategies

Multi-model assessments predict a shift towards 'super-extreme' and 'ultra-extreme' heatwave conditions.⁴³ The projected changes by the end of the 21st century indicate a need for a unified response to protect human health, livestock, agriculture, and biodiversity. Additionally, fluctuations in weather patterns have created conducive environments for spreading diseases like malaria and other air or waterborne illnesses, further stressing the public health systems in the region and underscoring the need for comprehensive climate-resilient strategies. The potential for exceeding the SWBGT limit should be incorporated into long-term health planning.

Joint health strategies can help mitigate the compounded risks arising from varying climate impacts across the GCC countries.⁴⁴ This would necessitate close collaboration among the Health Ministries of the member states, the specialized GCC Health Council (GHC), and

43 Zittis et al. "Climate Change and Weather Extremes in the Eastern Mediterranean and Middle East."

44 Lelieveld, J., Y. Proestos, P. Hadjinicolaou, M. Tanarhte, E. Tyrlis, and G. Zittis. 2016. "Strongly Increasing Heat Extremes in the Middle East and North Africa (MENA) in the 21st Century." *Climatic Change* 137 (1-2): 245-60. <https://doi.org/10.1007/s10584-016-1665-6>

globally recognized agencies such as the World Health Organization (WHO). Special attention would be devoted to region-specific health hazards. For example, focusing on mitigating the health implications of extreme heat as well as SDS, should be a priority. At the same time, the monsoonal countries need to double down on efforts to cope with tropical cyclones and the health risks associated with exceptionally humid and warm night time temperatures. Conducting in-depth health risk assessments that take into account the variance in extreme weather events across the Gulf can lay the groundwork for identifying priorities and formulating a targeted adaptation action plan. By doing so, the collective capabilities of the GCC can be harnessed to reinforce regional resilience to the health challenges exacerbated by climate change.

Instrumentalising international collaborations

To date, no projects have been initiated under the first term of the MoU between the GCC Secretariat and the WMO, and the MoU with CMA remains unfinished. Despite these delays, such agreements offer valuable avenues for capacity building and collaboration. Accelerating these partnerships is vital for tapping into global expertise and resources that can bolster regional climate resilience. Swift action could include finalising formal agreements with global authorities, combining both international and local funding for focused initiatives, and implementing proven methods through academic and specialised institutional partnerships. This approach could also facilitate technology transfer and enhance technical capacities.

Closer consultations with weather and climate product users

Very little has been done to get input from the users of weather and climate products: government agencies, local businesses, academic institutions, NGOs, and the general public. Their feedback is crucial for refining prediction models and mitigation strategies for extreme weather events. Regular interaction with users of weather and climate products can ensure that the initiatives taken are well-targeted and effective. Feedback from users could help enhance the region's response to extreme weather events and provide data for improving prediction and mitigation strategies. A regional collaborative effort on mitigation strategies could be fostered by creating a Gulf-wide climate task force that includes representatives from government agencies, academic institutions, NGOs, and the private sector. This task force could coordinate data collection, share best practices, and implement joint initiatives such as regional climate models, early warning systems, and emergency preparedness drills.

Raising awareness

An awareness campaign should be at the forefront of the regional climate change response. Increasing public consciousness of the urgency of the climate crisis, particularly among decision-makers, can foster an environment conducive to proactive and effective climate

action. Raising awareness of the importance of adaptation to climate change among senior decision-makers is critical. This could be done by providing training courses on climate change impacts and adaptation for mid-level managers and senior technical advisers.⁴⁵ This might mean, for example, providing information about extreme climatic events in the region and the importance of improving the mitigation measures at all levels of the government and society to reduce the impacts.

In addition to training courses and campaigns, incorporating climate science and policy into educational curricula could significantly boost awareness and individual action. This long-term approach ensures that future generations are equipped with the knowledge and skills to tackle climate challenges effectively. A jointly funded campaign could be established to facilitate these awareness initiatives. Involving all GCC states, and potentially other contributors from the broader region, would not only pool resources but also create a platform for best practice sharing, thus maximising the impact and reach of the initiatives.

Conclusion

Addressing the Gulf's vulnerability to extreme weather demands an integrated approach. This should include unified early warning systems, joint research, standard meteorological guidelines, and shared funding. Transparency and trust are key to fortifying regional climate resilience. Disaster preparedness, regional risk databases, and expanded research are immediate priorities. Quick, coordinated action will maximise impact, while engagement in global climate accords and international partnerships will further enrich knowledge and resources. Beyond environmental concerns, climate resilience is vital for regional stability, underlining the role of climate diplomacy.

Cooperation between the GCC, Iran and Iraq regarding extreme weather events presents a complex challenge, given underlying trust and confidence issues. Until now, lingering distrust, diverging interests, and institutional gaps have prohibited meaningful environmental cooperation in the region. This lack of trust has also extended to civil society collaboration, as evidenced by authorities' past refusal to share seismic data.⁴⁶ Nevertheless, combatting shared environmental challenges requires regional cooperation. Recent diplomatic engagements in and around the region raise hope for closer consultations and collaborations in the near future.

In summary, enhanced awareness, strengthened early warning systems, collaborative research, policy harmonisation, and effective utilisation of resources and collaborations are the keys to managing climate change impacts and building a resilient future for the Gulf region.

45 Alam, T., and L. Evans. 2022. "Climate Change Adaptation in the GCC." *INSIGHTS* 290: 11-26. <https://mei.nus.edu.sg/publication/12982-2/>

46 Todman, W., L. Yousef, and M. Abdelwahab. 2023. "The Unique Promise of Environmental Cooperation in the Gulf." July 11, 2023. CSIS. Retrieved 2023, from [www.csis.org: https://www.csis.org/analysis/unique-promise-environmental-cooperation-gulf](https://www.csis.org/analysis/unique-promise-environmental-cooperation-gulf)



Chapter 4

Tackling Sand and Dust Storms to Build on Regional Détente in the Gulf

Glada Lahn¹ and Adnan Tabatabai²

Abstract

A raft of environmental and climatic assaults pose bigger security and even existential threats to the Gulf countries than governments have hitherto acknowledged. Several of these – including deterioration of shared marine ecosystems, cyclones, and sand and dust storms – cannot be effectively tackled unilaterally and have demonstrated the capacity to cascade, compounding more traditional security threats in the region. While these environmental concerns are far too big of challenges to be called ‘soft issues,’ their various dimensions may serve as tangible starting points for trust building, as well as for domestic reforms critical to climate adaptation. Focusing on the transboundary threat of increasingly severe and damaging sand and dust storms, this chapter explores past and current cross-border initiatives on the issue, what has changed, and what will be needed for continual and meaningful cooperation in future.

A moment of reflection in a theatre of rivalry

As a geopolitical crossroads of global importance, the Gulf region has always been a theatre of rivalry among its littoral states. Additionally, the influence of extra-regional powers,

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2 Adnan Tabatabai is the co-founder and CEO of the Center for Applied Research in Partnership with the Orient (CARPO). Through CARPO, Tabatabai has set up and facilitated various regional dialogue initiatives, such as the Iran-Saudi Dialogue Initiative, since 2015, as well as the Tafahum wa Tabadul project, since 2018, enhancing dialogue and exchange between the six GCC member states, Yemen, Iraq, and Iran.

such as the United States, China, Russia, and several European countries, has tended to exacerbate this rivalry, leading to intricate regional dynamics that shape the destiny of not only the countries within its vicinity but also the broader international community. The power struggle and competing interests among these states sometimes play out through support for armed groups in third countries, leading to worsening volatility and insecurity in the wider region.

These tensions reached a dangerous apex in 2019, marked by a series of incidents that heightened regional anxieties. These included attacks on tankers in the Strait of Hormuz, strikes on oil refineries along the shores of the United Arab Emirates (UAE) and Saudi Arabia, the downing of a US drone over Iranian airspace, and the high-profile assassinations of Iranian General Qassem Soleimani and Iraqi General Abu Mahdi Al-Mohandis in early 2020 in Iraq, all of which amplified concerns about a potential escalation into an all-out regional war.

Policy debates in regional capitals acknowledged that it might be time to rethink the respective postures towards regional rivals. The outbreak of the COVID-19 pandemic in 2020 may have brought a significant moment of pause and reflection for regional leaders. Acts of solidarity and support emerged, notably by the GCC states towards Iran,³ which bore a significant brunt of the pandemic's impact in the region, and towards Iraq following its years of battling terrorism and heavy reconstruction needs.

After a decade of dangerous tensions among competing powers in the Gulf region, 2021 marked a starting point for regional de-escalation and détente. In January 2021, the AIUla GCC Summit brought about the end of the rift between certain GCC states and Qatar.⁴ In April 2021, the “Baghdad talks” between security officials from Iran and Saudi Arabia were officially confirmed as a dialogue format for the first time. Iraq reaffirmed its ambition to become a “hub for regional dialogue”⁵ by hosting the Baghdad Conference for Regional Cooperation and Partnership in August 2021. Almost all littoral states of the Gulf, plus Egypt and Jordan, were represented by heads of state and top diplomats.⁶ Amman hosted a second meeting in December 2022.⁷ These political gatherings showcased a shift away from antagonism and towards a constructive trajectory of “de-escalation, normalisation, and cooperation,”⁸ as one key interlocutor from Saudi Arabia put it.

3 Tabatabai, Adnan. 2020. “A Health Crisis as an Incentive to Foster Regional Cooperation in the Persian Gulf?,” Italian Institute of International Studies, May 11, 2020. <https://www.ispionline.it/en/publication/health-crisis-incentive-foster-regional-cooperation-persian-gulf-26083>

4 “Full transcript of AIUla GCC Summit Declaration: Bolstering Gulf unity,” *Al-Arabia News*, January 6, 2021. <https://english.alarabiya.net/News/gulf/2021/01/06/Full-transcript-of-AIUla-GCC-Summit-Declaration-Bolstering-Gulf-unity>

5 Kawa Hassan, Adnan Tabatabai and Desirée Custers, “Iraq as a Hub for Regional Dialogue,” Centre for Applied Research in Partnership with the Orient. May 11, 2021. <https://carpo-bonn.org/from-messenger-to-host/>

6 Ministry of Foreign Affairs, Iraq. 2021. “Final Communiqué of the Baghdad Conference for Cooperation and Partnership,” August 28, 2021. <https://mofa.gov.iq/2021/25539/>

7 The “Baghdad Summit process” is supported by the government of France and gained some regional consensus on the need to preserve Iraqi economic and political stability. Dalia Dassa Kaye and Sanam Vakil, “Seizing MENA’s moment: How to build a sustainable forum for region-wide cooperation,” Chatham House research paper, September 26, 2023. DOI: 10.55317/9781784135867

8 Quote obtained during background conversation led in May 2023 by one of the authors of this paper with a well-connected and well-informed researcher in Saudi Arabia

Current trends suggest that key regional players are on track with regards to this potential trajectory. Most importantly, after seven years of severed relations, Saudi Arabia and Iran publicly announced the resumption of official diplomatic ties in Beijing on 10 March 2023.⁹ Since the declaration, the foreign ministers of both countries held three bilateral meetings in Beijing, Tehran, and Riyadh, as well as, most recently, on the side-lines of the extraordinary meeting of the Organisation of Islamic Cooperation in Jeddah in October.¹⁰ Iran's President Ebrahim Raisi has been invited for a state visit to Riyadh, an invitation that has been reciprocated by the Iranian side to the Crown Prince of Saudi Arabia, Mohammed bin Salman.¹¹ In reaction to the major escalation of the Israel-Palestine conflict, President Raisi and Mohammed bin Salman held their very first phone conversation.¹² Whether or not the abrupt re-emergence of this conflict negatively impacts the dialogue momentum in the Gulf region is too early to assess and will depend on whether it expands to other regional arenas.

Without regional dialogue leading to practical cooperation, momentum might be lost and opportunities for longer-term stability missed. To cement these gains, cooperation has to take tangible form. This chapter considers the role that regional cooperation on shared climate and environmental risks, such as sand and dust storms (SDS), could play.

Environmental cooperation as a tangible starting point

In many informal exchanges, stakeholders from the Gulf region have identified shared environmental and climate change challenges as a thematic entry point for regional cooperation initiatives.¹³ Often incorrectly portrayed as 'soft issues' or 'a low-hanging fruit,' climate-related challenges are critical and existential threats for the region. Working together on them is imperative for two reasons.

First, dramatic climatic and environmental changes are ushering in new challenges for the Gulf states for which they lack the capacity to deal with unilaterally. These changes include dwindling freshwater resources (both rivers and groundwater), heavier flash flooding and storm flooding, droughts, and more frequent and intense sand and dust storms. Second, given that economic interests are arguably the main driver behind the diplomatic engagements around the region, protecting vital shared resources and addressing transboundary risks that might threaten them are key.

9 Ministry of Foreign Affairs of the People's Republic of China. 2023. "Joint Trilateral Statement by the People's Republic of China, the Kingdom of Saudi Arabia, and the Islamic Republic of Iran," October 3, 2023. https://www.fmprc.gov.cn/eng/zxxx_662805/202303/t20230311_11039241.html

10 "Iran urges Muslim countries to sanction Israel after Gaza hospital strike," *Al Jazeera*, October 18, 2023. <https://www.aljazeera.com/news/2023/10/18/iran-calls-on-oic-members-to-sanction-israel-following-hospital-attack>

11 "Deep Dive: The Iranian visit to Saudi Arabia," *Amwaj Media*, August 22, 2023. <https://amwaj.media/article/deep-dive-the-iranian-visit-to-saudi-arabia>

12 "Iran's Raisi, Saudi Arabia's MBS discuss Israel-Hamas war," *Al Jazeera*, October 12, 2023. <https://www.aljazeera.com/news/2023/10/12/irans-raisi-saudi-arabias-mbs-discuss-israel-hamas-war>

13 Dassa Kaye and Vakil, 2023.

For example, almost all of Iraq's export revenue derives from oil, and the country is in need of continuous public infrastructure and post-conflict reconstruction. It depends on its land and ecosystems to provide future jobs and revenue. On the other hand, the Saudi leadership is reliant on attracting foreign investment in and relocation to the kingdom as well as tourism to make its giga projects a success.

Without due attention, the region also faces compound and cascading climate risks. Climate change interacts with existing and worsening environmental degradation in the Gulf. Both gradual and sudden impacts can compound with exposed infrastructure, such as roads, dams, water treatment plants, electricity systems, and food production. These impacts can disrupt international trade and even spark or fuel conflict and migration, with effects cascading out to neighbouring countries and regions.¹⁴

The latter can occur when, for example, a failure in vital services, such as water, intersects with socio-economic dynamics, such as frustrations over unemployment, inequality, corruption, or rural-to-urban migration, as well as broader climate-related international issues, such as food price spikes and oil price volatility.¹⁵ Both the regions of Khuzestan¹⁶ in southern Iran and neighbouring Basra¹⁷ in southern Iraq are tinderboxes for such cascades.

Environmental topics have garnered an unprecedented level of foreign policy attention in the region in the last few years. Saudi Arabia hosted its Middle East Green Initiative summit in October 2021. Dubai hosted the first MENA Climate Week, a new addition to the UNFCCC conference schedule, in March 2022, and Riyadh followed suit in October 2023.¹⁸ In July 2022, Iran hosted an international conference on "Environmental Cooperation for a Better Future." Only months later, COP27 took place in Egypt's Sharm el-Sheikh, followed by COP28 in Dubai in November 2023. Facing some of the most acute effects of environmental degradation and climate change in the region, Iraq's leaders have been flagging adaptation as a priority in public statements, drawing attention to the opportunity for regional action.¹⁹ These examples show the growing attention that leaders are paying to this vast theme, hitherto superseded by more traditional security and economic concerns.

Several experts working closely with governments in the region consider environmental challenges as part of mutual economic integration and prosperity interests that could help

14 For a fuller explanation of cascades in the MENA region with example scenarios, see Glada Lahn and Greg Shapland "Cascading climate risks and options for resilience and adaptation in the Middle East and North Africa," CASCADES Research Paper, March 29, 2022. <https://www.cascades.eu/publication/cascading-climate-risks-and-options-for-resilience-and-adaptation-in-the-middle-east-and-north-africa/>

15 Lahn and Shapland, 2022.

16 "Iran's Khuzestan: Thirst and Turmoil," *International Crisis Group*. August 21, 2023. <https://www.crisisgroup.org/middle-east-north-africa/gulf-and-arabian-peninsula/iran/241-irans-khuzestan-thirst-and-turmoil>

17 Georgia Cooke, Renad Mansour and Glada Lahn "Same Old Politics Will Not Solve Iraq Water Crisis," *Chatham House*. April 19, 2020. <https://www.chathamhouse.org/2020/04/same-old-politics-will-not-solve-iraq-water-crisis>

18 "MENA Climate Week 2023," UNFCCC, <https://unfccc.int/MENACW2023>

19 For example, see the speech by the Iraqi prime minister at the UN General Assembly in September 2023. "Iraq: His Excellency Mohammed Shia' Al Sudani," United Nations General Assembly in New York, September 22, 2023. <https://gadebate.un.org/en/78/iraq>; and "Iraq promises action to tackle crippling climate change," *The Arab Weekly*, March 13, 2023, <https://theArabweekly.com/iraq-promises-action-tackle-crippling-climate-change>

counter zero-sum thinking in the region. For example, Haghirian discusses the opportunity for work on issues related to food and water security, as well as energy transition.²⁰ Dassa Kaye and Vakil propose that a new wider Middle East and North Africa regional forum to foster sustainable and inclusive regional cooperation and conflict prevention take on shared climate and energy challenges. The idea is that this would add “an additional cooperative layer to the region’s largely competitive security architecture” and reduce the incentives for countries to destabilise regional relations.²¹

Moving cooperation from high-level statements to practical work on the ground is not a walk in the park. A real obstacle for cross-border cooperation on environmental issues is the increasingly securitised atmosphere in this field. With more leaders in the region understanding climate-related challenges as potential sources for severe crises, state apparatuses may assert greater control over the area. This move can further constrict space for civil society and thus neglect local input and consultation that could lead to more sustainable outcomes.

In Iran, for example, environmental scientists have long called on the government to treat environmental challenges as a security threat. The state is now doing so, but this has led to the security apparatus wanting to control the agenda and being distrustful of work by nongovernmental organisations (NGOs), especially if that work is receiving funding from abroad. This approach has led to harsh prison sentences for some NGO workers.²²

At the same time, climate mitigation and more general cross-border environmental resilience measures can come up against contentious political and economic issues, including inter- and intra-state wrangles over territorial control of resources such as water; the practices of vested interests in oil, construction, and agriculture; and sensitivities over data gathering. These concerns could seriously hamper cross-border collaboration among national experts.

Cultural differences must also be overcome in the design of joint projects. For example, the GCC’s top-down, high-tech approaches to addressing climate mitigation or adaptation, which rely on large numbers of expatriate workers, may not be appropriate for Iraq or Iran. The concept of “smart cities” that efficiently control temperature and water use being pursued in Qatar and Dubai would not be a first step in areas subject to power system failure. Passive techniques such as shading and rooftop solar would make more sense as a starting point for resilience to heat in a city like Baghdad. Likewise, large-scale state acquisitions of land, such as that for Saudi Arabia’s NEOM, would likely engender greater social opposition.²³ In spite

20 Mehran Haghirian, “New Horizons for Regional Economic Diplomacy in the Persian Gulf,” *Bourse & Bazaar Foundation*, March 9, 2022. <https://www.bourseandbazaar.com/research-1/2022/03/09/new-horizons-for-regional-economic-diplomacy-in-the-persian-gulf>

21 Dalia Dassa Kaye and Sanam Vakil, “Seizing MENA’s moment: How to build a sustainable forum for region-wide cooperation,” Chatham House research paper, September 26, 2023. DOI: 10.55317/9781784135867

22 George Stone, “An Iranian researcher went home to serve his country. Now, ‘I realize that I’m lucky I’m not in prison.’” *Science*, May 24, 2018, <https://www.science.org/content/article/iranian-researcher-went-home-serve-his-country-now-i-realize-i-m-lucky-i-m-not-prison/>

23 Ruth Michaelson, “‘It’s being built on our blood’: the true cost of Saudi Arabia’s \$500bn megacity,” *The Guardian*, May 4, 2020, <https://www.theguardian.com/global-development/2020/may/04/its-being-built-on-our-blood-the-true-cost-of-saudi-arabia-5bn-mega-city-neom>

of these issues, a promising flurry of interaction has begun in response to at least one issue affecting all Gulf states: sand and dust storms.

Sand and dust storms: A shared threat

Sand and dust storms are a regular feature of the Gulf region, but they appear to have increased in frequency and severity in recent years. In spring 2022, dust storms hit the region with particular force. Affecting an area from Turkey to Oman, these storms hit Iraq the worst, with more than 9,000 people reported to have been hospitalised with breathing difficulties in a matter of weeks. Saudi Arabia and Iran also felt severe effects.²⁴ Schools, government offices, and transportation hubs were variously closed, and many flights were grounded.²⁵

SDS occur in several dryland plains around the world when annual winds whip up loose particles from the ground. They are a natural and regular feature in the arid areas of northern China and Mongolia, Central Asia, the Middle East, North Africa and the Sahel, south-western United States, and Australia. In spring and summer, they occur in the Levant and the Gulf. Most storms that cross borders are caused by the *shamal* winds, which sweep in from the northwest across Turkey, Syria, Iraq, Iran, and the GCC states. Several other winds affect parts of the region.²⁶

SDS transport vital nutrients across ecosystems, but they also harm human health and the economy. They can obscure vision and cover windscreens, often leading to traffic accidents and the closure of transport hubs. Dust particles measuring under 0.05mm can travel thousands of kilometres and pose greater dangers to health than sand because the smaller particles can enter the lungs and heart. They can also carry toxic particles, viruses, and pathogens, as demonstrated across the Sahelian “meningitis belt.”²⁷ In polluted Gulf cities

24 This is likely an underestimate, as several storms hit the region that spring, and the authors did not find official numbers. “Persistent Dust Storms Batter Iraq,” NASA Earth Observatory website, May 16, 2022, <https://earthobservatory.nasa.gov/images/149838/persistent-dust-storms-batter-iraq>; “Sandstorm blankets parts of Middle East, raising alarm,” *Al Jazeera*, May 23, 2022. <https://www.aljazeera.com/news/2022/5/23/sandstorm-blankets-parts-of-middle-east-raising-alarm>

25 Ismaeel Naar, “Iran to close schools and offices due to air pollution caused by dust storm,” *The National*, May 24, 2022. <https://www.thenationalnews.com/mena/iran/2022/05/24/iran-to-close-schools-and-offices-due-to-air-pollution-caused-by-dust-storm/>; Giorgio Cafiero, “‘Vicious cycle’: Storms intensify in the Gulf as climate changes,” *Al Jazeera*, June 2, 2022. <https://www.aljazeera.com/news/2022/6/2/a-vicious-cycle-intensifying-storms-in-gulf-as-climate-changes>; Kurdistan24, Iraq suspends flights, closes schools amidst intense dust storm, May 16, 2022. <https://www.kurdistan24.net/en/story/28356-Iraq-suspends-flights-closes-schools-amidst-intense-dust-storm>; “Iraq at standstill as fresh sandstorm halts port operations, affects businesses,” *Arab Weekly*, May 17, 2022. <https://thearabweekly.com/iraq-standstill-fresh-sandstorm-halts-port-operations-affects-businesses>

26 Ebrahim, Menaal. 2019. Sand and Dust Storms in the Middle East and North Africa (MENA) Region: Sources, Costs and Solutions, Report, World Bank Group, Fall 2019, <https://www.worldbank.org/en/region/mena/publication/sand-and-dust-storms-in-the-middle-east-and-north-africa-mena-region-sources-costs-and-solutions>

27 Gonzalez-Martin, Christina, Teigell-Perez, Nuria, Valladares, Basilio and Griffin, Dale W. “The Global Dispersion of Pathogenic Microorganisms by Dust Storms and Its Relevance to Agriculture.” *Advances in Agronomy*. vol. 127 (2014):1–41. DOI: 10.1016/B978-0-12-800131-8.00001-7

(some of which are among the most polluted in the world²⁸), these particles add to vehicle and industry emissions, creating especially dangerous conditions for the very young and old, as well as people with respiratory conditions, such as asthma.

SDS can damage crops at a vital time of the growing season and can trigger electrical outages by causing electrical transformers to short circuit as the dust combined with humidity acts as a conductor. This phenomenon caused crippling power outages in southern Iran in 2017.²⁹ SDS also reduce the output of solar photovoltaic (PV) panels and add to the operating costs because they need to be cleaned.³⁰ A Kuwaiti study revealed that dust can reduce the power output of PV systems by 15% to 30%, and coupled with high humidity, it can stop output altogether.³¹

Scientists around the world have noted the growing severity of SDS and its impacts in recent years.³² Several man-made factors, namely overgrazing, vegetation removal (including crop burning and deforestation), drying lakes and rivers, and climate change are widening the sources for dust. Drought and higher temperatures exacerbate desertification. Human settlements are also expanding, so storms have more infrastructure to hit.

Location-specific factors are also a consideration. Iraq, for example, is a major source of dust particles. The draining of the marshes in the south in the 1990s left land vulnerable to drying, while years of military manoeuvres have compacted soil, making it less able to absorb rain. Farms abandoned in the north because of drought, the conflict with Da'esh, and groundwater salination have further exposed plains to wind erosion (for more on Iraq, read chapter 7 of this volume).³³

Beyond the high health and welfare costs, estimating the economic costs of sand and dust storms is complex. Given that they are naturally occurring events in the region, the objective would be to compare with reduced impact, not with a situation in which they did not occur at all. According to a 2016 United Nations Environment Assembly factsheet, countries in the Middle East lost a total of US\$13 billion a year from SDS.³⁴ It is not clear how the calculation was made, but it would include lost working hours, damages, clean-up costs, and business losses. A first-of-its-kind study on the costs of SDS between 2001 and 2014 in Kuwait

28 IQAir, World Air Quality Report 2022, <https://www.iqair.com/us/world-air-quality-report>. These include Baghdad, Manama, and Kuwait City.

29 “تلاش برای اتصال برق ۱۱ شهر خوزستان/ برق‌دار شدن بخشی از آبادان” [“Efforts to connect electricity to 11 cities of Khuzestan/Electrification of a part of Abadan” in Persian], Iranian Students’ News Agency, February 23, 2017. <https://www.isna.ir/news/95112315957-از-آبادان-برق-دار-شدن-بخشی-از-آبادان>

30 Hamid Pouran, “The Middle East’s worsening dust storms are making it harder to deploy solar energy.” July 21, 2022, Comment, *Middle East Institute*, <https://www.mei.edu/publications/middle-east-worsening-dust-storms-are-making-it-harder-deploy-solar-energy>

31 Ali Al-Dousari, et al. 2019. “Solar and wind energy: Challenges and solutions in desert regions.” *Energy*, Volume 176 (2019): 184-194. <https://doi.org/10.1016/j.energy.2019.03.180>

32 Christian Elliot, “More Frequent Dust Storms Could Be in Our Future,” *The Scientific American*, May 10, 2023, <https://www.scientificamerican.com/article/more-frequent-dust-storms-could-be-in-our-future/>

33 Azzam Alwash, “From Threat to Opportunity: Harnessing Climate Change to Build a Prosperous Future for Iraq and the Region,” *Instituto Affari Internazionali, IAI Papers 23*: June 14, 2023, <https://www.iai.it/sites/default/files/iaip2314.pdf>

34 “UNEA-2 Fact Sheet: Sand and Dust Storms,” *United Nations Environment Programme*, 2016. <https://wedocs.unep.org/bitstream/handle/20.500.11822/7608/sand.pdf>

identified port delays for oil shipments and airline delays as areas of significant loss.³⁵ Kuwait reportedly estimates KD 190 million (US\$615 million) in financial losses each year that it is hit by SDS travelling downwind from Iraq but the methodology has not been disclosed.³⁶

Cooperation in jointly combatting sand and dust storms

In 2022, a two-year collaborative study based on 30 years of satellite data and intensive on-the-ground sampling identified two “hot spot” areas in southern Iraq that were responsible for the majority of dust being transported in storms to downwind parts of Iraq, Iran, Kuwait, and other Peninsula states.³⁷ In 2023, a four-year plan to fix soil in one of these areas began. It involves afforestation using native plants, digging irrigation channels, and installing mud coverage. According to the study’s authors, it is already showing promise, significantly shrinking the area as a source for SDS hitting Kuwait.³⁸ Southern Iraq and Iran should see significant benefits from reduced particles and desperately needed ecosystem gains in the area between Thi’qar and Muthanna, which has witnessed severe drought and farm losses. The Kuwait Fund for Arab Development is funding the project in partnership with UN Habitat.

Cooperation on the basis of mutual interests is already taking place in jointly combatting SDS.³⁹ The region now has its first early warning centre for sand and dust storms, and Saudi Arabia received World Meteorological Organization (WMO) accreditation for it in July 2023. As members of the WMO, all countries in the region can benefit from the Sand and Dust Storm Warning Advisory and Assessment System (SDS-WAS) programme, which has its Regional Centre for Northern Africa, Middle East, and Europe based in Barcelona.

Various international agencies, including the World Bank, are part of the United Nations Coalition on Combating Sand and Dust Storms, established in 2017 and the UN-supported Tehran summit on sand and dust storms in 2023.⁴⁰ These organisations can continue to play an advisory and supportive role, especially in assisting in coordination with existing

35 Ali Mohamed Al-Hemoud, et al. “Socioeconomic effect of dust storms in Kuwait,” *Arabian Journal of Geosciences*, 10(1) January 2017. DOI: 10.1007/s12517-016-2816-9.

36 This figure is mentioned in Yacoub Althuwaini, “Soiling Effect and Remedial Measures of Solar Photovoltaic System Performance in Kuwait,” *Journal of Power and Energy Engineering*, 11, 39-57. DOI: 10.4236/jpee.2023.114003, but it’s not found in the cited reference. The number is repeated in “Deal signed to combat dust storms,” *Kuwait Times*, January 19, 2023. <https://kuwaittimes.com/deal-signed-to-combat-dust-storms/>

37 Ali Al-Dousari, Ali Omar, Ali Al-Hemoud, Abdulaziz Aba, Majid Alrashedi, Mohamad Alrawi, Alireza Rashki, Peter Petrov, Modi Ahmed, Noor Al-Dousari, et al. 2022. “A Success Story in Controlling Sand and Dust Storms Hotspots in the Middle East,” *Atmosphere* 13, no. 8: 1335. <https://doi.org/10.3390/atmos13081335>

38 Ali Al-Dousari, email message to author, September 22, 2023.

39 Chris Aylett, Glada Lahn and Hamid Pouran, “Dust storms: A shared security challenge for the Middle East,” Expert Comment, *Chatham House*, July 11, 2023. <https://www.chathamhouse.org/2023/07/dust-storms-shared-security-challenge-middle-east>

40 The coalition has 19 members at the time of writing, including UN agencies UNEP, UN Habitat, UNDP and FAO. Non-UN bodies include the International Union for the Conservation of Nature (IUCN). “Sand and Dust Storms Coalition,” United Nations Convention on Combating Desertification, <https://www.unccd.int/land-and-life/sand-and-dust-storms/coalition>

programmes and studies on the ground to avoid duplication and optimise synergies, for example in land restoration.

Discussing the learnings from case studies has reaped rewards in the fields of electricity regulation and efficiency in the region. Bringing together Gulf and international experts on SDS preparedness and control could speed up the learning curve in effective implementation between technical and policy actors and build trust.

In 2021, the former President of Iraq, Barham Salih, brought together a group of academics and environmental experts to discuss climate impacts in Iraq. This resulted in a vision to guide economic diversification and development through ecological restoration called the Mesopotamian Revitalization Initiative (MRI), although to date, no further plans have been laid out.⁴¹ Large-scale initiatives from Saudi Arabia, Qatar, and the UAE target native tree and vegetation planting, including mangrove restoration.

A number of fruitful regenerative and conservation agriculture pilots also offer rich information. Work on conservation agriculture in several governorates of northern Iraq (2004-15)⁴² deployed zero tilling and stubble mulching, thereby increasing yields, retaining nutrients, and preventing soil erosion. In Saudi Arabia, a 2010-18 project regenerated Al-Baydha in Makkah Province by using permaculture principles and slowing down seasonal floodwaters. It worked with the local community to design sustainable pastures to enhance rural livelihoods.⁴³ It is clear from the study of these projects that work to regenerate local landscapes takes time, and it is a long-term investment that benefits from local indigenous knowledge and regional and international expertise.

Action on SDS also offers wins in terms of public health, quality of life, and economic prosperity. Regenerating desertified land in a sustainable way reduces dust downwind, brings rural livelihood benefits (reducing rural-to-urban migration), and enhances local resilience to climate change through water and soil retention and cooling. Work on SDS has many complementarities with climate change mitigation actions, which align with several countries' net-zero targets. For example, in the urban domain, the fact that dust mixes with pollution from other sources to deadly effect should spur much faster action to reduce diesel combustion. That suitable dry brush technologies now exist to effectively clean dust from solar PV without the use of water could enable economies of scale to emerge for such applications. Figure 1 illustrates positive cascades and feedback loops whereby regional cooperation activities (orange lozenges) could foster shared regional benefits (green hexagons).

One vehicle with potential for expanding regional environmental cooperation is the little-known Regional Organization for the Protection of the Marine Environment (ROPME) (for more

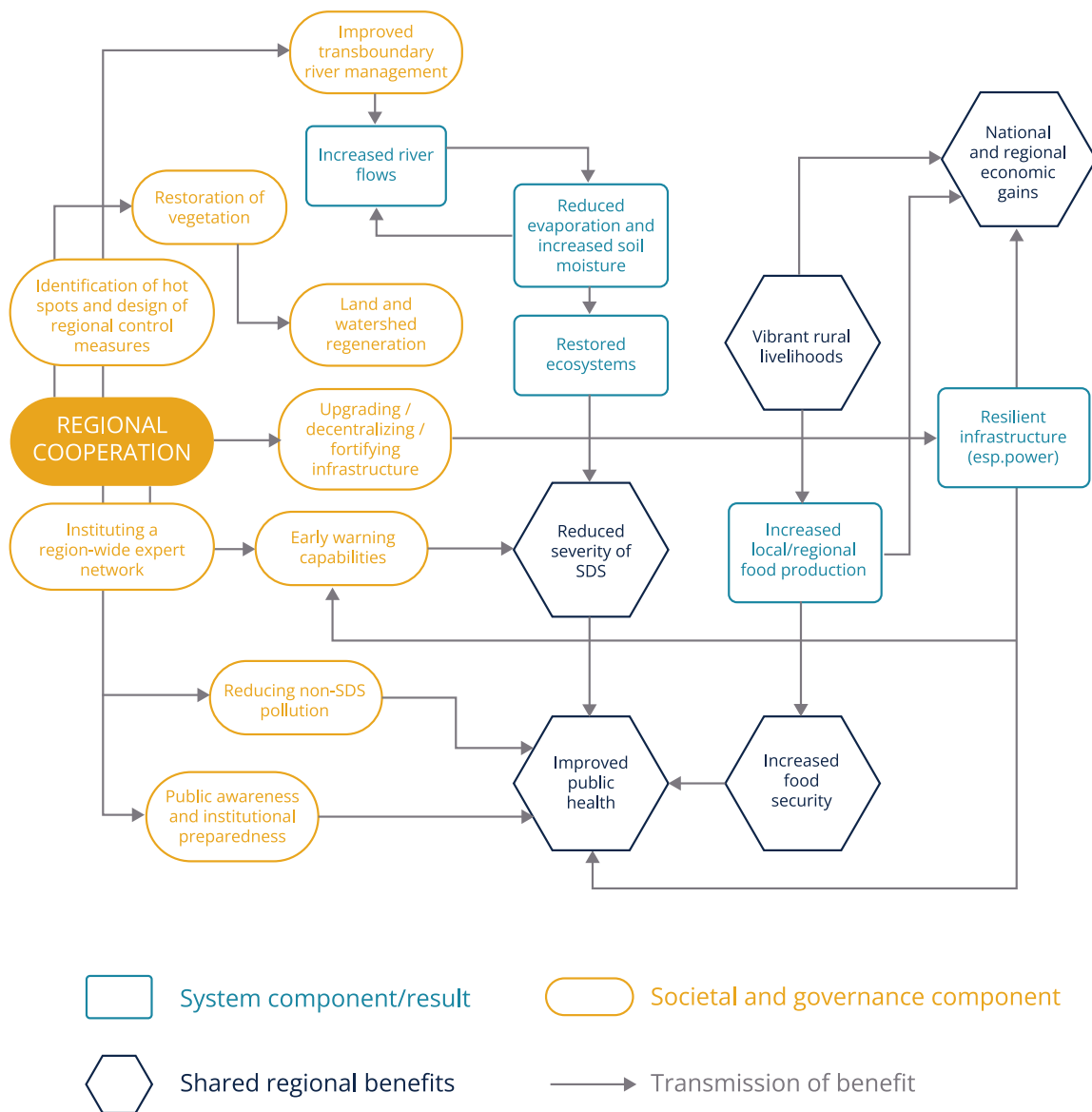
41 "Mesopotamia Revitalization Project: A Climate Change initiative to Transform Iraq and The Middle East." President's Office, the Iraqi Presidency, October 17, 2021, Iraq, <https://presidency.iq/en/Details.aspx?id=3437>

42 "Zero till project leaves legacy in Iraq," *Australian Centre for International Agricultural Research*, September 17, 2020, <https://www.aciar.gov.au/media-search/blogs/zero-till-project-leaves-legacy-iraq>; "Conservation Agriculture in Northern Iraq Phase III," ICARDA, <https://mel.cgiar.org/projects/20>

43 "The Story of Al Baydha: A Regenerative Agriculture in the Saudi Desert," narrated by Neal Spackman, *YouTube*, June 2, 2020. <https://www.youtube.com/watch?v=T39QHprz-x8>

on ROPME, read chapter 1 of this volume). This entity, which comprises the eight coastal states of the region (Bahrain, Iran, Iraq, Kuwait, Oman, Qatar, Saudi Arabia, and the UAE), arose out of a regional initiative with UNEP and other UN agencies in the late 1970s to protect common sea areas from pollution, particularly from oil. In spite of an earlier World Bank attempt to reenergise ROPME, work failed to take off because of deteriorating political relations. However, spurred by regional initiative, activity is restarting. Headquartered in Kuwait, it has become the centre of focus as a vehicle for strengthening collaboration on the issue.

Figure 1. Areas for regional cooperation on sand and dust storms



Next steps in expanding regional cooperation on SDS

Cooperation on SDS makes sense for all Gulf countries, and several stars are aligned to facilitate this. Firstly, the current moves toward rapprochement among governments offer

space for collaborative initiatives to take root. The current re-emergence of the Israel-Palestine conflict may endanger the rather positive political trend, but it will not reverse the apparent willingness and need to cooperate on climate-related issues. Secondly, all governments in the region acknowledge SDS as a problem that demands regional cooperation, and some are engaging in early-state cross-border initiatives. Thirdly, several region-wide and internationally supported foundations work on SDS, including the UN-coordinated West Asia Regional Master Plan to Combat Sand and Dust Storms and the above-mentioned WMO data centres. Fourthly, there is currently a groundswell of goodwill from global centres of expertise to support improvements to public health post-COVID, including air pollution, and to progress nature-based solutions for development and climate resilience in the region.

As far as SDS are concerned, practical cooperation should continue, expand, and institutionalise at the technical and practical levels. From the perspective of regional dust and environmental experts,⁴⁴ research priorities must include:

Control measures

Identifying hot spots and designing and rolling out regional projects that target stabilisation. As Al-Dousari et. al. 2022 show, cross border scientific cooperation can match dust samples with their origins.⁴⁵ A mix of work on restoring soil moisture and nurturing native plants can then fix soil in place and reduce transit of airborne particles. For example, in a pilot in Kuwait Bay, planting *Nitraria retusa* and *Lycium shawii* in a particular wind-catching formation and irrigated with brackish water was found to increase flora and fauna and significantly reduce downwind sand and dust rates.⁴⁶ In Al-Baydha, Saudi Arabia, rainwater harvesting and various measures to restore ecological balance halted desertification.

Region-wide expert network and sharing portal

Instituting a region-wide expert network and space for exploring region-wide scientific exploration of solutions is key. Numerous universities and centres have pieces of the picture regarding meteorology, evolving SDS patterns and origins, and how to increase infrastructure resilience and remediate land. There could be a central pool for sharing studies, webinars,

44 The first three are from Dr Ali Al-Dousari, Aeolian Specialist, Crisis Decision Support Program, Environment & Life Sciences Research Center, Senior Research Scientist, Kuwait Institute for Scientific Research, by email communication with the author, July 18, 2022; these also agree with the conclusions of Banafsheh Keynoush, "Severe sand and dust storms are an underrated risk in the Gulf region, despite mitigation measures," *Middle East Institute*, March 14, 2022. <https://www.mei.edu/publications/severe-sand-and-dust-storms-are-underrated-risk-gulf-region-despite-mitigation>; The World Bank Group 2019 report and many others also flag the fourth point about land remediation, and the recommendation here is based on the experience of the above-mentioned regional initiatives and pilots and conversations with regional actors in ecosystem conservation as part of the CASCADES.eu project in 2022.

45 Ali Al-Dousari et al. 2023. A Salt Tolerant Native plants as a Solution for Mobile Sand and Dust in Kuwait. *IOP Conference Series: Earth and Environmental Science*. <https://iopscience.iop.org/article/10.1088/1755-1315/1222/1/012011>

46 Ibid.

and thought pieces across the region, perhaps an extension of the Arab Development Portal, supported by the Arab Coordination Group of the UNDP, with a part of the site dedicated to SDS-related studies.⁴⁷ In addition, experts from around the Gulf region should meet in person on a regular basis to share their findings on SDS – a role that ROPME could play.

Land and livelihood regeneration

Land-regeneration initiatives will take root and flourish only with the support of local communities, using the rich scientific knowledge of native flora, as well as coordinated agricultural training and regulation to make sure that ecosystems contribute to local livelihoods. With several projects in the region already completed or active, there is much to learn from and replicate. Relevant civil society bodies are vital assets, but any collaborative framework beyond borders must take account of the deep mistrust that may exist among parties.

There are also a number of areas that would reduce the societal impacts of SDS on which all Gulf countries could benefit from sharing experience and best practice. These include early warning systems and public alerts; reducing non-SDS pollution, for example from traffic, the oil and gas and other heavy industry sectors; and upgrading infrastructure for climate resilience, including protecting grids from dust and moisture.

Public awareness and institutional preparedness

Devising strategies on a scientific basis for urban areas – in particular to protect indoor air quality in residential areas, hospitals, schools, and houses of worship – to minimise the effect of dust on people’s health, and for rural areas to better protect people, animals, and crops. Internal coordination of government agencies and local government offices is essential for public education, alerts, and infrastructure weatherisation.

Conclusion

While the moves towards détente and diplomacy in the Gulf are positive developments, many blocks stand in the road toward more durable security in the region. Rapprochement needs initiatives, not just intentions. As such, this ‘moment of regional dialogue’ on the political level must be followed by exchanges and cooperation at the level of scholars, technical experts, and societal influencers. Shared environmental and climate-related challenges present a solid foundation for cross-border cooperation. In light of the opportunities that the Baghdad Conference process has opened, specific dialogue formats that convene regional experts in

⁴⁷ The Arab Development Portal was set up in 2016 as a “one-stop-shop knowledge resource that aims to improve the scope, depth, reliability, and availability of high-quality development knowledge to support development progress in the Arab region,” Arab Development Portal website, <https://www.arabdevelopmentportal.com/whatwedo>

thematically focused deliberations on climate and environmental issues in the Gulf region should be elevated to inform political decision-making.

This chapter has highlighted SDS as a fruitful starting point because of the existing level of agreement on the importance of cooperation by all countries at the head-of-state level, the regional and international resources and support already in place, and current cooperative studies and pilots on which plans could be built. The urgency of the matter – and sheer economic sense in joining forces, as the Kuwait-Iraq cooperation shows, may incentivise serious attempts to move together, rather than duplicate efforts in possibly contradictory ways.



Chapter 5

Cooperation Opportunities for the Gulf in the Energy Transition

Robin Mills¹

Abstract

Political differences, sanctions, and unfavourable investment conditions have severely constrained the GCC states' engagement with their two Gulf neighbours, Iran and Iraq. But there is great complementarity between the most advanced of the GCC, on the one hand, and Iran and Iraq on the other, because the GCC states have capital, access to technical expertise and a growing body of experience across the field of energy transition solutions. Opportunities for cooperation are numerous. They include, non-exhaustively: aligned positions in international negotiations and trade; common policies, for example on standards or carbon pricing; collaboration on energy transition and climate-related technologies and skills development; cross-border infrastructure such as electricity lines or hydrogen or carbon dioxide pipelines; cross-border investments or joint investments in third countries; and, when it comes to security more broadly, cooperation on environmental protection, weather disaster readiness, and climate adaptation. Such opportunities can be realised on a bilateral basis or by individual companies with little or no government involvement; others require multilateral cooperation, whether under the aegis of the GCC or otherwise.

Introduction

The six member states of the Gulf Cooperation Council (GCC) seem, at first glance, to face a similar set of challenges and opportunities in the energy transition. These are rather different

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from those of their two large neighbours, Iran and Iraq. Their domestic economies rely heavily on the production, refining, use, and export of oil and gas; seven of the eight are members of the Organisation of Petroleum Exporting Countries (OPEC) or the expanded OPEC+ alliance; and they all have hot and semi-arid or arid climates with high solar irradiation. However, between the GCC states and their two neighbours, there are major differences: monarchies versus republics with semi-democratic elements; states with relatively small populations and geographic areas (apart from Saudi Arabia), versus two large countries; high or very high incomes versus upper-middle income; and a half-century or more of political stability and continuity, versus histories of revolution and conflict.

Iran, Iraq, and to some extent Oman are short of capital, while Saudi Arabia, the UAE, Kuwait, and Qatar are major capital exporters with globally-important sovereign wealth funds. Per-capita GDP in Iran (\$4091) and Iraq (\$4775) is low compared to that of the GCC, which ranges from Oman at the bottom (\$19,509) to Qatar at the top (\$66,838).² At the same time, business dealings with Iran are severely constrained by US-led sanctions, Iraq has a long recent history of violence and political instability, and both rank poorly on corruption, while the GCC monarchies have in general been safe and politically stable, with moderate to low levels of corruption.³ Even in the absence of major sanctions, foreign investment in Iran has been difficult because of non-transparency and the dominance of important sectors by parastatal companies and corporations linked to the Revolutionary Guards.⁴

Relations between Saudi Arabia, Bahrain, and the UAE, on one hand, and Iran on the other, have been poor, although Saudi Arabia and Iran restored relations in March 2023, mediated and guaranteed by China.⁵ The conflict in Gaza that broke out in October 2023 could further complicate Gulf-Iran interactions, given the developing economic and political relations between the UAE and Israel, and US-urged talks over normalisation between Israel and Saudi Arabia. There have also been intra-GCC strains, notably the blockade of Qatar by Saudi Arabia, the UAE, Bahrain, and Egypt from June 2017 to January 2021. More recently, there are reported tensions between Riyadh and Abu Dhabi over regional political issues, including Yemen, and their economic competition.⁶

Within the GCC, approaches to the energy transition are quite different, and the degree of progress and near-term outlooks are very different as well. These differences are even more marked between the GCC states and their two neighbours. Cooperation on the energy transition and the fight against climate change today are limited. Some energy

2 World Bank. 2023. "World Development Indicators." *World Bank*. <https://databank.worldbank.org/indicator/NY.GDP.PCAP.CD/1ff4a498/Popular-Indicators>

3 Transparency International. 2022. "Corruption Perceptions Index." *Transparency International*. <https://www.transparency.org/en/cpi/2022>

4 Khiabani, Mohammad. 2009. "The Great Tehran Expo Privatization Scandal You've Never Heard Of." PBS. 17 August. <https://www.pbs.org/wgbh/pages/frontline/tehranbureau/2009/08/the-great-tehran-expo-privatization-scandal-youve-never-heard-of.html>

5 Middle East Policy Council. 2023. "The Impact of Iranian-Saudi Normalization." Middle East Policy Council. March, 2023. <https://mepc.org/commentary/impact-iranian-saudi-normalization>

6 Said, Summer, Dion Nissenbaum, Stephen Kalin, and Saleh al-Batati. 2023. "The Best of Frenemies: Saudi Crown Prince Clashes With U.A.E. President." July 18, 2023. *Wall Street Journal*. <https://www.wsj.com/articles/frenemies-saudi-crown-prince-mbs-clashes-uae-president-mbz-c500f9b1>

transition-related initiatives of GCC states are competitive; others are at least duplicative. Most significant so far are cross-border investments in renewable energy, mainly between Saudi Arabia, the UAE and Oman. The differences relating to natural resources, institutional capacity, economic development, and political stance present a challenge for cooperation, but they also create opportunity, because of complementarity.

The energy transition, as discussed here, covers a broad range of developments. The overriding theme is the attempt to tackle climate change by reducing and removing greenhouse gas emissions and adapting to unavoidable consequences. The improving performance and cost profile of new energy technologies, such as solar and wind power, batteries, and electric vehicles, makes them viable choices even in the absence of strong climate policy. Countries would need to clearly define what their objectives are from such cooperation, whether it is conceived narrowly or broadly, and whether it is an end in itself or intended to further other goals such as deconfliction. The following sections address these issues and suggest some of the more promising avenues for exploration.

Existing platforms for multilateral energy cooperation

Current cooperation between the Gulf countries in the field of energy is limited to a bilateral basis, or under the aegis of the GCC, or through multilateral bodies such as OPEC (which includes Iraq, Iran, Saudi Arabia, Kuwait, and the UAE, and is enlarged to OPEC+ by cooperation with non-OPEC producers), the International Renewable Energy Agency (IRENA), the Arab Petroleum Investments Corporation (APICORP), and the United Nations Framework Convention on Climate Change (UNFCCC).

The GCC's Long-Term Comprehensive Development Strategy from 1999 did not mention climate or energy transition, but it did discuss issues of water scarcity, preservation of the environment, full utilisation of energy infrastructure, the connection of electricity networks, economic diversification, and the political and economic dimensions of oil.⁷ The 2014 report⁸ mentions climate to some extent, and the environment much more specifically, acknowledging the need to reduce carbon dioxide emissions. It addresses common policies on oil, including the oil lending scheme to cover for export interruptions, the petroleum media strategy, the sharing of electricity and water data, measures for water interconnections (which do not seem to have eventuated), unification of electricity and water technical standards, and, most practically, measures to eliminate lead from petrol and to reduce the sulphur content of diesel. In 2016, studies were conducted on a unified water strategy.⁹

7 Cooperation Council for the Arab States of the Gulf (GCC) Secretariat General. 1999. "Long -Term Comprehensive Development Strategy For the GCC States (2000-2025)." *GCC Secretariat-General*. <https://www.gcc-sg.org/en-us/CognitiveSources/DigitalLibrary/Lists/DigitalLibrary/Economy/1274259140.pdf>

8 Cooperation Council for the Arab States of the Gulf (GCC) Secretariat-General. 2014. "GCC The Process and Achievements 8th Edition." *GCC Secretariat-General*. <https://www.gcc-sg.org/en-us/CognitiveSources/DigitalLibrary/Lists/DigitalLibrary/The%20GCC%20Process%20and%20achievement/7161447306380.pdf>

9 Al-Zubari, Waleed K. 2017. "An Overview of the GCC Unified Water Strategy, 2016-2035." *The 12th Gulf Water Conference*. https://wstagcc.org/WSTA-12th-Gulf-Water-Conference/waleed_zubari.pdf

The Supreme Council meeting of December 2022, by contrast, did mention renewables, climate, and energy transition extensively.¹⁰ There is a Renewable and New Energy committee, which held its eleventh meeting in Muscat in September 2023, discussing electricity transmission and its role in supporting renewable energy integration.¹¹ The GCC could form one venue for the discussion of pan-Gulf initiatives including Iran and Iraq, but the GCC states themselves would first have to align on a position; they may also be concerned that Iran would perceive and exploit differences between them. Therefore, it may be best that such discussions began with limited, technocratic issues, such as common environmental or efficiency standards or environmental monitoring and reporting.

The Middle East Green Initiative which was launched by Saudi Arabia in October 2021 is another area for multilateral cooperation in the Gulf region that could be expanded further. In November 2022, it was announced that \$2.5 billion would be allocated to fund its projects. It has been endorsed by all the GCC states and Iraq, as well as most other MENA countries (but not Iran), and various others internationally. It includes plans for combatting desertification, planting trees, reducing regional greenhouse gas emissions by 670 million tonnes of CO₂-equivalent, implementing a 'circular carbon economy,' creating regional centres for carbon capture, sustainable fisheries, and storm warnings, and initiatives on clean cooking, plastic removal from oceans, and cloud seeding.¹² The Saudi Green Initiative, sitting under the MGI, includes aims to cut 130 million tonnes of carbon dioxide using 'clean hydrocarbon technology,' which could include approaches such as methane reductions, carbon capture and storage, and facility electrification, that would be generally applicable to the petroleum industry in other GCC and Gulf countries.¹³ Tackling desertification and restoring vegetation cover is very relevant to Iran and Iraq, arguably more so than to the GCC. The MGI's charter leaves it open to the membership of additional regional countries, including Iran, and to be chaired by a representative of another country after the initial two-year term of the Saudi chair.¹⁴

In March 2023, after Iran and Saudi Arabia announced a resumption of diplomatic relations, the Saudi finance minister Mohammed Al-Jadaan said that Saudi investments in Iran could happen 'very quickly.' Although this has not yet led to anything tangible, it is at least somewhat promising that energy-related cooperation could eventuate. An invitation to Iran to join the MGI could be a positive step,¹⁵ though Tehran may be cautious about seeming to endorse

10 GCC Secretariat-General. 2022. "Chaired by HH the Crown Prince, Prime Minister of the Kingdom of Saudi Arabia 43rd Session of the GCC Supreme Council." December 9, 2022. *GCC Secretariat-General*. <https://www.gcc-sg.org/ar-sa/MediaCenter/NewsCooperation/News/Pages/news2022-12-9-2.aspx>

11 Mendoza, Jomar. 2023. "MUSCAT: Oman's Ministry of Energy and Minerals recently chaired the 11th meeting of the Renewable and New Energy Committee, in cooperation with the General Secretariat of the GCC, represented by the Energy Department, marking a significant step towards ad." September 10, 2023. *Oman Observer*. <https://www.omanobserver.om/article/1142618/business/meeting-held-to-advance-renewable-energy-initiatives-and-collaboration-in-the-gcc>

12 Saudi & Middle East Green Initiatives. 2022. *MGI Initiatives*. <https://www.greeninitiatives.gov.sa/mgi-initiatives>

13 International Energy Agency. 2022. *Energy Statistics Data Browser*. <https://www.iea.org/data-and-statistics/data-tools/energy-statistics-data-browser?country=WORLD&fuel=Energy%20supply&indicator=TESbySource>

14 Saudi & Middle East Green Initiatives. 2022. *MGI Initiatives*. <https://www.greeninitiatives.gov.sa/mgi-initiatives>

15 Geranmayeh, Ellie. 2023. "Iran-Saudi Arabia reconciliation can help the Middle East's climate change fight." April 28, 2023. *The National*. <https://www.thenationalnews.com/weekend/2023/04/28/to-tackle-climate-change-in-the-middle-east-an-active-cross-border-approach-is-needed>;

Saudi leadership in such issues. European involvement may help, given Europe's strong focus on environmental and climate issues. The EU Commission's joint communication on 'A strategic partnership with the Gulf' of May 2022¹⁶ mentions such opportunities to build GCC-Iran cooperation (for more on EU-Gulf relations, read chapter 8 of this volume).

At the same time, the Gulf countries have interests in advancing a robust common position at climate change negotiations. The UAE hosts the COP28 UN climate conference starting on November 30, 2023. The Arab Group Climate Change Negotiation under the League of Arab States is intended to coordinate Arab countries' positions in UNFCCC negotiations, and OPEC and OAPEC also produce briefs and meet prior to COPs and other UNFCCC sessions. Obvious elements of common interest would include commitments to phase down 'unabated' fossil fuel use (i.e. without carbon capture and storage [CCS]), to allow international carbon trading of CCS-derived credits, and to favour gas over coal.

Such areas are not viewed favourably by EU countries in general, as their climate approach focusses on eliminating fossil fuels rather than using them with lower emission. However, the Gulf could build common ground with the US, Canada, Australia, Norway, and the UK, all of which are supportive of CCS. Carbon border tariffs, such as that being introduced by the EU, present a challenge for exports from a region with high embedded carbon. Other areas, such as the call to triple renewable energy capacity globally, are now quite uncontroversial internationally, but could also be a springboard for more intra-Gulf cooperation and investment. Apart from formal decisions within the UNFCCC/Paris Agreement process, COP28 also serves as a venue for important multilateral or 'minilateral' agreement and clubs, as well as for business. This could be particularly valuable in the case of Iran, where external engagement is often not easy.

More broadly, while attention on security in the Gulf has historically focussed on oil, and to some extent on liquefied natural gas, a safe and stable situation is also required for the region to gain a prominent role in the export or transit of renewable electricity, hydrogen, or new energy-related systems or materials. Within a broader concept of security, the region is also challenged by natural and climate-related disasters and longer-term degradation, notably rising sea-levels, higher temperatures and heatwaves, drought and desertification, floods, pandemics, pests and agricultural diseases, and the possible spill overs from state weakness or collapse in neighbouring countries such as Libya, Syria, Yemen, Afghanistan, and Pakistan. This opens a rich field for cooperation,¹⁷ particularly on strengthening critical infrastructure and systems to protect against climate-related problems.

16 European Commission High Representative of the Union for Foreign Affairs and Security Policy. 2022. "Joint Communication to the European Parliament and the Council." May 18, 2022. *European External Action Service*. <https://www.eeas.europa.eu/sites/default/files/documents/Joint%20Communication%20to%20the%20European%20Parliament%20and%20the%20Council%20-%20A%20Strategic%20Partnership%20with%20the%20Gulf.pdf>

17 Mills, Robin. 2016. "Gulf countries should collaborate on climate change." March 13, 2016. *The National*. <https://www.thenationalnews.com/business/robin-mills-gulf-countries-should-collaborate-on-climate-change-1.153300>

New opportunities for energy cooperation

Before considering what areas of future cooperation could be entertained, it's first worth considering what the objectives of such cooperation would be. These could include the following, which are not mutually exclusive, and could be sequenced in time.

- **Tactical or transactional:** identify specific areas of problems or tension, and opportunity, that could be improved by energy or environmental cooperation.
- **Energy-strategic:** develop broad cooperation in energy that would tackle major challenges, including climate change, climate adaptation, environmental degradation, energy security, energy transition, and the economic gains of regional energy integration.
- **Grand strategic:** use energy cooperation as one component of a wider alignment that aims to resolve regional economic and political problems and create durable strategic architectures.

These objectives could be handled in some cases on a bilateral basis, in some cases with a two-sided approach with the GCC on one side and Iran on the other, and possibly with Iraq as another party or semi-neutral mediator (given the inclination of its political system). There could also be a genuine multilateral process, including all the Gulf states and, where appropriate, external parties, mediators, or guarantors, such as European or Asian players.

The opportunities for collaboration discussed below assume a reasonable continuing level of engagement between the GCC states and Iran, and a partial relaxation of US sanctions on Iran, enough for some level of business normality between Tehran and its Gulf neighbours, but not a major political rapprochement with Washington.

Energy finance

Four of the GCC members are among the largest capital exporters in the world, and host major sovereign wealth funds (Saudi Arabia's Public Investment Fund; the Abu Dhabi Investment Authority, Investment Corporation of Dubai, and Mubadala; the Kuwait Investment Authority; and the Qatar Investment Authority). The Oman Investment Authority and Bahrain's Mumtakalat are smaller but still sizeable investors.

Iraq and Iran, meanwhile, due to the legacy of conflict and sanctions, as well as internal mismanagement, have a large need for investment in their energy sectors, both hydrocarbon and low-carbon, as well as in electricity, water, and areas of climate preparedness. There is also the potential to build regional cooperation and constrain political frictions by jointly investing in projects in neighbouring countries that bring benefits to the Gulf, for example gas pipelines, renewable installations, electricity connections or water systems in Jordan, Turkey, or Pakistan.

The Energy Charter Treaty of 1991,¹⁸ for example, was intended to provide a stable framework for investment in energy, primarily in Europe and the post-Soviet space. While the ECT has unfortunately fallen foul in recent years of objections that it constrains climate action, an updated version could be a model for the Gulf. That would provide security for cross-border investments in major infrastructure such as pipelines and grid connections, and for long-term contracts for gas, hydrogen, electricity, carbon dioxide, minerals, and other energy transition commodities. It could include an institutional framework for pricing and markets, financial transactions, and dispute resolution. Something of this type would be important for protecting any investments and financing provided.

The OPEC Fund for International Development¹⁹ provides development finance for areas which include energy access, energy transition, and water. The Organisation of Islamic Cooperation²⁰ and the Islamic Development Bank²¹ also provide funding for areas such as renewable energy and energy efficiency. APICORP²² is another active investor, headquartered in Khobar, Saudi Arabia, and owned by the ten members of OAPEC (UAE 17%, Saudi Arabia 17%, Kuwait 17%, Iraq 10%, Qatar 10%, Bahrain 3%, plus others). It increasingly invests beyond the petroleum sector, including in renewable energy and hydrogen, as well as in refineries, liquefied natural gas terminals and other hydrocarbon-related assets.²³ Its investments are mostly in the Arab countries but also cover central and south-east Asia, Europe, and the Americas.

These existing financial institutions and frameworks could significantly help in shaping the contours of future energy cooperation in the Gulf region.

Electricity

The most tangible cooperation under the GCC umbrella is probably the Gulf Interconnection Authority (GCCIA), which links the electricity grids of the GCC countries. However, due to a lack of commercial and price transparency, the rather similar gas and oil-based generation fleets in which no country has a major cost advantage, the similar time zones and demand patterns (with the exception of western Saudi Arabia), and an unwillingness to be dependent on neighbours, the GCCIA's capacity is limited to 1200 megawatts (MW) along its backbone, and 600 MW to Bahrain, which is only a small fraction of the approximately 83-gigawatt (GW) generation capacity in Saudi Arabia, for instance. The GCCIA is mostly used to support reserve margins and for emergency balancing, and settled on an in-kind basis rather than

18 International Energy Charter. 2019. *The Energy Charter Treaty*. <https://www.energycharter.org/process/energy-charter-treaty-1994/energy-charter-treaty/>

19 The OPEC Fund for International Development. 2023. *Energy*. <https://opecfund.org/focus-areas/energy>

20 Organisation of Islamic Cooperation. *Organisation of Islamic Cooperation*. Accessed October 18, 2023. <https://www.oic-oci.org/home/?lan=en>

21 Islamic Development Bank. *Renewable Energy*. Accessed October 18, 2023. <https://www.isdb.org/sector/renewable-energy>

22 Arab Petroleum Investments Corporation. 2023. *Projects*. <https://www.apicorp.org/what-we-do/projects/>

23 Ibid.

in cash.²⁴ It does not serve as a consistent method of sending electricity from lower-cost to higher-cost producers, or balancing across time periods.

Iran also exports electricity to Iraq, and Iranian companies have invested in Iraqi power plants.²⁵ This is important given the major gas and electricity shortages in Iraq, with frequent protests leading to the downfall of various electricity ministers and heavy political pressure on successive governments. Although Iraq's power sector suffers even worse shortfalls when Iranian gas or electricity supplies are interrupted, Iran's own difficulty in supplying reliably, and its apparent use of its influence to forestall other solutions, are part of Iraq's problems.

Iran has built quite a self-sufficient domestic electricity equipment industry and has equipped plants in Iraq; if US sanctions were substantially eased, it could expand its equipment exports to other regional countries. To export more electricity, though, would first require solving Iran's episodic domestic shortages, which come both in winter,²⁶ due to high heating demand causing gas shortfalls, and in summer²⁷ when air-conditioning use rises and hydroelectric output is reduced by drought. The US has aimed to diminish Iraqi dependence on Iran for gas and electricity, which are expensive and rather unreliable, not to mention the excessive influence of Tehran in Baghdad to which they contribute.

Aside from Iran and Iraq, Kuwait also suffers from electricity shortages. All have plans to increase the share of renewables in their electricity mix, but it is dominated by fossil fuels. Iran, Iraq, Kuwait, and Saudi Arabia all still burn substantial amounts of oil for power generation, and only the UAE has a substantial fraction of non-hydrocarbon generation. Obvious areas for cooperation on electricity include sharing experience on renewable (mainly solar) deployment and business models, where the UAE, Saudi Arabia, and Oman have developed successful programmes.

The GCCIA is constructing a connection to Iraq, of 500 megawatts increasing to 1800 MW (Iran supplies 1200 MW). This could be a first step towards much more regional interconnectivity.²⁸ This could save costs and emissions, and help incorporate higher shares of renewable output. There is a 1.5-hour time difference between sunrise or sunset in eastern Iran (cities such as Mashhad and Zahedan), and western Saudi Arabia (such as the Neom project and various renewable projects along the Red Sea coast, and the major cities of Jeddah, Makkah and Madinah), allowing solar power to cover a wider stretch of the day. Connections to other

24 Gulf Cooperation Council Interconnection Authority. 2021. "Annual Report 2021." *Gulf Cooperation Council Interconnection Authority*. <https://www.gccia.com.sa/media/downloadsfs>

25 Al-Maleki, Yesar. 2021. "Iran Deepens Iraq Energy Role With 3GW Basra Power Plant." May 21, 2021. *Middle East Economic Survey*. <https://www.mees.com/2021/5/21/power-water/iran-deepens-iraq-energy-role-with-3gw-basra-power-plant/7bbde4b0-ba34-11eb-a4bc-d9579bae640a>

26 Ershad, Alijani. 2023. "Amid gas shortages and blackouts, a harsh winter is fueling discontent in Iran." January 24, 2023. *France 24*. <https://observers.france24.com/en/middle-east/20230125-iran-gas-shortage-electricity-blackouts-power-harsh-winter>

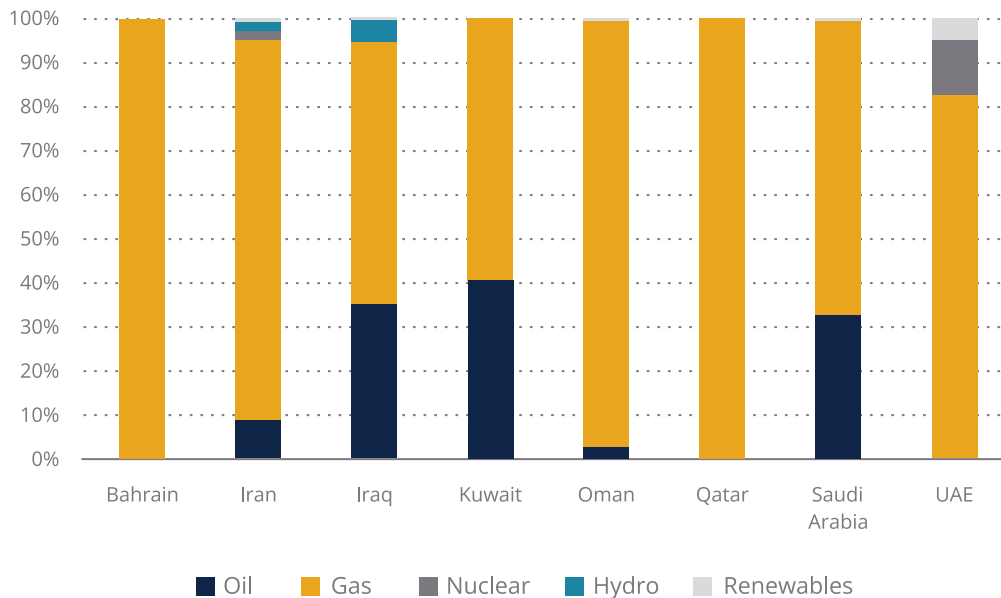
27 Iranwire. 2023. "Gas-Rich Iran Hit Hard by Energy Crisis." August, 2023. *Iranwire*. <https://iranwire.com/en/news/119357-gas-rich-iran-hit-hard-by-energy-crisis/>

28 Mills, Robin. 2023. "GCC Grid Infrastructure and Connectivity – An Electrifying Vision." August 29, 2023. *Arab Gulf States Institute in Washington*. <https://agsiw.org/gcc-grid-infrastructure-and-connectivity-an-electrifying-vision/>

neighbouring states, such as Egypt, Turkey, India, and Central Asian countries, would link a wider net of time zones and generation resources. Iran, Iraq, Saudi Arabia, and Oman have ample open land for solar and wind installations, while the smaller Gulf states may eventually become constrained. Hydropower in Iran could be used as pumped storage, which would stabilise the regional grid while reducing the problem of inconsistent water flows.

However, a wider grid would depend on an institutional and commercial framework to ensure payment, and ideally trading on an economic basis. Even more importantly, it would require significant regional trust for countries to depend on neighbours for a substantial amount of their electricity. This matters less in the case of Iraq, where electricity provision is poor anyway, but much more for the GCC countries, as they need reliable power for air-conditioning and water desalination.

Figure 1. Electricity generation by method
(2022 for Saudi Arabia, Iran, UAE; 2020 for others)²⁹



Renewable energy

Solar power holds great promise in the GCC. Photovoltaic output in the Gulf region, for example, ranges from 4.58-5.67 kWh/kWp in Saudi Arabia, 4.34-5.26 kWh/kWp in Iraq and 3.31-5.48 kWh/kWp in Iran. These figures represent the average daily photovoltaic generation (in kWh) from 1 kilowatt of installed capacity. Above 4.5 kWh/kWp would be considered excellent on global comparisons. The best national average for any country in the world

²⁹ Energy Institute. 2023. “2023 Statistical Review of World Energy.” *Energy Institute*. <https://www.energyinst.org/statistical-review>; International Energy Agency. 2022. “Energy Statistics Data Browser.” *International Energy Agency*. <https://www.iea.org/data-and-statistics/data-tools/energy-statistics-data-browser?country=WORLD&fuel=Energy%20supply&indicator=TESbySource>

is 5.38 kWh/kWp for Namibia, therefore the best sites in Saudi Arabia, Iraq, and Iran are comparable to Namibia's average. The Gulf's figures are in the range of 50-70% higher than two leading European users of solar power, namely 2.72-3.32 kWh/kWp in Germany and 3.08-4.91 kWh/kWp in Spain.³⁰

Wind potential is less evenly distributed, but Saudi Arabia, Oman, and Iran all have areas of high-quality wind resources, while the UAE recently developed 103.5 MW of wind power and plans more.³¹ The combined wind and solar potential in southern Oman alone is estimated at 300 GW, with another 179-300 GW of offshore wind potential;³² Iran has 32-554 GW of wind potential;³³ and Saudi Arabia up to 200 GW of onshore potential, plus 28 GW of fixed and 78 GW of floating offshore wind.³⁴ Wind is also complementary to solar in that it tends to blow more strongly at night and in the winter. Accordingly, the opportunity for collaboration in solar and wind energy development is enormous in the Gulf region.

For example, a Dubai-based private company explored plans to build 600 megawatts of gas-fired, solar and wind plants in the province of Khuzestan in 2021,³⁵ but this has not yet progressed. There could be a number of similar projects in light of the new political environment.

Abu Dhabi's state-owned Masdar, privately-owned AMEA Power, listed company Acwa Power of Saudi Arabia, and Nebras Power of Qatar, are four leading regional renewable developers, with a range of projects throughout the Middle East, Africa, Central Asia and elsewhere. Masdar has investments in Saudi Arabia and Oman, Nebras has Middle East assets,³⁶ while Acwa is a partner for the solar power project in Iraq with TotalEnergies mentioned above. These and others could all invest in projects in Iraq and Iran under the right conditions.

These conditions would include solid power purchase agreements (PPAs) with a creditworthy offtaker or the state utility backed by government guarantees; a reasonable tariff ensuring

30 Global Solar Atlas. 2023. *Global Solar Atlas*. <https://globalsolaratlas.info/>

31 Ahmar, Abir. 2023. "UAE opens 104 MW wind project ahead of U.N. climate summit." October 7, 2023. *Reuters*. <https://www.reuters.com/business/energy/uae-opens-104-mw-wind-project-ahead-un-climate-summit-2023-10-06/>

32 Prabhu, Conrad. 2023. "South Oman alone has renewable energy potential of 300 – 500 GW." May 23, 2023. *Oman Observer*. <https://www.omanobserver.om/article/1137591/business/south-oman-alone-has-renewable-energy-potential-of-300-500-gw>; Global Wind Energy Council. 2021. "Offshore Wind Technical Potential in Oman." *Global Wind Energy Council*. https://gwec.net/wp-content/uploads/2021/06/Oman_Offshore-Wind-Technical-Potential_GWEC-OREAC.pdf

33 Rahmani, Kiana, Alibakhsh Kasaeian, Mahdi Fakoor, Amirreza Kosari, and Sayyedbenyamin Alavi. 2014. "Wind Power Assessment and Site Matching of Wind Turbines in Lootak of Zabol." *International Journal of Renewable Energy Research* 4 (4): 965-976. https://www.researchgate.net/figure/Wind-power-density-at-altitude-of-80-m-in-Iran-5_fig1_283017682

34 Global Wind Energy Council. 2021. "Offshore Wind Technical Potential in Oman." *Global Wind Energy Council*. https://gwec.net/wp-content/uploads/2021/06/Oman_Offshore-Wind-Technical-Potential_GWEC-OREAC.pdf

35 Dorsey, James M. 2021. "Playing cat and mouse: UAE energy company agrees to build power plants in Iran." December 14, 2021. *Modern Diplomacy*. <https://moderndiplomacy.eu/2021/12/14/playing-cat-and-mouse-uae-energy-company-agrees-to-build-power-plants-in-iran/>

36 Mills, Robin. 2023. "Commitments and Contradictions: Gulf and Middle East Decarbonization Strategies Ahead of COP28." August 14, 2023. *Center on Global Energy Policy*. <https://www.energypolicy.columbia.edu/commitments-and-contradictions-gulf-and-middle-east-decarbonization-strategies-ahead-of-cop28/>

an acceptable risk-weighted rate of return; and the provision of land, grid access, and other necessary permits. APICORP would be an obvious institution to support investment in renewable systems, grids, and other energy transition assets.

New energy industries

Saudi Arabia, the UAE, Oman, and Qatar, in particular, are interested in the development of new energy industries, notably low-carbon hydrogen and its derivatives, and CCS. Hydrogen is a nascent business, in which Saudi Arabia, Oman, and the UAE have emerged as early leaders, but eventually Iran could be an important player, especially given synergies with its existing industrial base. There is a high degree of competitiveness in what is seen as a key future industry that can partly offset future declines in oil and gas revenues, both between Gulf countries, and with other major emerging sites for output including North Africa (mostly Egypt and Morocco), south-western Africa, Australia, the US, Chile and north-western Europe. Hydrogen is expensive to produce, even if costs fall sharply as anticipated with the initiation of the first large projects. It is also very costly to transport over long distances. Thus, Gulf states could benefit from building economies of scale for local manufacturing of hydrogen systems, sharing infrastructure for export and local use or conversion of hydrogen, and working together on technological improvements.

They are also interested in creating new domestic manufacturing industries in areas such as electric vehicles (EVs), batteries, hydrogen electrolyzers, renewable energy systems, and critical minerals for energy transition such as lithium and copper (for more on common resources in the Gulf, read chapter 2 of this volume). For example, Saudi Arabia has said it wants to manufacture 300,000 electric vehicles annually by 2030,³⁷ about its total current domestic car sales, and has launched its own EV brand, Ceer,³⁸ as well as investing in US luxury EV maker Lucid, which intends to set up a factory at the King Abdullah Economic City.³⁹ The Kingdom is attempting to develop a full battery supply chain.⁴⁰ So far, Saudi Arabia and the UAE are the main Gulf countries pursuing such strategies.

Saudi Arabia has attempted to expand mining for new energy-related resources.⁴¹ Iran,

37 The Economist. 2023. "Saudi Arabia Wants to Become a Force in Electric Vehicle Manufacturing." September 28, 2023. *The Economist*. <https://www.economist.com/middle-east-and-africa/2023/09/28/saudi-arabia-wants-to-become-a-force-in-electric-vehicle-manufacturing>

38 Arabian Business. 2023. "Saudi Arabia's Ceer and Siemens to develop electric vehicles." August 15, 2023. *Arabian Business*. <https://www.arabianbusiness.com/lifestyle/cars-boats/saudi-arabias-ceer-and-siemens-to-develop-electric-vehicles>

39 Lucid Motors. 2022. "Electric Vehicle Manufacturer Lucid Group Gearing Up for First International Plant in Saudi Arabia After Signing Agreements with Multiple Agencies." February 28, 2022. *Lucid Motors*. <https://lucidmotors.com/media-room/lucid-group-gearing-up-first-international-plant-saudi-arabia>

40 Benchmark Minerals. 2023. "From oil to lithium: How Saudi Arabia is building a battery supply chain." June 16, 2023. *Benchmark Minerals*. <https://source.benchmarkminerals.com/article/from-oil-to-lithium-how-saudi-arabia-is-building-a-battery-supply-chain>

41 Martin, Matthew. 2023. "Saudi Arabia's Mining Ambitions." July 31, 2023. *Bloomberg*. <https://www.bloomberg.com/news/newsletters/2023-07-31/saudi-arabia-s-mining-plan-israel-gulf-tensions-egypt-s-dollar-egp-usd-hunt?sref=IUPsko0S>

already a significant miner of copper, in March and June 2023, announced the discovery of large resources of lithium and copper respectively,⁴² whose commerciality remains unproven. There is potential for joint ventures in the mining, processing, and use of such minerals. For instance, there could be GCC investment in Iran's large and under-explored minerals sector, and collaboration on regional centres for processing rare earths, lithium, and nickel.

Regional countries are aspiring competitors in some of these areas. The desire of Europe and the US for 'de-risking' or 'friendshoring' and lessening dependence on China and Russia for critical materials and components could include the Gulf region but is unlikely to embrace Iran. Since the individual country markets are relatively small by comparison with those of China, India, the US, or EU, a wider regional market, with mutual recognition of 'buy local' policies, would help the economic competitiveness of local manufacturing. Iran's existing large car industry and domestic market could benefit from scaling up EV manufacturing and sourcing components from neighbours. Expansion into such industries is particularly critical for Iran and Iraq, given their large populations, heavy dependence on oil revenues, and very limited progress to date in developing new energy industries that could supplement hydrocarbons.

Table 1. Gas flaring by country, 2022⁴³

Country	Flaring (billion cubic metres)	Change in flaring since 2010	Flaring as % of marketed gas production	CO ₂ emissions from flaring (Mt)	Share of flaring in national energy-related emissions
Bahrain	0.1	-	0.6%	0.2	NA
Iran	18.4	+14%	7.1%	37.1	5.6%
Iraq	17.8	+141%	189.4%	35.9	23.4%
Kuwait	0.7	+250%	5.2%	1.5	4.4%
Oman	2.1	+62%	5.0%	4.2	3.2%
Qatar	1.3	+30%	0.7%	2.6	4.6%
Saudi Arabia	2.5	-7% (since 2013)	2.1%	5.1	0.4%
UAE	1.1	+22%	1.9%	2.2	0.8%

42 Intellinews. 2023. "Iran hails discovery of largest copper deposit in Middle East." June 15, 2023. *Intellinews*. <https://www.intellinews.com/bnegrin-iran-hails-discovery-of-largest-copper-deposit-in-middle-east-281830/>

43 Energy Institute. 2023. "2023 Statistical Review of World Energy." *Energy Institute*. <https://www.energyinst.org/statistical-review>

Road to net-zero emissions

Even in an era of energy transition, the region's enormous hydrocarbon resources will remain important⁴⁴ – indeed, its market share and influence will probably grow substantially.⁴⁵ Flaring of unused gas, one of the major sources of oil industry emissions, has increased in every regional country except Bahrain and Saudi Arabia since 2010, despite attempts to reduce it (Table 1). It is a material part of national gas production and emissions, particularly in Iran, Iraq, Kuwait, and Oman. Collaboration on reducing flaring and methane leaks should therefore be a constructive and uncontroversial activity. This is relatively straightforward; it requires upgrades to outdated equipment with high rates of leakage; systems to monitor methane leakage, including satellite imaging which could naturally cover the whole region; sharing of modern technologies with low leakage rates; and investment to capture and process flared gas, pipelines to take it to market and power plants and industries to use it.

The Net Zero Producers Forum, which aims to eliminate emissions from hydrocarbon production, includes Saudi Arabia, Qatar, and the UAE, alongside the US, Canada, and Norway.⁴⁶ While the other GCC members could presumably also join, Iraq would be problematic because of the longstanding difficulty of eliminating its very high level of gas flaring. Iran would be problematic, too, although if relations with the US improved, such a forum might be a useful apolitical venue for contacts.

Conclusion

Intra-Gulf relations have somewhat improved in 2023. But the situation remains fragile, and could be affected by a new US administration, the fall-out of a deeper US-China confrontation, or a flare-up of conflict in the wider Middle East or in the Gulf itself. US sanctions on Iran, and the difficulty and opacity of Iran's business environment, make cooperation hard. That complexity extends to potential GCC involvement with Iraq.

Nevertheless, there are some specific initiatives and projects that could rebuild some mutual interests and build collaboration, without committing more deeply or irreversibly than regional states are comfortable with. The most obvious examples include cross-border investment in renewable energy, projects to stop gas flaring and cut methane leaks, and sharing of experiences in new energy systems.

Deeper cooperation would include major international capital projects in electricity interconnections, pipelines for gas, carbon dioxide, and hydrogen, investments in

44 Husari, Ruba. 2022. "For Gulf producers, decarbonization does not mean zero oil production." January 31, 2022. *Middle East Institute*. <https://www.mei.edu/publications/gulf-producers-decarbonization-does-not-mean-zero-oil-production>

45 Griffiths, Steve. 2021. "The Oil and Gas Industry in a Net Zero by 2050 World." August 26, 2021. *Khalifa University*. <https://www.ku.ac.ae/the-oil-and-gas-industry-in-a-net-zero-by-2050-world>

46 Department of Energy. 2022. "The United Arab Emirates Joins as Sixth Member of the Net-Zero Producers Forum." May 13, 2023. *Department of Energy*. <https://www.energy.gov/articles/ united-arab-emirates-joins-sixth-member-net-zero-producers-forum>

petrochemicals, hydrogen, and synthetic fuel production, and the development of cross-border supply chains for new energy systems. Such investments could also be carried out in third countries, which would provide a measure of political insurance. Cooperation in Iraq on important projects related to energy, climate, and water, or at least a wary mutual understanding between Iran and the GCC,⁴⁷ would ease the concerns of Tehran and its allies in Iraq that GCC investments are intended to undermine them or act as a proxy for US policy.

Such examples of deeper cooperation could be on a case-by-case basis, but they would be much more powerful if embedded in an institutional framework, providing robust commercial signals, investor protections and environmental governance. That could be a component of a broader regional understanding, including cooperation on security and environmental problems, and alignment of climate policies, that could reach beyond the energy sector. And it would equip the regional countries to deal with the formidable economic, social, and political challenges of the energy transition and climate change.

47 Mills, Robin. 2023. "Why energy could help bring Iraq back into the Arab economic mainstream." June 19, 2023. *The National*. <https://www.thenationalnews.com/business/comment/2023/06/19/why-energy-could-help-bring-iraq-back-into-the-arab-economic-mainstream/>



Chapter 6

Boosting Food Security in the Gulf through Regional Cooperation

Malak Altaeb¹

Abstract

Food security is a significant challenge for the Gulf states, as water scarcity, climatic changes, and heavy reliance on food imports have worsened. Regardless of the oil revenues abundance, member states of the Gulf Cooperation Council (GCC) have only been able to address immediate food security concerns through imports and international trade partnerships. However, this approach may be susceptible to global crises and climate changes. Therefore, this chapter highlights the critical need for the GCC states to explore cooperation with Iran and Iraq and to work together through regional cooperation on food security. This chapter underscores instances of continued food trade between the UAE and Iran, and the supportive role Iran played for Qatar during the 2017 blockade illustrates the potential for economic interests to prevail over political differences. Emphasising Iran's diverse agricultural potential, the chapter proposes how investments by the GCC states can bolster regional food security. Bilateral cooperation with the GCC states as well as involving international players such as the European Union and China are also considered. Strategies include modernising agricultural practices, fostering knowledge sharing, and enhancing infrastructure.

Introduction

While the Gulf region grapples with pressing challenges like water scarcity, financial volatility, and a marked reliance on food imports, it stands on the precipice of a more significant looming

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crisis: food insecurity. Climate change is worsening this problem, with prolonged droughts and heat waves directly impacting agricultural production. The limited use of modern farming methods in the region further exacerbates the issue of resource scarcity and increases the need for efficient food production. Land degradation² has rendered small-scale agricultural endeavours even more precarious and has amplified the region's food security concerns. Ongoing conflicts in various countries in the broader region also compound the problem, directly affecting food security and people's well-being. In addition, the global COVID-19 pandemic and the war in Ukraine have both strained food security across the region and beyond.

The Gulf region, known for its high temperatures, humidity, and dry lands,³ stands at a critical juncture. Looked at through the lens of food security, the Gulf Cooperation Council (GCC) countries present a narrative which contrasts with that of Iran and Iraq. The GCC states greatly depend on the revenue generated from oil exports, which contributes three-fourths of their annual revenues and exports.⁴ These revenues are largely used for food imports; limited arable land, water scarcity,⁵ and over-exploited groundwater aquifers⁶ mean that the region is not self-sufficient when it comes to food. □ The GCC states' significant economic wealth allows them to invest in food security initiatives, modern infrastructure, and strategic food reserves, albeit at varying levels. Some of the GCC countries have even initiated efforts to enhance domestic food production in addition to investing in Agri-tech projects and farmlands abroad.

Even though their financial strength currently aids in offsetting immediate food security concerns through imports, such a strategy may not be sustainable in the long run, especially when tested by global crises, such as pandemics and extreme climate events. Although the GCC states are relatively food secure today, the effects of climate change, water scarcity, and global supply chain disruptions remain potential threats.

It is imperative for the Gulf states to focus on fostering regional cooperation, leveraging shared knowledge, and pooling resources to combat common threats. This chapter aims to highlight the potential advantages of regional cooperation between the GCC states, Iran, and Iraq. The chapter provides recommendations on how collaborative research, shared agricultural technology advancements, and mutual assistance pacts can help build resilience against food insecurity in the Gulf and the broader region.

2 Smith, Sophie. "Confronting Environmental Challenges in the GCC: The Initiatives at Play." *Euro Gulf Information Centre*. Accessed September 21, 2023. <https://www.egic.info/confront-environment-challenges-gcc>.

3 Al-Olaimy, Tariq. 2021. "Climate Change Impacts in the GCC." May 25, 2021. *Echoing Sustainability in MENA*. <https://www.ecomena.org/climate-change-gcc/>

4 Iqbal, Z., and U. Fasano-Filho. 2003. "GCC Countries: From Oil Dependence to Diversification." In *GCC Countries*. USA: International Monetary Fund. <https://doi.org/10.5089/9781589062337.054.ch001>

5 Raouf, Mohamed. 2009. "Water Issues in the Gulf: Time for Action." January 1, 2009. *Middle East Institute*. <https://www.mei.edu/publications/water-issues-gulf-time-action#:~:text=According%20to%20the%20United%20Nations,closer%20to%20100%20cubic%20meters>

6 Alrashed, Mohammad, and Mohsen Sherif. 2000. "Water Resources in the GCC Countries: An Overview." *Water Resources Management* 14: 59-75. https://www.researchgate.net/publication/225968054_Water_Resources_in_the_GCC_Countries_An_Overview

Does financial security guarantee food security?

Given the region's economic advantages from oil revenues, the GCC countries are considered among food-secure countries per the Global Food Security Index, which assesses factors of affordability, availability, quality, and safety, as well as sustainability and adaptation.⁷ However, the region's susceptibility to fluctuations in food prices, observed during global crises such as the COVID-19 pandemic and recently in the aftermath of the war in Ukraine,⁸ highlights its vulnerability to food insecurity, as it lacks the necessary resources for self-sufficient food production.

While each GCC country faces unique food security challenges, common themes of water scarcity, limited arable land, and heavy reliance on imports are evident across the board. Many Gulf states, including Saudi Arabia, Kuwait, and UAE, implement food subsidy programs to maintain affordable food prices for their citizens.⁹ For example, Oman's subsidies focus on staple food items, while Saudi Arabia covers food, water, and energy. These programs play a crucial role in ensuring food accessibility.

At the same time, the GCC states, particularly, have cultivated strong trade relationships with food-producing partners worldwide, including with Asian countries, which account for sixty percent of the GCC's foreign trade.¹⁰ They often engage in long-term contracts to secure their food supply. For example, the UAE has contracted with countries like India, Thailand, and Pakistan for a consistent rice supply.¹¹ After the 2017 blockade, Qatar accelerated its efforts to secure food supplies to fill the gap created by Saudi Arabia; it entered into long-term agreements with countries like Turkey, Iran, Kuwait, and Oman for various food products.¹² In comparison, Kuwait has engaged in long-term contracts for rice, particularly with India.¹³ Like the UAE, Oman sources a significant portion of its rice from India, Pakistan, and Thailand.¹⁴

7 Economist Impact. 2022. *Global Food Security Index*. <https://impact.economist.com/sustainability/project/food-security-index/>

8 Bilan, Y., A. Vysochyna, T. Vasylieva, D. Grytsyshen, and L. Smutka. 2023. "Impact of coronavirus disease (COVID-19) on food security: Bibliometric analysis and empirical evidence." *Frontiers in Sustainable Food System* 7: 1126454. <https://doi.org/10.3389/fsufs.2023.1126454>

9 Ramady, Mohamed. 2022. "Food Security at the Forefront of GCC and Global Economic Concerns." May 26, 2022. *Emirates Policy Center*. <https://epc.ae/en/details/featured/food-security-at-the-forefront-of-gcc-and-global-economic-concerns>

10 ISPI. 2013. "Asia-GCC Relations: Growing Interdependence." *ISPI Online*. <https://www.ispionline.it/en/publication/asia-gcc-relations-growing-interdependence-8025>

11 Singh, Marisha. "India, UAE Ban Rice Export: Possible Fallout on Markets." August 2, 2023. *Gulf Business*. <https://gulfbusiness.com/india-uae-ban-rice-exports-impact-world-market/>

12 Umar, Sharique Umar and Salem Ghurab. 2023. "The 2017 Gulf Crisis and Changes in Qatar's Economic Landscape." In *Social Change in the Gulf Region: Multidisciplinary Perspectives*, ed. Md Mizanur Rahman and Amr Al-Azm. Singapore: Springer Nature. https://doi.org/10.1007/978-981-19-7796-1_27

13 Staff Desk. 2022. "Export Rice From India To Kuwait." August 26, 2022. *Vakilsearch*. <https://vakilsearch.com/blog/export-rice-from-india-to-kuwait/>

14 Nair, Vinod. 2023. "Oman Has Sufficient Reserves of Rice: Official." August 1, 2023. *Oman Observer*. <https://www.omanobserver.om/article/1140905/oman/community/oman-has-sufficient-reserves-of-rice-official>

Some GCC states also invest in agricultural projects abroad, aiming to guarantee future food sources. For example, the UAE has investments in agriculture in Egypt and Morocco. In 2009, the UAE's agricultural investment firm Janan partnered with Egypt to cultivate 42,000 hectares of land for wheat, maize, and other crops, and the project was extended until 2015.¹⁵ In 2022, UAE's DANA Global and Agadir Horticultural Complex partnered to create an eco-efficient agriculture hub in Morocco.¹⁶

Saudi Arabia, the largest country in the GCC, is facing major food security issues due to its dry environment. While many of these challenges also apply to other Gulf states, the scale of Saudi Arabia's population, the largest in the group, along with its vast desert terrain, amplify these issues. The country's freshwater resources are limited, which leads to excessive reliance on desalination. Moreover, the country still relies heavily on imported food, leaving it vulnerable to global market fluctuations; policy has shifted towards increasing imports and reducing dependence on local produce due to the overuse of groundwater aquifers.¹⁷

Kuwait ranks among the ten poorest countries in water resources per capita, as 60% of its water resources come from desalination plants, and the remaining 40% are trusted wastewater and groundwater aquifers, according to the World Bank 2022 statistics on water resource distribution in Kuwait.¹⁸ Oman suffers from a scarcity of arable land and depletion of underground water resources, particularly in regions where water tables are falling, like Al Batinah.¹⁹ Meanwhile, Bahrain's limited landmass as an island state means it relies heavily on the King Fahd Causeway to import essential commodities, making it vulnerable to disruptions.²⁰ These countries are impacted by fluctuating oil prices, directly affecting their ability to import food.

Qatar's food security challenges were highlighted during the 2017 blockade, when its only land route for food imports was abruptly cut off following its dispute with Saudi Arabia, the UAE, Bahrain, and Egypt. At the time, Qatar imported around 90% of its foodstuffs, with 40% entering through its only land border with Saudi Arabia.²¹ Although the UAE has been most successful in exploring new solutions, such as advanced hydroponics, desert agriculture, and vertical farming – techniques which maximise production while minimising water usage,

15 United Arab Emirates Telecommunications Regulatory Authority. 2019. "Investing in Agriculture Projects Abroad." TRA. <https://u.ae/-/media/About-UAE/Success-stories/cs-docs/CS10.ashx>.

16 TECHx Media. 2022. "DANA Global Signs Partnership to Bring Desert Tech to Morocco." December 22, 2022. TECHx Media. <https://techxmedia.com/dana-global-signs-partnership-to-bring-desert-tech-to-morocco/>, <https://techxmedia.com/dana-global-signs-partnership-to-bring-desert-tech-to-morocco/>

17 Khrais, Rami. 2016. "What Saudi Arabia Is Doing to Save Water." April 1, 2016. Al-Monitor. <https://www.al-monitor.com/originals/2016/04/saudi-arabia-self-sufficiency-water-policy.html>

18 Atiq Ur Rehman Tariq, Muhammad, Rabeeah Alotaibi, Kumudu Kaushalya Weththasinghe, and Zohreh Rajabi. 2022. "A Detailed Perspective of Water Resource Management in a Dry and Water Scarce Country: The Case in Kuwait." *Frontiers in Environmental Science* 10. <https://doi.org/10.3389/fenvs.2022.1073834>

19 McDonnell, Rachael. 2016. "Groundwater Use and Policies in Oman." *IWMI Project Report* 14. <https://gw-mena.iwmi.org/wp-content/uploads/sites/3/2017/04/Rep.14-Groundwater-use-and-policies-in-Oman.pdf>

20 Razaq, Selman. 'King Fahad Causeway: More than a Road for Bahrain.' *Al Wasel Bahrain*. Accessed 8 October 2023. <https://alwaselbahrain.com/king-fahad-causeway-more-than-just-a-road/>

21 Almohamadi, Sara Fouad. 2017. "Qatar Food Insecurity." August 21, 2017. IISS. <https://www.iiss.org/online-analysis/online-analysis/2017/08/qatar-food-insecurity>

which is critical in a desert environment – challenges remain in the sustainable sourcing and distribution of food across the Emirates.

Recommendations for regional cooperation on food security

Regional cooperation on food security between the GCC states, Iran, and Iraq is paramount because these countries share interconnected ecological, economic, and logistical challenges, but also opportunities. By collaborating, they can pool resources, share knowledge, and benefit from economies of scale, ensuring a consistent food supply and a more resilient and sustainable agricultural sector.

Climate action requires regional cooperation to tackle environmental issues on a regional level and ensure economic diversity and social cohesion. Fostering food security cooperation requires a long-term commitment, collaboration, and a holistic approach that addresses the unique challenges and opportunities in the region. Thus, to ensure long-term food security, Gulf countries must adopt complementarity as well as sustainable agriculture practices to combat soil degradation, excessive water use, and pesticide reliance. Addressing food waste, mitigating dependency on a few staple foods, managing rapid population growth, and navigating geopolitical tensions are critical aspects of their food security strategy. The necessity for a resilient food system makes cooperation between these neighbouring countries desirable and crucial for regional stability.

Food security cooperation between the GCC states and Iran

The GCC states and Iran, given their geographic proximity, have been engaged in trade on a wide range of commodities for centuries. The Gulf has long been a nexus of trade routes, especially for goods traversing between the East and the West. The historical Silk Road trade routes connected Iran with the Arabian Peninsula.²² This allowed goods, including agricultural produce and spices, to flow both ways.

Today, the concept of food security cooperation between the GCC states and Iran is laden with complexities due to longstanding geopolitical tensions, including disputes over regional influence, energy resources, and political ideologies. Nevertheless, food security offers a potentially less divisive avenue for collaboration, which could benefit the economies of regional countries and the overall regional stability.

The trade dynamic between Iran and the UAE, particularly in the food sector, encapsulates their intertwined histories and the fact that economic interests can and will supersede political differences. Even at the height of the Iran-UAE conflict, agriculture and food exports

22 Williams, Tim. 2014. *The Silk Roads: An ICOMOS Thematic Study*. Charenton-le-Pont, France: International Council of Monuments and Sites. https://www.icomos.org/images/mediatheque/ICOMOS_WHThematicStudy_SilkRoads_final_lv_201406.pdf

from Iran to the UAE were minimally affected.²³ For decades, Dubai has been a critical re-export hub for Iranian products.²⁴ Although there was no direct state-level agricultural partnership, the UAE and Iran's market reach benefited from their indirect collaboration. The UAE is Iran's most significant growing export market.²⁵ There are eight thousand registered Iranian²⁶ companies around the Emirates, primarily focused on trade between the two countries and in re-exportation. Since both countries decided to turn a new page in relations and strengthen their diplomatic ties in 2021, Iran-UAE trade has exceeded one billion dollars in the first five months of the Iranian calendar.²⁷

Following the 2017 blockade on Qatar, Iran emerged as a vital lifeline for the small Gulf state, especially concerning food security.²⁸ With its only land border with Saudi Arabia closed and sea and air routes restricted, Qatar turned to Iran to bypass these trade impediments. Qatar established air bridges with Iran, importing fresh produce, dairy products, and other essentials.²⁹ This renewed partnership, formed out of necessity, once again showed the potential to reshape Gulf trade dynamics, prioritising economic interests over political differences.

Oman's amicable relations with Iran have also resulted in an uninterrupted trade relationship between the two countries. Iranian goods, including agricultural produce, are shipped through the Omani port of Sohar from Iran's Shahid Rajaei port.³⁰ As both countries striving to diversify their economies, their collaboration covers many aspects including logistics, energy, and tourism but also expanded to also include livestock and foodstuff during the pandemic period.³¹

Kuwait has slightly increased its food trade with Iran since 2020, when it resumed food imports to meet local demand in the aftermath of the pandemic.³² In 2021, Iran recorded a notable trade surplus with Kuwait, primarily driven by the export of mineral, animal, and

23 The New Arab. 2021. "Iran-UAE Trade Reaches More than \$1.1b in 5 Months." September 3, 2021. *The New Arab*. <https://www.newarab.com/news/iran-uae-trade-reaches-more-1b-5-months>

24 Khalid, Tuqa and Andrew Torchia. 2018. "In Dubai, U.S. Sanctions Pressure Historic Business Ties with Iran." November 19, 2018. Reuters. <https://www.reuters.com/article/iran-sanctions-dubai-idINKCN1NO151>

25 Observatory of Economic Complexity. "Kuwait & Iran Country to Country Profile." OEC. Accessed 10 October 2023. <https://oec.world/en/profile/bilateral-country/kwt/partner/irn>

26 Reuters. 2012. "MIDEAST MONEY-Sanctions Sap Dubai's Role as Iran Trade Hub." February 15, 2012. *Reuters*. <https://www.reuters.com/article/iran-business-dubai-idINL5E8DC0CE20120215>

27 The New Arab. 2021. "Iran-UAE Trade Reaches More than \$1.1b in 5 Months." September 3, 2021. *The New Arab*. <https://www.newarab.com/news/iran-uae-trade-reaches-more-1b-5-months>

28 Wellesley, Laura. 2019. "How Qatar's Food System Has Adapted to the Blockade." November 14, 2019. Chatham House International Affairs Think Tank. <https://www.chathamhouse.org/2019/11/how-qatars-food-system-has-adapted-blockade>

29 Clarke, Hilary. 2017/ "Iran Sends Planes Stuffed with Food to Qatar." June 11, 2017. CNN. <https://www.cnn.com/2017/06/11/middleeast/iran-qatar-planes-food/index.html>

30 Beer, Eliot. 2016. "Oman Expands Food Production, Looks to Iran." March 8, 2016. *Food Navigator*. <https://www.foodnavigator.com/Article/2016/03/08/Oman-expands-food-production-looks-to-Iran>

31 Prabhu, Conrad. 2023. "Oman, Iran Trade and Economic Ties on an Upswing." *Oman Observer*. <https://www.omanobserver.om/article/1137820/oman/oman-iran-trade-and-economic-ties-on-an-upswing>

32 Ahmadi Al Hashem, Morteza. 2020. "Kuwait to Resume Importing Foodstuff from Iran." April 6, 2020. *Mehr News Agency*. <https://en.mehrnews.com/news/157275/Kuwait-to-resume-importing-foodstuff-from-Iran>

vegetable products.³³ Bahrain, on the other hand, has very little food trade with Iran, due to longstanding conflicts between the states.³⁴

Opportunities to enhance regional food security exist in the assorted climate conditions found in Iran, which provide an extensive array of agricultural goods. GCC investment can bolster Iran's agriculture. Iran's diverse climate enables the cultivation of various crops, from rice and tea in wetter northern regions to wheat and barley in drier southern areas. GCC funds can improve agricultural methods by introducing advanced technologies and investing in post-harvest processes, such as developing efficient transportation networks, reducing waste, and extending product shelf life.

The GCC states and Iran have experienced water scarcity, but each has implemented innovative solutions to address this issue. The GCC has made strides in desalination, while Iran has pioneered qanat irrigation systems (qanats are ancient underground aqueducts that transport water from mountain sources to arid plains).³⁵ Collaboration on desalination technology between the GCC and Iran could benefit both regions by merging advanced technologies, reducing costs, and developing environmentally friendly and energy-efficient methods. Qanats could also help the GCC manage freshwater resources better. Iran has the potential to aid the GCC by sharing their knowledge of qanat systems and integrating them in modern ways. Furthermore, Iran could also impart their water management practices, all linked to the use of qanats, including crop rotation, water rationing, and community-based systems. Qanats are less susceptible to energy shortages or technological malfunctions than modern systems. On the other hand, the UAE, Saudi Arabia and others could share best practices on modern technologies with Iran.

Iran's population of over eighty million offers a valuable market for the GCC's processed food products and beverages, while the GCC could benefit from Iran's agricultural exports. Iran's meat products, produced according to halal standards which appeal to Muslim-majority countries, is another potential area of food trade. The GCC states could also invest in Iran's agricultural sector and receive a guaranteed supply of specific crops in return. This investment could include the transfer of agricultural technology and advancements in farming techniques and seed technologies. Investing in Iran's agriculture sector can reduce the GCC's dependency on distant markets and increase supply security.

While there continue to be risks associated with investing in such sectors due to past conflicts and lingering tensions, there are myriad ways to limit their negative impacts. A joint initiative between Iranian agricultural consortiums and leading GCC agri-businesses, such as Almarai from Saudi Arabia and Al Dahra in the UAE, could mitigate some of risks. The GCC could invest in farmlands with modern farming techniques and, in exchange, receive

33 Observatory of Economic Complexity. "Bahrain & Iran Country to Country Profile." OEC. Accessed 10 October 2023. <https://oec.world/en/profile/bilateral-country/irn/partner/bhr>

34 Observatory of Economic Complexity. "Kuwait & Iran Country to Country Profile." OEC. Accessed 10 October 2023. <https://oec.world/en/profile/bilateral-country/kwt/partner/irn>

35 Middle East Institute. 2014. "Harvesting Water and Harnessing Cooperation: Qanat Systems in the Middle East and Asia." January 14, 2014. MEI. <https://www.mei.edu/publications/harvesting-water-and-harnessing-cooperation-qanat-systems-middle-east-and-asia>

a guaranteed amount of produce at a fixed price. Any excess produce could be sold in local markets in Iran, ensuring mutual benefits for all parties.

Despite economic sanctions imposed on Iran, some food-related transactions and trade are permitted. A recent agreement allowing Iran to purchase six billion dollars' worth of food and other items prioritises humanitarian needs over political disputes.³⁶ The deal creates opportunities for deeper cooperation between Iran and other GCC states, particularly Oman and Qatar. However, the United States Department of State has affirmed its commitment to vigilantly monitoring, by the US Treasury Department, the utilisation of these funds, ensuring that they are allocated exclusively to meet the humanitarian needs of the Iranian people.³⁷ In addition, it has been stated that the U.S. has the power to stop a transaction if necessary, and US officials have made it clear that any misuse of funds will result in the freezing of accounts.³⁸

Multilateral cooperation on food security in Iraq

Though agriculturally richer than most GCC countries, Iraq struggles with outdated irrigation systems, poorly planned agriculture, and post-conflict rehabilitation, leaving agriculture creating only 2% of the country's economic output in 2019.³⁹ Development projects, including infrastructure and transportation networks, storage facilities, and farming equipment, could support Iraq's efforts to increase food security (for more on Iraq, read chapter 7 of this volume).

The Gulf countries could invest in Iraq's agricultural sector by forming public-private partnerships with local farmers in Iraq. The objective of such investments should be to modernise Iraq's agriculture by introducing innovative irrigation technologies, improved seed varieties, and sustainable practices, and also provide funding and technical expertise to improve crop cultivation, livestock management, and agricultural infrastructure. The GCC countries could thereby ensure a consistent, nearby supply of essential food products. Additionally, incorporating traditional farming techniques from GCC countries and Iran would ensure the compatibility of new crop varieties and local farming practices. Countries like the UAE and Saudi Arabia have extensive experience in desert agriculture, water conservation techniques, and greenhouse technologies. Their expertise could assist Iraq in utilising its arid lands for productive purposes.

36 Feldscher, Kyle and Jennifer Hansler. 2023. "How Iran Can Use the \$6 Billion Involved in the Release of 5 Americans." September 18, 2023. CNN. <https://edition.cnn.com/2023/09/18/politics/iran-money-explainer/index.html>

37 Marley, Patrick. 2023. "Blinken Rejects Claim That \$6 Billion in Iranian Assets Helps Hamas." October 9, 2023. *The Washington Post*. <https://www.washingtonpost.com/nation/2023/10/08/blinker-iran-funds-hamas-israel/>

38 Feldscher, Kyle and Jennifer Hansler. 2023. "How Iran Can Use the \$6 Billion Involved in the Release of 5 Americans." September 18, 2023. CNN. <https://edition.cnn.com/2023/09/18/politics/iran-money-explainer/index.html>

39 Bernadaux, Chloe. 2021. "Cultivating Cronyism: The Collapse of Agriculture in Post-War Iraq and Syria." June 24, 2021. *Carnegie Endowment for International Peace*. <https://carnegieendowment.org/sada/84848>

A land lease system could be initiated: rather than a coalition of Gulf countries buying land, they would lease it for a fixed period, allowing local farmers to remain primary stakeholders. A fund contributed by such a coalition could offer local farmers loans at minimal interest rates, ensuring they have the capital to modernise their farms. Regular meetings between Iraqi agricultural representatives and regional counterparts could be held to ensure the smooth operation of the initiative, address concerns, and adapt to changing circumstances. Local farmers should be integral to the decision-making process, to ensure that projects align with their needs and do not compromise their rights.

Building on existing initiatives, such as the Baghdad Conference for Cooperation and Partnership which was held twice in Iraq and Jordan, would be a clear way forward.⁴⁰ For example, the Arab Authority for Agricultural Investment and Development (AAAID), which aims to provide vital food commodities to the Arab world, already serves as a platform for food trade.⁴¹ The AAAID has invested over one billion dollars towards this goal, but only half of the investment has been utilised.⁴² This platform could be used for multilateral investments on food security related initiatives in Iraq.

Addressing food security issues in Iraq requires the engagement and participation not just of the Gulf states, but also other major players invested in the region, like the European Union, China, Turkey, and India. Collaborating multilaterally with Iraq on food security could optimise resource allocation, enhance technological adaptation, and stabilise the geopolitical situation of Iraq and the broader region.

Establishing a knowledge-sharing platform where experts from the EU, China, the GCC states, and Iran can offer training sessions, webinars, and workshops for Iraqi farmers, researchers, and officials is thus crucial. Multilateral collaboration on joint research projects to develop crop varieties well-suited to Iraq's climate and soil conditions should be considered. This can include drought-resistant crops and disease-resistant varieties. To achieve this, it would be advisable to seek guidance from the EU's agricultural research experts, who have been working on increasing yields.⁴³ This could be through exchange programs, where Iraqi agricultural scientists could collaborate with European counterparts (for more on EU-Gulf relations, read chapter 8 of this volume).

The European Union and China possess the capacity to work together on initiatives concerning cold storage chains and grain silos, capitalising on their distinct proficiencies in technological innovation and infrastructure. Knowledge transfer is pivotal to fortifying food security cooperation in Iraq. This may be expedited by nurturing partnerships among

40 Schiavi, Francesco Salevio. 2022. "The 2nd Baghdad Conference: A Starting Point for Regional Stability?" December 22, 2022. ISPI Online. <https://www.ispionline.it/en/publication/2nd-baghdad-conference-starting-point-regional-stability-37114>

41 Keulertz, Martin and Rabi Mohtar. 2019. "Governance and Cooperation over Food and SDG 2 in the Arab Region." Emirates Diplomacy Academy. https://www.agda.ac.ae/docs/default-source/Publications/eda-insight_gear-ii_food_en_final2cc50239ddfe6fca8ebaff00006646c8.pdf?sfvrsn=63b6d3b_4

42 Ibid.

43 European Commission. 2021. "Redesigning Crops to Meet Society's Increasing Food Needs." EC. <https://ec.europa.eu/research-and-innovation/en/projects/success-stories/all/redesigning-crops-meet-societys-increasing-food-needs>

universities and research institutions in the EU, China, Iran, the GCC states, and Iraq. Furthermore, the European Investment Bank (EIB) could extend targeted loans and grants to bolster these endeavours.⁴⁴

Investment in infrastructure like roads, ports, and storage facilities in Iraq would facilitate quicker, more reliable food transportation. China could offer assistance in developing modern agricultural infrastructure, in line with its intention to cooperate on food security, indicated during the inaugural Arab–China summit.⁴⁵ With its experience managing large-scale projects, China has successfully implemented greenhouse and vertical farm structures, which could be replicated in Iraq to facilitate year-round crop cultivation and enhance the yields of high-value crops. Moreover, creating a regional food stockpile in strategic locations could act as a buffer against supply chain disruptions. Iraq is both politically and geographically well-positioned to host such an initiative.

At the same time, Iran and Iraq have a long and complex history of sharing water resources, a critical issue for the two countries. Collaborative efforts could be made, following the reactivation of their joint water committee,⁴⁶ to ensure fair and sustainable distribution of water resources. For countries in the Gulf region interested in investing in or collaborating with Iraq on food security, ensuring the country has a stable water supply is crucial. An unstable water supply can negatively impact agricultural output and even lead to socio-political unrest, making investments and collaborative efforts more challenging. Therefore, the success of the GCC's engagement with Iraq's food security is dependent on Iraq's water cooperation with Iran and Turkey. Taking a holistic approach that recognises the interconnectedness of these factors is crucial for achieving sustainable success.

Iran and the GCC states could also enhance their cooperation by establishing joint research centres in Iraq to develop drought-resistant and disease-resistant crops – these would be tailored to Iraq's environment, but with implications for the broader region. They could also establish advanced irrigation systems and storage facilities by involving leading universities and companies from around the region. This could be aided by developing public awareness campaigns about the importance of food security cooperation.

44 EIB Press Office. 2022. "EIB Confirms €500 Million Loan to IFAD to Invest in Global Food Security." November 14, 2022. European Investment Bank. <https://www.eib.org/en/press/all/2022-485-eib-confirms-eur-500-million-loan-to-ifad-to-invest-in-global-food-security>

45 Ministry of Foreign Affairs of the People's Republic of China. 2022. "President Xi Jinping Attends the First China-Arab States Summit and Delivers a Keynote Speech, Underscoring the Importance of Carrying Forward the Spirit of China-Arab Friendship Featuring Solidarity and Mutual Assistance, Equality and Mutual Benefit, and Inclusiveness and Mutual Learning and Jointly Building a China-Arab Community with a Shared Future in the New Era." December 10, 2022. FMPRC. https://www.fmprc.gov.cn/eng/zxxx_662805/202212/t20221211_10988748.html

46 Shafaq News. 2023. "Iran and Iraq Reactivate Joint Water Committee." May 12, 2023. *Shafaq News*. <https://shafaq.com/en/Iraq-News/Iran-and-Iraq-reactivate-joint-water-committee>

Conclusion

The GCC states have substantial financial resources but minimal arable land, making cooperation with Iraq and Iran on food security especially advantageous. At the same time, Iran and Iraq would benefit from increased cooperation with the GCC states. Despite being hindered by sanctions and geopolitical tensions, Iran has much to offer in terms of agricultural diversity and traditional water management expertise. Iraq could benefit significantly from investment in its agricultural sector during its post-conflict recovery phase, which could help rejuvenate and modernise the industry. All regional countries have unique contributions to make and stand to gain from collaboration, creating a compelling interplay of complementary strengths. Partnerships on food security could lay the foundation for a broader diplomatic dialogue by prioritising this critical and universal issue.

Political commitment is vital for building trust and ensuring political differences do not overshadow cooperative initiatives. Regional players need to recognise the necessity of strong political leadership in creating the will to actualise cooperative measures.

Conducting joint research on drought-resistant agriculture and water conservation methods could serve as a launchpad for more complex accords. Establishing shared food reserves, mutual investments, and harmonised policies on food safety and standards could fortify this partnership. Moreover, such partnerships could promote regional integration, by fostering economic synergies while mitigating the perils of food supply chain vulnerabilities.

Harnessing a united front for food security within the GCC, and integrating Iraq and Iran, could redefine the region's approach to ensuring stable food supplies and interdependent economies. Such a cooperative framework is crucial to bolstering the GCC's resilience to unforeseen disruptions, and laying the groundwork for reinvigorated regional ties. With COP28 around the corner, the GCC states can set a global precedent, highlighting their dedication to sustainable food collaboration while fostering regional and international partnerships that tackle the pressing challenges of our time.



Chapter 7

Bolstering Iraq's Climate Response through Regional Environmental Cooperation

Maha Yassin¹

Abstract

Iraq is among the worst-hit countries by the impacts of climate change in the Gulf region. Water scarcity, prolonged drought, and heatwaves have unleashed a chain of consequences, including population displacement, tribal conflicts, economic loss, and public health issues. To address these challenges and bolster its climate response, Iraq must leverage existing regional initiatives and climate agreements, in addition to harnessing Iraq's diplomatic channels to enhance collaboration with neighbouring countries on which Iraq relies on for its water and electricity demands. Capacity building, equitable water-sharing arrangements, and investments in water desalination, irrigation, and agriculture hold promise for addressing Iraq's climate-related challenges. This chapter underscores the need for Iraq to maintain a balanced approach in its engagement with regional actors while taking measures to strengthen its internal stability. By navigating the evolving landscape of regional realignment, Iraq can position itself as a proactive and influential player in addressing region-wide climate-related challenges, and contribute to regional peace and stability.

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Introduction

Climate change is rapidly exacerbating the stability and development of many countries across the Middle East and North Africa. According to the World Bank,² the region is expected to incur severe economic losses from climate-related water stresses by 2050, projected at 6-14% of GDP. Longstanding and emerging conflicts, population growth and displacement are adding to the losses, setting up the region for more instability. Iraq has been amongst the worst hit countries in the region.

Water scarcity in Iraq has cast its shadow over every aspect of life, unleashing a ripple effect of consequences.³ This crisis has spurred population displacement,⁴ ignited tribal conflicts,⁵ and exacerbated crime and violence in rural and urban areas.⁶ Furthermore, the repercussions extend to health and the economy, as evidenced by reports of contaminated waterways⁷ and the diminishing expanse of arable land for agriculture.⁸

The frequency and severity of heatwaves have also intensified within the last decade all around the region, but especially in Iraq. Increased temperatures have affected the stability of power supplies. Demand reaches its peak during Iraq's long summer, which has often seen the complete collapse of fossil-fuelled power plants. Consequently, the outages impact economic stability and, at the same time, destabilise the security of the state, as many, especially in the south, revolt against the poor government response. These major impacts of climate change, coupled with unjust water policies by riparian countries, as well as poor governance and national response, are likely to negatively impact stability and development even further across the country.

For Iraq to effectively position itself as a key player in the region and counteract the emerging threats to its stability posed by climate change and poor governance, it must take

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- 2 World Bank Group. 2017. "Beyond Scarcity: Water Security in the Middle East and North Africa." September 12, 2017. World Bank. <https://www.worldbank.org/en/topic/water/publication/beyond-scarcity-water-security-in-the-middle-east-and-north-africa>
 - 3 Schaefer, Cathrin. 2023. "How Climate Change Causes Culture Clashes in Iraq's Cities." July 25, 2023. *Deutsche Welle*. <https://www.dw.com/en/when-the-farmers-come-to-town-climate-change-causes-culture-clashes-in-iraqs-cities/a-66331373#:~:text=Around%2092%25%20of%20Iraqi%20land,search%20of%20work%20and%20opportunity>
 - 4 International Organization for Migration. 2022. *Migration, Environment, and Climate Change in Iraq*. United Nations Iraq. <https://iraq.un.org/en/194355-migration-environment-and-climate-change-iraq#:~:text=Iraq%20has%20been%20named%20the%20fifth-most%20vulnerable%20country,scarcity%2C%20frequent%20sand%20and%20dust%20storms%2C%20and%20flooding>
 - 5 Alhassan, Shukri. 2020. "Drought Ignites Tribal Conflicts in Southern Iraq." August 17, 2020. Planetary Security Initiative. <https://www.planetarysecurityinitiative.org/news/drought-ignites-tribal-conflicts-southern-iraq>
 - 6 Loveluck, Louisa, and Mustafa Salim. 2022. "Climate Migrants Flee Iraq's Parched Rural South, but Cities Offer No Refuge." September 28, 2022. *The Washington Post*. <https://www.washingtonpost.com/world/2022/09/06/iraq-climate-crisis-drought-basra/>
 - 7 Lossow, Tobias von, Irina Patrahau, Kendra Kock, Maha Yassin, Laura Birkman, Susanne Schmeier, and Alyssa Offut. 2022. *Action Needed: Three Priorities for Iraq's Water Sector*. Water, Peace and Security Partnership. <https://waterpeacesecurity.org/files/229>
 - 8 Barhoum, Laila, and Elise Nalbandian Nalbandian. 2022. *Unfarmed Now Inhabitant When: Agriculture and Climate Change in Iraq*. Oxfam International. <https://oxfamlibrary.openrepository.com/bitstream/10546/621360/4/bn-unfarmed-now-unlived-when-310322-en.pdf>

advantage of existing regional initiatives and climate agreements. Iraq lacks the domestic resources and capabilities to address its growing challenges such as water shortages, habitat degradation, desertification, and pollution. The government in Baghdad faces limitations in terms of bureaucratic capacity and funding mechanisms required for an effective response. Internal political instability, corruption, and disagreements with neighbouring countries are adding to the challenge. Thus, Iraq is in dire need of regional and multilateral initiatives to support its efforts.

This chapter analyses some of the key climate and multilateral cooperation initiatives that could be used to tackle environmental issues inside Iraq as well as the broader region, and identifies practical areas for cooperation.

Iraq's environmental challenges

Northern Iraq has been grappling with severe drought since 2021, whereas southern governorates have experienced diminishing water availability and quality.⁹ By May 2021, the annual water inflow had significantly declined, plummeting from its peak of nearly 80 billion cubic metres (BCM) a year during the 1970s to less than 50 BCM.¹⁰ In 2022, Iraq's water reserves had shrunk by half since the preceding year; and the Tigris and Euphrates rivers will likely dry up in the coming years. Iraq is expected to be water deficit by 20 BCM/year by 2030, leaving millions of people under the threat of extreme drought conditions.¹¹

As a consequence, desertification, driven by persistent drought, stands as a significant climate-related challenge in Iraq that threatens food security. It currently threatens approximately 92% of the country's territory, rendering it more susceptible to sand and dust storms (SDS) and the erosion of fertile lands.¹² The Iraqi Ministry of Environment foresees over 270 days of dusty conditions per year, exacerbating health problems and economic losses.¹³

Present climate projections strongly suggest that Iraq's water crisis could worsen in the near future.¹⁴ The water policies of Iran and Turkey have exacerbated Iraq's water crisis

9 Norwegian Refugee Council. 2021. *Iraq's Drought Crisis and the Damaging Effects on Communities*. Norwegian Refugee Council. <https://www.nrc.no/globalassets/pdf/reports/iraqs-drought-crisis/iraqs-drought-crisis-and-the-damaging-effects-on-communities.pdf>

10 International Federation of Red Cross and Red Crescent Societies. 2023. *Iraq: Droughts*. IFRC. <https://reliefweb.int/report/iraq/iraq-droughts-dref-operation-no-mdriq013-final-report>

11 Fanack Water. 2023. "What Does the Future Hold for Water in Iraq?" January 2, 2023. Fanack Water. <https://water.fanack.com/iraq/what-does-the-future-hold-for-water-in-iraq/>

12 Schaer, Cathrin. 2023. "How Climate Change Causes Culture Clashes in Iraq's Cities." July 25, 2023. *Deutsche Welle*. <https://www.dw.com/en/when-the-farmers-come-to-town-climate-change-causes-culture-clashes-in-iraqs-cities/a-66331373#:~:text=Around%2092%25%20of%20Iraqi%20land,search%20of%20work%20and%20opportunity>

13 Red Cross Red Crescent Climate Centre. 2022. "Iraq Sees More than One Heavy Sandstorm a Week." June 1, 2022. IFRC. <https://www.climatecentre.org/8535/iraq-sees-more-than-one-heavy-sandstorm-a-week/>

14 Binder, Lisa, Barbora Šedová, Lukas Rüttinger, Julia Tomalka, and Stephanie Gleixner. 2022. "Climate Risk Profile: Iraq." July 20, 2022. *Weathering Risk*. <https://weatheringrisk.org/en/publication/Climate-Risk-Profile-Iraq>

significantly. For instance, since 1997, Iran has altered the course or dammed more than ten rivers that flow into Iraq, in addition to several smaller tributaries that contribute to the Tigris and Euphrates.¹⁵ These policies have not only reduced water availability in Iraq but have also posed a substantial challenge to water quality. In the southern regions, saltwater intrusion and pollution have intensified, leading to widespread animal deaths¹⁶ and the loss of large agricultural areas.¹⁷

One of the critical rivers affected by Iran's policies since 2007 is the Karun River, which significantly contributes to pushing the saltwater intrusion in the Shatt al-Arab.¹⁸ However, in 2023, there was a release of water from the Karun into the Shatt al-Arab, resulting in a notable improvement in water quality. This step played a pivotal role in preventing Basra from experiencing another water crisis, similar to the one in 2018.¹⁹ The decision to release water from the Karun River was likely because of significant political intervention.

Turkey's water policies are also a major contributor to the ongoing water crisis in Iraq. During the 1980s, Ankara agreed to release 500 CM/second into the Euphrates River.²⁰ However, this volume has gradually diminished over the years, dipping to a mere 175 CM/second by 2022.²¹ At the heart of these policies lies the construction of twenty-two dams as part of the Southeastern Anatolia Project, initiated in the 1960s²². This expansive project's objectives encompass hydropower generation, agricultural applications, and flood prevention, with substantial ecological consequences on the population within Turkey itself, but also in Iraq. Despite diplomatic and advocacy efforts to secure equitable water shares, Turkey has continued its dam construction unabated.

15 Deutsche Welle. 2014. "حسناً، ملف المياه المشتركة بين العراق وإيران." January 2, 2014. Deutsche Welle. <https://www.dw.com/ar/%D9%85%D9%84%D9%81-%D8%A7%D9%84%D9%85%D9%8A%D8%A7%D9%87-%D8%A7%D9%84%D9%85%D8%B4%D8%AA%D8%B1%D9%83%D8%A9-%D8%A8%D9%8A%D9%86-%D8%A7%D9%84%D8%B9-%D8%B1%D8%A7%D9%82-%D9%88%D8%A5%D9%8A%D8%B1%D8%A7%D9%86/a-17337937>

16 Skelton, Mac. 2023. "Iraq's Climate Change Agenda Must Prioritize Health-for Humans, Animals, and Plants." August 30, 2023. The Century Foundation. <https://tcf.org/content/commentary/iraqs-climate-change-agenda-must-prioritize-health-for-humans-animals-and-plants/>

17 ReliefWeb. 2022. "Iraq: Droughts - Dref Operation N° MDRIQ013 - Operation Update N° 1 - Iraq." July 15, 2022. ReliefWeb. <https://reliefweb.int/report/iraq/iraq-droughts-dref-operation-ndeg-mdriq013-operation-update-ndeg-1#:~:text=According%20to%20the%20United%20Nations,temperatures%2C%20and%20associated%20health%20problems>

18 Al Khalej. 2022. "حصر العطش. لائحة ب'الأنهار' التي قطعها إيران وغيرت مسارها عن العراق،" مركز الخليج. "الدراسات الإيرانية" June 20, 2022. Al Khalej. <https://www.alkhalej.net/p/9795924>

19 Belkis, Wille. 2019. *Basra Is Thirsty: Iraq's Failure to Manage the Water Crisis*. Human Rights Watch. https://www.hrw.org/sites/default/files/report_pdf/iraq0719_web.pdf

20 Daly, John. 2014. "Turkey's Water Policies Worry Downstream Neighbors." September 10, 2014. *The Turkey Analyst*. <https://www.turkeyanalyst.org/publications/turkey-analyst-articles/item/343-turkey%E2%80%99s-water-policies-worry-downstream-neighbors.html>

21 Salih, Mohammed A. 2023. "Water and Climate Change Will Shape Iraq-Turkey Relations." July 26, 2023. Foreign Policy Research Institute. <https://www.fpri.org/article/2023/07/water-and-climate-change-will-shape-iraq-turkey-relations/>

22 Ibid.

While Turkey and Iraq have engaged in some diplomatic efforts on water issues, such as the signing of various Memoranda of Understanding (MoU) on water management in 2009,²³ negotiations on equitable water allocations have yielded limited success and lack broad support within the national political leadership, let alone the international community. Consequently, it is becoming imperative for Iraq to collaborate with neighbouring countries to address its pressing water needs. Relying solely on its depleting freshwater resources, which are largely under the control of Turkey and Iran, is no longer a viable option.

Because of diminished water inflow and rising sea levels, the southern province of Basra has grappled with saltwater intrusion and pollution for decades.²⁴ A consensus among climate models indicates a sea level rise of 9.6 cm by 2030.²⁵ This increase is causing severe salinization in Shatt al Arab, the city's primary waterway, with far-reaching implications for public health, ecosystems, and economic activities.²⁶ Iraq's attempts to address this predicament have proved ineffective and inadequate.

At the same time, reports anticipate a notable temperature rise ranging from 1.6 to 2.4 °C by 2030.²⁷ The extent of this increase varies based on different climate change scenarios. The most substantial temperature surge is foreseen in the north-eastern and western parts of the country. With the increased heatwaves, Iraq finds itself unable to maintain the growing demand on power, and investing in more fossil-fuelled power plants will only worsen its pollution crisis.

Recognising the urgent need to address the energy shortfall, the Iraqi Minister of Electricity has acknowledged the country's current electricity deficit, which has surged to 13,000 megawatts.²⁸ In response, the Ministry has outlined a series of projects for 2023, encompassing the establishment of both fossil-fuelled and integrated power plants, along with investments in solar energy installations. While the latter appears somewhat modest in scale and does not fully align with Iraq's broader transition to cleaner energy, the Ministry of Electricity is gearing up to pivot toward its neighbours from the Gulf Cooperation Council (GCC), particularly Saudi Arabia and the United Arab Emirates (UAE),²⁹ to strengthen its efforts in this sector. Iraq has the opportunity to benefit from its southern neighbours' established

23 Climate Diplomacy. 2023. "Turkey, Syria and Iraq: Conflict over the Euphrates-Tigris." *Climate Diplomacy*. <https://climate-diplomacy.org/case-studies/turkey-syria-and-iraq-conflict-over-euphrates-tigris>

24 Salman, Havan H., and Hamdiea Skheel Jazaa. 2023. "Shatt Al-Arab River and the Seawater Intrusion: Causes and Solutions." *Al-Bahir Journal for Engineering and Pure Sciences* 2 (1). <https://doi.org/10.55810/2312-5721.1018>

25 Binder, Lisa, Barbora Šedová, Lukas Rüttinger, Julia Tomalka, and Stephanie Gleixner. 2022. "Climate Risk Profile: Iraq." July 20, 2022. *Weathering Risk*. <https://weatheringrisk.org/en/publication/Climate-Risk-Profile-Iraq>

26 Mohamed, Abdul-Razak M, and Entisar K. Hameed. 2019. "Impacts of Saltwater Intrusion on the Fish Assemblage in the Middle Part of Shatt Al-Arab River, Iraq." *Asian Journal of Applied Sciences* 7 (5). <https://doi.org/10.24203/ajas.v7i5.5917>

27 Binder, Lisa, Barbora Šedová, Lukas Rüttinger, Julia Tomalka, and Stephanie Gleixner. 2022. "Climate Risk Profile: Iraq." July 20, 2022. *Weathering Risk*. <https://weatheringrisk.org/en/publication/Climate-Risk-Profile-Iraq>

28 Independent Arabia. 2023. "العراق يحاصر انقطاعات الكهرباء بالطاقة المتجددة؛ اندبندت عربية." June 19, 2023. *Independent Arabia*. <https://www.independentarabia.com/node/464256/>

29 Masdar News. 2021. "Masdar Signs Agreement to Develop Solar Projects in Republic of Iraq with a Total Capacity of 1 GW." October 7, 2021. *Masdar News*. <https://news.masdar.ae/en/news/2021/10/08/14/07/masdar-signs-agreement-to-develop-solar-projects-in-republic-of-iraq-with-a-total-capacity-of-1-gw>

expertise and capacities in drawing a comprehensive roadmap towards a green energy sector that has the capacity to provide the necessary outputs for domestic consumption.

At the same time, Iraq depends heavily on Iranian imports of electricity and gas, which make up around 33% to 40% of its total power supply.³⁰ Furthermore, Iran gains from the virtual water trade, with Iraq being its top trading partner. Iran and Iraq aim to potentially double their trade,³¹ given that Baghdad has become a crucial economic channel, especially because of US sanctions on Tehran.

The prevailing policies of the current government in Iraq, which exhibit a degree of alignment and cooperation with Iran, likely played a pivotal role in facilitating the relatively modest yet crucial water agreement this year. This alignment can be viewed as part of the Coordination Framework's policy to portray itself as a diplomatic powerhouse in the region. Furthermore, this agreement underscores the notion that addressing the impacts of climate change in Iraq is a deeply political endeavour, one that can shift based on the interests of prominent political parties and their degree of connection to Iran. In this context, it signals that Iraq possesses the potential to wield significant influence in shaping more extensive and impactful water and energy accords with neighbouring countries, if the political environment in Baghdad allows.

Leveraging regional initiatives to boost Iraq's climate response

In both 2021 and 2022, Iraq hosted the Baghdad Conference for Cooperation and Partnership,³² with the third edition anticipated later in 2023. These gatherings tackled various topics, including climate change, food, water, and energy security. The initiative showcases Iraq's growing regional influence, as well as its key role as a mediator on regional issues and a convener of multilateral diplomatic and cooperation gatherings. The March 2023 rapprochement between Iran and Saudi Arabia was also largely thanks to Iraqi efforts in bringing the two sides closer together through direct and indirect talks.

The closing remarks of the second iteration of the conference underscored participants' 'commitment to addressing the challenges posed by climate change and global warming, aligning with international agreements.'³³ This reflects an increasing recognition of climate change as a shared regional threat, necessitating collaborative efforts to counter it. In the upcoming third conference, Iraq should place a stronger focus on climate change and

30 Reuters. 2023. "Iraq to Trade Crude Oil for Iranian Gas to Settle Power Debt, Prime Minister Says." July 11, 2023. [Reuters.https://www.reuters.com/markets/commodities/iraq-trade-crude-oil-iranian-gas-resolve-power-debt-pm-2023-07-11/](https://www.reuters.com/markets/commodities/iraq-trade-crude-oil-iranian-gas-resolve-power-debt-pm-2023-07-11/)

31 Al Araby. 2023. "إيران تسعى لمضاعفة صادراتها إلى العراق،" العربي الجديد." April 29, 2023. Al Araby. <https://www.alaraby.co.uk/economy/%D8%A5%D9%8A%D8%B1%D8%A7%D9%86-%D8%AA%D8%B3%D8%B9%D9%89-%D9%84%D9%85%D8%B6%D8%A7%D8%B9%D9%81%D8%A9-%D8%B5%D8%A7%D8%AF%D8%B1%D8%A7%D8%AA%D9%87%D8%A7-%D8%A5%D9%84%D9%89-%D8%A7%D9%84%D8%B9%D8%B1%D8%A7%D9%82>

32 Dmour, Hazem Salem. 2022. "Baghdad Conference for Cooperation and Partnership 2022: An Important Step in a Long Road." December 20, 2022. Strategiecs Think Tank. <https://strategiecs.com/en/analyses/baghdad-conference-for-cooperation-and-partnership-2022-an-important-step-in-a-long-road>

33 Jordan News Agency. 2021. "وكالة الأنباء الأردنية،" البيان الختامي لمؤتمر قمة بغداد للتعاون والشراكة،" بترا - وكالة الأنباء الأردنية." Jordan News Agency. <https://www.petra.gov.jo/Include/InnerPage.jsp?ID=187354&lang=ar&name=news>

leverage this platform to advocate for water and energy agreements with Iran, Turkey, and Saudi Arabia. It is also an opportunity to rally other countries to establish a joint fund for climate adaptation and mitigation, capitalising on regional and global funding initiatives.

Regionally, Iraq could take advantage of existing initiatives. For example, the Middle East Green Initiative (MGI) is positioned as a regional cooperation platform led by Saudi Arabia, aiming to address the escalating impact of climate change in the region.³⁴ Its primary objective is to secure funding for climate adaptation and mitigation projects throughout the Middle East. In conjunction with these projects, the MGI has set ambitious goals, including a commitment to plant trees equivalent to 5% of global afforestation efforts and achieve carbon reductions equivalent to a 10% global emissions decrease.³⁵

Annually, Saudi Arabia hosts the MGI summit,³⁶ which draws participation from both regional and global stakeholders. This summit is portrayed as a platform for countries to unite in combatting climate change. Saudi's use of the term 'alliance'³⁷ strongly suggests that the MGI's role extends beyond being merely a conduit for climate financing in the Middle East. Instead, it appears to seek to institutionalise regional adaptation and mitigation efforts within its framework, enhancing Saudi Arabia's influence and establishing a central role in the region's transition toward sustainability in the years to come. The introduction of the MGI appears to be a strategic initiative aimed at reaffirming Saudi Arabia's standing as a major regional player while simultaneously transitioning its image from a fossil fuels powerhouse to an active player in the global fight against climate change.

In 2022, Saudi Arabia announced that it would create and oversee a specialised MGI Secretariat while committing \$2.5 billion for the support of MGI projects over a ten-year period.³⁸ While on-the-ground projects linked to the MGI are yet to see the light, the Saudis have already made concrete steps and commitments through Vision 2030 and the Saudi Green Initiative.³⁹ Through these national initiatives, the Kingdom aspires to take on a prominent role in the worldwide renewable energy landscape, aligning with its objective of expanding electricity production through renewable sources. Saudi Arabia is also slated to manage the coordination and allocation of funding through regional centres. The Kingdom will use funding and green technologies as leverage to encourage states across the region to align with its interests.

34 Saudi & Middle East Green Initiatives, 2022. "About MGI." Saudi & Middle East Green Initiatives. <https://www.greeninitiatives.gov.sa/about-mgi/>

35 Ibid.

36 Azhar, Saeed, and Yousef Saba. 2021. "Saudi Arabia Outlines Plans under Mideast Green Initiative." October 25, 2021. *Reuters*. <https://www.reuters.com/business/cop/mideast-green-initiative-invest-104-bln-says-saudi-crown-prince-2021-10-25>

37 Saudi & Middle East Green Initiatives. 2022. "MGI Summit." Saudi & Middle East Green Initiatives. <https://www.greeninitiatives.gov.sa/mgi-summit>

38 Reuters. 2022. "Saudi Arabia commits \$2.5 bln to Middle East green initiative - Crown Prince." November 7, 2022. *Reuters*. <https://www.reuters.com/business/sustainable-business/saudi-arabia-commits-25-bln-middle-east-green-initiative-crown-prince-2022-11-07/>

39 Saudi & Middle East Green Initiatives. 2023. "Saudi Green Initiative Forum 2022." Saudi & Middle East Green Initiatives. https://www.greeninitiatives.gov.sa/sgi-forum?gclid=Cj0KCQjwm66pBhDQARIsALIR2zAAfPzRguO26R8QSnga_C3maIZbz-0p76lpZqdyNarI_Tvo1MIOXDAAaAqh-EALw_wcB

Iraq is presented with a valuable opportunity to leverage its diplomatic channels and proactively engage in negotiations with Saudi Arabia. For example, the Kingdom has already backed a significant solar energy project in Najaf, which is expected to add 1000 megawatts of power to Iraq's grid.⁴⁰ The successful implementation of such a large-scale project necessitates not only financial and technical cooperation but also a stable political environment, a facet that has been showing improvement in recent years between these historically conflicted neighbours. The Kingdom's pioneering investment opens the doors for more countries to collaborate in fortifying Iraq's clean energy sector. The MGI could provide avenues for more multilateral cooperation, and investment in this sector.

To unlock the full potential of the financial support pledged by the Saudis, Iraq must first create an appealing environment for both Saudi and foreign stakeholders to execute adaptation and mitigation projects. This necessitates the establishment of greater security, transparency, and accommodating conditions. Moreover, a seeming prerequisite for further Saudi and GCC investments in Iraq is the need for Baghdad to demonstrate that it is not under the influence of Tehran.

At the same time, for any regional environmental initiative to effectively contribute to conflict resolution in the Middle East, it must acknowledge how conflicts, particularly those related to resources like water, will shape climate policies in the region. It must actively promote dialogue and bridge divisions among various state actors to succeed in achieving its climate objectives. Through the MGI, Saudi Arabia could, for example, work on shared water challenges in the region with a focus on Iraq. This could lead to closer coordination and cooperation between Saudi Arabia, Iran, and Iraq, as well as other neighbouring countries in the fight against climate change.

Iran is also experiencing desertification and water shortages, especially in the south.⁴¹ The accompanying shortages have already resulted in protests in the province of Khuzestan. The seemingly increased focus on climate change by the Iranian government is likely an acceptance of the threat it plays to stability in the country.⁴² Iran is now prioritising climate change as a key policy area, as demonstrated by Tehran hosting a Regional Ministerial Meeting of Environmental Cooperation for a Better Future in July 2022, and a major climate conference in September 2023, both attended by Iran's president.⁴³ The 2022 ministerial

40 Independent Arabia. 2023. "العراق يحاصر انقطاعات الكهرباء بالطاقة المتجددة؛ انديندنت عربية." June 19, 2023. *Independent Arabia*. <https://www.independentarabia.com/node/464256/>

41 Goodman, Jack. 2021. "Iran Water: What's Causing the Shortages?" August 1, 2021. *BBC News*. <https://www.bbc.com/news/58012290>

42 Anderson, Maia. 2023. "Bringing Iran to the Climate Action Table." October 20, 2023. Middle East Institute. <https://www.mei.edu/publications/bringing-iran-climate-action-table>

43 Tasnim News Agency. 2022. "Iran welcomes regional cooperation to address environmental challenges." July, 12, 2022. *Tasnim News Agency*. <https://www.tasnimnews.com/en/news/2022/07/12/2742458/iran-welcomes-regional-cooperation-to-address-environmental-challenges>

meeting was attended by several regional countries such as the UAE, Syria,⁴⁴ Qatar,⁴⁵ and Iraq. The 2023 international conference was jointly organised with the United Nations,⁴⁶ and it aimed at fostering increased dedication to coordinated efforts at sub-regional, regional, and global scales. The objective is to mitigate risks and bolster resilience against the adverse cross-border effects of SDSs. A Saudi delegation was also present in Tehran for the September conference.

Iran's climate efforts represent a step towards acknowledging and sharing the damage of climate change, especially on water availability in Iraq. The Iranian initiatives and meetings also represent an attempt to gain influence in the region by pulling countries such as Iraq further into its orbit in the face of its rivalry with Saudi Arabia and the West. Iran likely wants to create its own regional alternative, in order to compete with the Saudi Middle East Green Initiative, which might conflict with Iraq's attempts to build a multilateral cooperation inside the country. At the same time, Iran may view the expansion of ties between Iraq and Saudi Arabia, especially in the realm of energy and water technologies, as a threat to its economic lifeline. As such, Baghdad has been walking a diplomatic tightrope, balancing Tehran and Riyadh, trying not to antagonise either of its neighbours.

Areas for multilateral cooperation inside Iraq

The potential for multilateral cooperation involving Iraq, Iran, Saudi Arabia, and other Gulf states on environmental issues presents an opportunity to not only address a common threat but also to contribute to peace and stability in the region. This section provides recommendations on areas for multilateral cooperation inside Iraq, looking at funding, capacity building, water management, desalination practices, and boosting solar energy output.

Funding

Iraq, as one of the world's most climate-vulnerable countries, depends on securing the necessary funding and capacity resources to manage the risks associated with climate-

44 Tehran Times. 2022. "Regional Diplomacy for a Better Environment." July 12, 2022. *Tehran Times*. <https://www.tehrantimes.com/news/474606/Regional-diplomacy-for-a-better-environment>

45 Qatar News Agency. 2022. "State of Qatar Participates in Regional Ministerial Meeting of Environmental Cooperation in Iran." July 14, 2022. *Qatar News Agency*. <https://www.qna.org.qa/en/News-Area/News/2022-07/14/0033-state-of-qatar-participates-in-regional-ministerial-meeting-of-environmental-cooperation-in-iran>

46 United Nations. 2023. "UN Supports Iran in Holding an International Conference on Combating Sand and Dust Storms in I.R. Iran." September 11, 2023. United Nations Iran. <https://iran.un.org/en/245453-un-supports-iran-holding-international-conference-combating-sand-and-dust-storms#:~:text=Tehran%2C%2011%20September%2C%202023%20%2D,on%209%2D10%20September%202023>

sensitive regions.⁴⁷ Therefore, for any multilateral initiative to succeed in Iraq there needs to be a funding mechanism to support the process. This underscores the critical need to attract institutions and funds willing to invest in this area. Iraq could start with establishing a joint fund that encompasses key international actors who are currently funding some climate mitigation and adaptation projects, in addition to inviting other organisations and states who are willing to participate in the future. The aim of establishing a united fund is to provide a dependable financial base for large-scale mitigation and adaptation projects instead of fragmented and short-lived efforts. An important contributor in this regard would be the GCC states through their sovereign wealth funds. In return, Iraq can offer in kind facilitations to the GCC states and other contributors to establish investments in Iraq especially in the fields related to climate change response.

More specifically, relevant Iraqi ministries could also work directly with the MGI to develop, for instance, robust water management strategies for smaller scale projects and fund their implementation by establishing bilateral funding mechanisms. Furthermore, Iraq has the opportunity to establish and strengthen partnerships with global funding initiatives like the Financial Mechanism of the United Nations Framework Convention on Climate Change (UNFCCC)⁴⁸, the Water and Development Alliance of USAID⁴⁹ and the Islamic Development Bank.

Capacity building

Iraq must prioritise building its capacities and facilitating the provision of technical support to bolster its response to climate-related challenges. The Iraqi government should focus on a comprehensive restructuring of its climate response. Environmental conservation, and the establishment of resilient institutions capable of offering effective guidance and engaging in negotiations, irrespective of local political conflicts, should be priorities. Iraq must empower its key ministries – such as the Ministry for Water Resources and the Environment, local directorates, academic institutions, and civil society organisations engaged in climate and environmental matters – by providing them with the necessary resources, training, data access, and more budget allocations for projects implementation. This support is crucial for the development and execution of climate adaptation and mitigation strategies.

Collaborative knowledge-sharing agreements and the exchange of technical expertise with neighbouring countries are essential in this endeavour. For instance, Iraq could greatly benefit from the technical advancements achieved by Iran, Saudi Arabia, and Turkey in various fields such as water management, agriculture, and green energy. Iraq can incentivise its neighbours to initiate policy and technical educational and training programmes in

47 IOM, rep., *Migration, Environment, and Climate Change in Iraq* (United Nations, August 11, 2022), <https://iraq.un.org/en/194355-migration-environment-and-climate-change-iraq#:~:text=Iraq%20has%20been%20named%20the%20fifth-most%20vulnerable%20country,scarcity%2C%20frequent%20sand%20and%20dust%20storms%2C%20and%20flooding>

48 Green Climate Fund, “Green Climate Fund: New Capital to Accelerate Investment in Global Climate Action,” Homepage | Green Climate Fund, accessed October 16, 2023, <https://www.greenclimate.fund/>

49 Water and development alliance, “Water and Development Alliance,” Water and Development Alliance | Globalwaters.org, 2022, <https://www.globalwaters.org/wada>

exchange for facilitated and partially subsidised investment projects inside Iraq in the fields of water provision, clean energy, and agriculture where trained local capacities are also employed to train and advance their knowledge further.

Shared water resources

A particularly pressing concern in Iraq is the need for a fair water-sharing agreement with neighbouring riparian countries. Iraq has faced criticism from Turkey and Iran, who argue that its deficient water management practices worsen the ongoing water crisis. To rectify this, Iraq must focus on enhancing its water management capabilities. This begins with building on existent strategies and developing inclusive national strategies that involve relevant local and regional stakeholders. Water strategies should include short and long-term goals implemented in collaboration with the riparian countries to insure transparency and fair water allocations. The implementation of these strategies should serve as a guiding framework for successive Iraqi political leaderships. The effectiveness of these water management strategies depends on reaching a consensus among riparian countries regarding equitable water-sharing arrangements.

Desalination practices

The GCC states have long been pioneers in desalination investment and technology development. Remarkably, nearly 60% of the world's desalination capacity is concentrated within the GCC region,⁵⁰ with Saudi Arabia receiving 70% of its fresh water from desalination. Notably, Saudi Arabia has plans to invest approximately \$80 billion over the next decade to expand its desalination capacity.⁵¹ Leveraging this substantial expertise and financial capacity, Iraq can collaborate with Saudi Arabia to establish water desalination and purification projects within its borders. Furthermore, the Kingdom can take the lead in coordinating efforts with other GCC states interested in investing in similar facilities in Iraq. However, it's imperative that these endeavours involve close coordination with Iran, as it also plays a pivotal role in influencing salinization rates in the Gulf.

Irrigation and agricultural practices

A sector ripe for multilateral cooperation is the adoption of modern irrigation systems, an area where the GCC states have made significant advancements.⁵² Iraq's agricultural

50 Chibani, Achref. 2023. "The Costs and Benefits of Water Desalination in the Gulf." April 12, 2023. Arab Center Washington DC. <https://arabcenterdc.org/resource/the-costs-and-benefits-of-water-desalination-in-the-gulf/>

51 Ibid.

52 Shahid, S.A., and M. Ahmed. 2014. "Changing Face of Agriculture in the Gulf Cooperation Council Countries." In Shahid, S., Ahmed, M., eds., *Environmental Cost and Face of Agriculture in the Gulf Cooperation Council Countries*. New York: Springer. https://doi.org/10.1007/978-3-319-05768-2_1

sector has suffered due to drought and desertification, and it stands to benefit from the progress made by its neighbouring states in these domains. To kickstart the revitalisation of Iraq's agricultural sector, a primary measure would be the reclamation of land degraded by desertification. This endeavour can be achieved through the MGI, which aims to plant 50 billion trees across the region. Notably, Iraq could launch an extensive greening campaign in its most affected areas as part of this initiative. Iran could also be part of this practice: it gave a special attention to the impact of desertification and SDSs on socio-economic situations in the region during the September conference and called for regional cooperation to tackle this issue. However, a working mechanism for regional collaboration on this issue is yet to be determined.

It is essential to acknowledge that any afforestation efforts within Iraq would necessitate substantial water resources. To ensure the success of this campaign, the establishment of modern water technologies and practices and the reinforcement of water negotiations with neighbouring countries are imperative to advance this multilateral effort. These measures will play a pivotal role in securing the resources needed to support the sustainable growth of Iraq's agricultural sector.

Solar Energy

Iraq possesses distinct advantages in the realm of solar energy. With an average daily irradiance of 5.6 kWh per square meter, and over 3,000 hours of annual sunshine, it stands out as one of the most dependable global locations for consistent solar resource availability.⁵³ However, local endeavours to expand solar energy and other renewables have encountered a range of political, security, and structural challenges.

While Iraq maintains its cooperation with Iran for electricity imports through natural gas, and is soon connecting with Jordan's power grid,⁵⁴ solar energy initiatives in Iraq and the region have yet to be prioritised. However, due to Iraq's growing demand for energy and the investment potential this sector holds, regional countries have the opportunity to engage in multilateral solar initiatives inside Iraq, replicating the Saudi-backed project in Najaf. Iraq should work on extending its energy agreements with other neighbours in the north as well, particularly with Turkey which established a massive solar energy plant this year.⁵⁵ Benefiting from the high daily solar irradiance, Iraq is presented with an opportunity to

53 Yassin, Maha. 2023. "Scaling up Iraq's Energy Transition: Is Now the Right Time?" September 27, 2023. IRIS. <https://auis.edu.krd/iris/publications/scaling-iraq%E2%80%99s-energy-transition-now-right-time>

54 Al-jnaidi, Laith. 2023. "Iraq Says Power Link with Jordan Ready." September 30, 2023. *Anadolu Ajansı*. <https://www.aa.com.tr/en/middle-east/iraq-says-power-link-with-jordan-ready/3004758#:~:text=Iraq%20will%20be%20supplied%20with,1st%20phase%20of%20interconnection%20project&text=Iraq%20said%20Saturday%20t>

55 Daily Sabah, "Türkiye Officially Launches Europe's Largest Solar Power Plant," Daily Sabah, May 2, 2023, <https://www.dailysabah.com/business/energy/turkiye-officially-launches-europes-largest-solar-power-plant>

garner investments in solar energy. Such projects could also involve other states such as the UAE which has recently shown interest in entering the Iraqi solar energy market as well.⁵⁶

Conclusion

Iraq stands at a unique juncture, holding the potential to play an important role in fostering regional stability and economic growth by facilitating collaboration among its neighbouring countries in addressing common regional threats. However, Iraq must carefully assess the potential implications of these regional initiatives. While Iraq seeks to engage with regional climate efforts, it must tread carefully to avoid over-reliance on specific regional actors like Saudi Arabia or Iran for investments and technical support.

Currently, Iran, Saudi Arabia, and Turkey all express aspirations for environmental cooperation and advocate for regional implementation strategies. However, in practice, many actions remain primarily on a national scale. While it is reasonable to acknowledge that the establishment of effective multilateral cooperation on such transboundary issues may require considerable time and resources, there are promising indications of moving from dialogue to tangible action.

Forging multilateral cooperation within Iraq to address climate-related challenges is not a one-sided effort. Iran, Saudi Arabia, and Turkey have vested economic and security interests within Iraq that they can leverage during negotiations over environmental cooperation. To strengthen its position amid this trend of initiatives, Iraq must embark on several crucial steps. First, the country should lay the groundwork for regional cooperation and investment by strengthening political stability and security inside the country. Second, Iraq must prioritise its climate agenda by actively engaging all internal stakeholders and involving them in the formulation of strategies and implementation plans. Lastly, Iraq should expand its horizons beyond regional cooperation and initiate collaborations with global actors who possess advanced expertise in responding to climate change. By taking these steps, Iraq can better navigate the dynamic landscape of environmental collaboration and position itself as a proactive and influential player in addressing climate-related challenges in the Gulf region and beyond.

56 John Lee, "Progress on Masdar Solar Projects in Iraq: Iraq Business News," Iraq Business News | All the latest business news from Iraq, August 16, 2023, <https://www.iraq-businessnews.com/2023/08/16/progress-on-masdar-solar-projects-in-iraq/>



Chapter 8

Addressing Shared Environmental Challenges in the Gulf with European Support

Mehran Haghirian¹

Abstract

This chapter explores the potential for regional cooperation in the Gulf and the role that European expertise, technology, and funding can play in supporting the region's efforts to combat shared environmental challenges. Europe's contributions can include technical assistance, knowledge sharing, and the establishment of mechanisms for regional environmental cooperation. Recent diplomatic developments in the Gulf, including the re-establishment of ties between key regional players, have created opportunities for enhanced cooperation. The upcoming COP28 in the UAE, as well as the Baghdad Conference format, also offer platforms for multilateral collaboration. The chapter identifies common environmental challenges in the region, focusing on water scarcity, heatwaves, and sand and dust storms, as areas for cooperation with European involvement. European countries have a vested interest in promoting stability and security in the Gulf, and climate change and environmental issues have become key aspects of regional security. The chapter emphasises the importance of involving all Gulf countries in regional environmental initiatives and suggests that European engagement can facilitate multilateral cooperation and advance shared goals.

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Introduction

The Gulf region is encountering the most severe effects of climate change. The entire region is facing varying levels of water scarcity, heatwaves are making even the most urbanised cities uninhabitable, and sand and dust storms (SDS) are wreaking havoc around the Gulf. Regional leaders have come to the realisation that no one country is capable of resolving or mitigating the devastating impacts of climate change and that cooperation is required to tackle shared challenges. Regional countries can benefit from external support to effectively tackle environmental challenges holistically. European expertise, technology, and institutional frameworks for regional environmental cooperation could help boost climate diplomacy in the Gulf.

Since 2021, new openings have emerged for diplomacy between regional rivals in the Gulf. In particular, Iran and Saudi Arabia re-established diplomatic and economic ties in March 2023 following more than two years of negotiations, Abu Dhabi and Kuwait also restored their relations with Tehran, and Oman and Qatar enjoy cordial relations with their northern neighbour. The AlUla summit in 2021 also resulted in an overdue détente amongst the member states of the Gulf Cooperation Council (GCC). Moreover, the Baghdad Conference for Cooperation and Partnership brought together officials from all regional countries to find areas for cooperation and, eventually, integration. France, and the European Union, have backed the Baghdad format.

The Conference of the Parties (COP28) takes place in the United Arab Emirates (UAE) in November–December 2023. This important international gathering presents new avenues to forge multilateral collaboration, and also with European involvement. Mitigating water scarcity, decreasing the frequency of heatwaves, and fighting SDS are on the agenda. While the Gulf states have the ability to purchase modern technologies, they are largely incapable of correct usage without proper training and continued technical support. Up until recently, they have largely lacked the necessary political will and institutional processes to effectively coordinate amongst relative entities. This is where European expertise can add value.

This chapter looks at shared challenges in water scarcity, heatwaves, and sand and dust storms in the Gulf to identify areas for cooperation with European support and involvement.

European interests in supporting regional diplomacy in the Gulf

For decades, European countries have sought to protect key interests by promoting stability and security in the Gulf. Whether maintaining energy trade, protecting freedom of navigation, preventing nuclear proliferation, or addressing challenges related to terrorism and migration, European governments have been deeply engaged in the region. Following the Russian invasion of Ukraine and the subsequent shock on global energy markets, ties to and stability in the Gulf have become more important for European security than ever before. But the region's security-related issues extend beyond energy supplies and military threats. Environmental challenges and climate change, including issues related to water scarcity and extreme weather events, are increasingly growing as national security concerns

in every country in the region. The Europeans are aware of these facts, but there is a need now to factor and prioritise them in their policy approach towards the Gulf.

In February 2022, Josep Borrell hosted the 26th EU-GCC Joint Council and Ministerial Meeting in Brussels to deepen Europe's engagement with the region. Commenting on the fallout of the Russian invasion of Ukraine, Borrell affirmed the region's importance beyond energy security and stated that "the European Union has to engage more."² In May 2022, the EU published the Joint Communication to the European Parliament and the Council on a strategic partnership with the Gulf, arguing that "the Gulf is a dynamic neighbouring region and an important gateway between Europe, Asia, and Africa."³

The Europeans have been involved in mediation and conflict resolution efforts between Gulf states or at least expressed support for the ongoing diplomatic back and forth in the region between regional rivals. While Europeans have welcomed the recent diplomatic developments between regional players, these changes must now be viewed as a means of advancing regional stability that facilitates wider European interests. They should also allow for Europe to approach the region in a more inclusive manner, such as supporting a more structured dialogue process among the eight littoral states surrounding the Gulf, particularly in the climate sphere. This is key to building sustainable ties and is an area where Europe can bring added value to the conversation. As stipulated in the Joint Communication, "the countries of the region – on both sides of the Gulf – should lead and guide such efforts" to reduce tensions and build confidence, "but the EU and the wider international community can and should offer support and advice."

Even though Europe has an inclusive approach towards the region in the sense that it has functional relations with all countries around the Gulf, it has often reduced the region to just the six GCC states to avoid complications. The Joint Communication is reflective of the EU's keenness to expand its engagements with the region, particularly on economic ties. However, it does not fully represent the approach of most European countries towards the region as it is not inclusive and excludes Iran and Iraq. The main reason was, according to one European official, that the negotiations to restore the Joint Comprehensive Plan of Action (JCPOA) had not concluded and that if it was revived, the Joint Communication would have looked very different in the sense that it would have included potential areas for cooperation with Iran.⁴ It mentions that "involvement of other key Gulf countries in the partnership may also be considered as relations develop and mature," and the only two other countries are Iran and Iraq.⁵

2 EU-GCC Joint Council: Remarks by High Representative Josep Borrell upon arrival. *European Union External Action*. February 21, 2022. https://www.eeas.europa.eu/eeas/eu-gcc-joint-council-remarks-high-representative-josep-borrell-upon-arrival_en

3 Joint Communication to the European Parliament and the Council: A strategic partnership with the Gulf. *European Commission*. May 18, 2022. <https://www.eeas.europa.eu/sites/default/files/documents/Joint%20Communication%20to%20the%20European%20Parliament%20and%20the%20Council%20-%20A%20Strategic%20Partnership%20with%20the%20Gulf.pdf>

4 Author's interview with a European official. May 13, 2022.

5 Joint Communication to the European Parliament and the Council: A strategic partnership with the Gulf.

European countries have significant expertise and an existing economic footprint in the Gulf that they can leverage to support regional environmental diplomacy. Such efforts would also cement a European role in the emerging multipolar order in the region. Europeans can provide financing and capital, technology and technical assistance, and the know-how for establishing mechanisms and institutions to facilitate multilateral environmental cooperation between the GCC states, Iran, and Iraq. European governments already use these tools as part of their bilateral relations with the regional states, but the recent push among these countries for regional diplomacy provides Europe an opportunity to regionalise its environmental diplomacy as well.

If the JCPOA is not restored, however, US secondary sanctions on Iran will be tightened, and Washington will once again implement a maximum pressure campaign on Tehran. This will evidently limit talks of regional cooperation that includes Tehran. Washington has been suggesting that if the JCPOA is not restored, it expects all GCC countries, as well as the Europeans, to join the campaign against Iran. This comes also in the backdrop of more than a year of “Woman, Life, Freedom” protests by Iranians against the Islamic Republic, which have garnered international support. To add to the complexity, Iran’s involvement in Russia’s war on Ukraine has soured relations between European capitals and Tehran.

Nevertheless, constructive engagement continues to dominate EU policy towards the region. Despite the differences, maintaining EU dialogue with Iran is key. Moreover, even if the JCPOA negotiations collapse completely, the GCC states have made clear that they will want to maintain some dialogue and economic ties with Tehran, primarily to prevent dangerous escalation. The Europeans can find ways to limit the reach of US sanctions and carve out exceptions when their interests demand. Particularly, new instruments could be developed to shield European and international companies involved in initiatives against climate change.

Paving the road for environmental cooperation in the Gulf

The COVID-19 pandemic seriously tested the national capacities of the Gulf countries, whether on vaccine distribution, sourcing personal protective equipment (PPE), or healthcare infrastructure. But thanks to the already vast transportation links and regional connectivity, the crisis also highlighted the possibilities of regional cooperation. The UAE, for example, excelled in crisis management by initiating regional humanitarian assistance and acting as re-exportation hub for the distribution of vaccines, medicine, and equipment for the region, including to Iran.⁶ The cooperation that took place between Iran and the UAE at times of serious political tensions illustrated how shared threats could be tackled collectively and how useful regional links can be. Because of the vast transport links, including dozens of established flight routes from multiple Iranian airports to Dubai, it was easy to deliver much-

6 UAE sends medical aid to Iran as coronavirus outbreak intensifies. *Al-Monitor*. March 17, 2020. <https://www.al-monitor.com/originals/2020/03/uae-iran-medical-aid-coronavirus-outbreak.html#ixzz8GWDcRoau>

needed humanitarian aid. Qatar also delivered medical aid to Iran.⁷ The cooperation that took place in the aftermath of the COVID-19 pandemic is an example that could be used in developing the framework for regional cooperation beyond bilateral agreements and responses to global pandemics.

With the recent diplomatic reconciliations across the region, including the restoration of diplomatic ties between Saudi Arabia and Iran, there is a newfound interest in diplomatic engagements and multilateral cooperation. Today, according to Abdulkhaleq Abdulla, a prominent Emirati academic and political commentator, “There is a GCC-wide consensus to reach out to Iran and engage with it in the hope that it responds in kind this time around.”⁸ Since 2021, all GCC states have talked openly about efforts to build effective diplomatic channels with Iran, affirming that deeper economic ties after the lifting of US sanctions under the JCPOA are in the mutual interest of the region.⁹ The GCC states have declared that “enhanced regional dialogue” would “allow for more regional partnerships and economic exchange.”¹⁰ These statements signify the new horizons for regional diplomacy and an expanding appetite for multilateral engagements in the region.¹¹

There is also a flurry of diplomatic engagements amongst the GCC states, as well as with Iraq, despite deep-rooted and periodic conflicts between the neighbouring states. After all, the north and south of the Gulf are more interconnected than the governments of the region want to admit. There have been centuries of interlinkages between every major seashore around the body of water. At the same time, the geographical proximity also means that they face shared environmental threats and challenges. Metaphorically, if someone sneezes in Ahwaz, Basrah, or Sharjah, the entire Gulf catches a cold. The water scarcity issues, heatwaves, and SDS are not bound to a single city but have taken over large parts of the region.

Tackling shared environmental challenges has turned out to be the entry point to effectuating further regional cooperation in the Gulf. Some GCC states had already started engaging Iran to cooperate on environmental issues, as evidenced by the ministerial meeting in Tehran in July 2022, at which the UAE and Iran signed a document on environmental cooperation.¹²

7 Qatar Fund for Development sends medical aid to the Republic of Iran to combat the outbreak of the Corona pandemic. *Qatar Fund for Development*. July 29, 2021. <https://qatarfund.org.qa/qatar-fund-for-development-sends-medical-aid-to-the-republic-of-iran-to-combat-the-outbreak-of-the-corona-pandemic/>

8 Abdulkhaleq Abdulla. The UAE-Iran diplomatic reset is part of a greater focus on regional stability. *The National*. August 24, 2022. <https://www.thenationalnews.com/opinion/comment/2022/08/24/a-new-chapter-in-iran-uae-relations/>

9 U.S. GCC Iran Working Group Statement. U.S. *Department of State*. November 17, 2021. <https://www.state.gov/u-s-gcc-iran-working-group-statement/>

10 Joint Statement on the Meeting of the E3 + United States with the Gulf Cooperation Council. U.S. *Department of State*. November 18, 2021. <https://www.state.gov/joint-statement-on-the-meeting-of-the-e3-united-states-with-the-gulf-cooperation-council/>

11 Mehran Haghirian. New Horizons for Regional Economic Diplomacy in the Persian Gulf. *Bourse & Bazaar Foundation*. March 9, 2022. <https://www.bourseandbazaar.com/research-1/2022/03/09/new-horizons-for-regional-economic-diplomacy-in-the-persian-gulf>

12 Minister of Climate Change takes part in Ministerial Meeting on Environment Cooperation for a Better Future. *Emirates News Agency*. July 13, 2022. <https://www.wam.ae/en/details/1395303065831>

Soon after, Iran and Kuwait signed a similar agreement.¹³ In September 2023, Iran hosted a climate change conference that saw the participation of most GCC states, including Saudi Arabia.¹⁴ In tandem, Saudi Arabia has been pushing forward with its Middle East Green Initiative, which encompasses the entire region except Iran. Because of closer ties after the rapprochement, however, there seems to be room for closer coordination and cooperation between Riyadh and Tehran, particularly on environmental issues.

Shared environmental challenges in the Gulf

The environmental challenges facing the Gulf are transboundary and affect all littoral states. Shared issues related to water scarcity, heatwaves, and sand and dust storms are discussed in this section to identify areas for cooperation.

Water scarcity

Water scarcity is growing as a regional issue, and its consequences will have far-reaching effects, including possible new regional conflicts, forced migration, food insecurity, and poverty. The 2020–21 period was the second-driest rainfall season in four decades, which resulted in crop failure and extreme shortages in groundwater storage.¹⁵ Iran, which is relatively better positioned than the GCC states and Iraq in water endowments, is now facing a water bankruptcy.¹⁶ The Tigris and Euphrates rivers in Iraq could completely dry up by 2040, and the Shatt al-Arab, or Arvand Rood, is drying as well.¹⁷ Moreover, because of overexploitation, the building of dams, and unprecedented rise in consumption, the region's freshwater resources have decreased in both quantity and quality. A 2021 report argues that because of depleting water resources and higher temperatures, agricultural productivity is expected to drop by 30% to 60%.¹⁸ This is exacerbated by poor cropping patterns that are also detrimental to the local and regional water resources.

13 Kuwait, Iran sign agreement to combat sand storms. *Kuwait News Agency*. July 5, 2022. <https://www.kuna.net.kw/ArticleDetails.aspx?id=3044260>

14 UN supports Iran in holding an international conference on combating sand and dust storms. *United Nations Office in Iran*. September 11, 2023. <https://iran.un.org/en/245453-un-supports-iran-holding-international-conference-combating-sand-and-dust-storms>

15 Claire Parker and Kasha Patel. Sandstorm wave sweeps Middle East, sending thousands to hospitals. *The Washington Post*. May 26, 2022. <https://www.washingtonpost.com/world/2022/05/26/sand-storms-middle-east-climate-change/>

16 Maya Gebeily. As Iran faces 'water bankruptcy', drought exposes past problems, future threats. *Reuters*. July 28, 2021. <https://www.reuters.com/article/climate-change-water-iran-idUKL8N2P24NL>

17 Abdul Haleem Al-Muhyi. The Challenges Facing Shatt Al Arab River in Present and Future. *Marsh Bulletin*, Vol. 2, (2016). <https://www.iasj.net/iasj/download/249b2d1d8387cfa1>

18 Abdolmajid Naderi Beni, Nick Marriner, Arash Sharifi, Jafar Azizpour, Keivan Kabiri, Morteza Djamali, Alan Kirman. Climate change: A driver of future conflicts in the Persian Gulf Region?, *Heliyon*, Vol. 7, Iss. 2, (2021). <https://www.sciencedirect.com/science/article/pii/S2405844021003935>

As issues of water scarcity have worsened, GCC countries have become increasingly reliant on desalination plants for the replenishment of groundwater, with the UAE and Saudi Arabia spending around US\$6 billion per year on water desalination.¹⁹ Some GCC states, such as Bahrain and Qatar are 90% reliant on desalinated water for domestic use, and the region is the greatest producer of desalinated water in the world, with Saudi Arabia alone responsible for about 20% of global production.²⁰ The older desalination methods used in some areas are costly and potentially dangerous for local ecosystems. Thermal desalination means a large carbon footprint because of overreliance on energy-intensive thermal plants, an environmental impact much higher than the new reverse osmosis technology used in advanced GCC states. The energy used comes from the oil and gas reserves of each country, which leads to decreasing energy exports, environmental damage, and increasing water salinity in the Gulf.

Water issues extend to limited access to clean drinking water. In 2018, contaminated drinking water in Basrah sent at least 118,000 people to the hospital, sparking massive protests.²¹ As Winthrop Rodgers notes, because less freshwater comes down the river system, saltwater from the Gulf penetrates farther inland up the Shatt al-Arab waterway, which also poisons farmland across southern Iraq.²² Moreover, according to UNICEF, nearly three out of five children in Iraq have no access to safely managed water services, and less than half of all schools in the country have access to basic water, the lack of which harms children's health, nutrition, cognitive development, and future livelihoods.²³

Heatwaves

Water scarcity has worsened in part because of rising temperatures and deadly heatwaves that repeatedly break historical and international records. In fact, the broader Middle East region is heating up about twice as quickly as the rest of the world.²⁴ In June 2022, the temperature in the Iranian city of Abadan reached 52.2°C, and thermometers hit 51.6°C in Iraq's Basrah. These heatwaves reached the region even before the official start of the summer season. According to a study conducted in 2015 by Elfatih Eltahir and Jeremy Pal, the environmental conditions in the Gulf region make it a specific regional hot spot where climate change, in absence of significant mitigation, is likely to severely impact human habitability in the future.²⁵ In other words, with current emission trends and economic structures, the region

19 Ibid.

20 Mahima Shanker. Possible Solutions to the Middle East's Water Woes. *Maithri*. December 1, 2021. <https://www.maithriaqua.com/post/middle-east-water-woes-possible-solutions>

21 Winthrop Rodgers. The Cradle of Civilization is Drying Up. *Foreign Policy*. July 25, 2023. https://foreignpolicy.com/2023/07/25/iraq-kurdistan-climate-change-rivers-tigris-euphrates/#cookie_message_anchor

22 Ibid.

23 Running Dry: water scarcity threatens lives and development in Iraq. UNICEF. August 29, 2021. <https://www.unicef.org/iraq/press-releases/running-dry-water-scarcity-threatens-lives-and-development-iraq>

24 Claire Parker and Kasha Patel. Sandstorm wave sweeps Middle East, sending thousands to hospitals.

25 David Chandler. Persian Gulf could experience deadly heat. *Massachusetts Institute of Technology News*. October 26, 2015. <https://news.mit.edu/2015/study-persian-gulf-deadly-heat-1026>

could become uninhabitable in the next 100 years.²⁶ Already on hot days, everyday objects such as door handles, metal gates, seat belts, and water in a hose can become hazards.²⁷

Economic costs of these heatwaves are enormous too, especially when they are mixed with the consequences of pollution, SDS, and droughts. The International Monetary Fund (IMF) estimates that the region's hottest countries, such as Bahrain, Qatar, and the UAE, could see an immediate decline in per-capita economic growth of around 2 percentage points for every temperature increase of 1°C.²⁸

At the same time, these heatwaves can be dangerous for the nuclear industries in the region, including in Iran, the UAE, and the new Saudi plans for nuclear power generation. In August 2022, the rising seawater temperatures in the Gulf cut the power output at Bushehr because the temperature was too high to cool the reactors.²⁹ With temperatures rising every year, more of these incidents are expected if no mitigation strategy is introduced.

Sand and dust storms (SDS)

The droughts and low precipitation, coupled with scorching hot temperatures, give rise to stronger, more frequent, and more damaging sand and dust storms (for more on SDS, read chapter 4 of this volume). Dust particles originate from drying plains and waterbeds, which then get mixed with industrial pollution and create hazardous conditions in the region.³⁰ Cities in the central and southern Iranian provinces; all of central Iraq; east and central Saudi Arabia; the entirety of Kuwait, Bahrain, and Qatar; and major parts of the UAE often witness SDS on a monthly basis. The United Nations (UN) estimates that the Middle East and North Africa (MENA) region loses about US\$13 billion in gross domestic product (GDP) every year because of SDS.³¹ According to the World Bank, SDS and their environmental consequences cost the MENA region more than US\$150 billion annually and over 2.5% of GDP for most countries in the region.³²

26 Brandon Miller. Persian Gulf heat: It may become too hot for humans to survive, study warns. CNN. October 28, 2015. <https://edition.cnn.com/2015/10/27/world/persian-gulf-heat-climate-change/index.html>

27 Dhruv Khullar. What a Heat Wave Does to Your Body. *The New Yorker*. August 25, 2023. <https://www.newyorker.com/news/annals-of-a-warming-planet/what-a-heat-wave-does-to-your-body>

28 Adam Lammon. Can the Middle East Avoid the Coming Climate Disaster? *The National Interest*. May 30, 2022. <https://nationalinterest.org/feature/can-middle-east-avoid-coming-climate-disaster-202649>

29 Patrick Sykes, Iran's Nuclear Program Hits New Snag on Climate Challenge. *Bloomberg*. August 31, 2022. <https://www.bloomberg.com/news/articles/2022-08-31/iran-s-nuclear-program-hits-new-snag-as-climate-challenge-grows>

30 Shirin Hakim and Kaveh Madani. The Rise and Fall of Iran's Khuzestan: A Calamity of International Significance. *Atlantic Council*. April 17, 2017. <https://www.atlanticcouncil.org/blogs/iransource/the-rise-and-fall-of-iran-s-khuzestan-a-calamity-of-international-significance/>

31 Claire Parker and Kasha Patel. Sandstorm wave sweeps Middle East, sending thousands to hospitals.

32 Sand and Dust Storms in the Middle East and North Africa (MENA) Region. *The World Bank*. Fall 2019. <https://documents1.worldbank.org/curated/en/483941576489819272/pdf/SAND-AND-DUST-STORMS-IN-THE-MIDDLE-EAST-AND-NORTH-AFRICA-MENA-REGION-SOURCES-COSTS-AND-SOLUTIONS.pdf>

In May 2022, Iraq was forced to call a national holiday to decrease movement by the public, aiming to reduce hospitalisations and health complications related to a wave of SDS.³³ Across the region, more than 1,000 people went to hospital for respiratory problems in the span of a few days. Two previous SDS in Iraq resulted in around 10,000 hospitalisations. Another SDS later that month also sent 1,200 people to the hospitals when it reached Riyadh, as they often do.³⁴

The various health issues as a consequence of SDS and other environmental issues such as pollution and heatwaves have led to high numbers of hospitalisations as well as internal and external migration, particularly in Iran and Iraq. What this common feature of the region's geography illustrates is that such environmental issues transcend borders and local strategies will never suffice to fully solve issues. Thus, a concerted effort to address this issue is integral to mitigate the detrimental impacts of SDS.

Europe's role in supporting environmental cooperation in the Gulf

Ahead of his visit to the region in 2021, Borrell wrote, "Climate change in the Gulf is a reality" and "water security is a real issue."³⁵ He argued that "we [Europeans] can help."³⁶ But Europeans have been largely absent from regional initiatives in the Gulf. Taking advantage of the new diplomatic openings, Europeans should redouble their engagements in water and ecological diplomacy. This will mean integrating climate stabilisation and ecosystem regeneration into the heart of the EU's foreign policy.³⁷

As "a pioneer on climate change initiatives," the Joint Communication outlines how the EU can share expertise and know-how, particularly in exploring best practices, technology options, innovation, regulatory frameworks, and standards.³⁸ In October 2023, the 27th GCC-EU Joint Council meeting took place in Muscat, which stressed the importance and urgency of promoting joint action in mitigating climate change and adapting to its impacts, protecting the environment, and developing renewable energies and energy efficiency.³⁹

European facilitation in multilateral dialogue must now focus on concrete interventions where technical assistance, technology, and financing can add value. For example, at the October

33 Claire Parker and Kasha Patel. Sandstorm wave sweeps Middle East, sending thousands to hospitals.

34 Iraq sandstorm grounds flights, sends 1,000 to hospitals. *France 24*. May 23, 2022. <https://www.france24.com/en/live-news/20220523-iraq-sandstorm-grounds-flights-sends-1-000-to-hospitals>

35 Josep Borrell. The EU's stakes and options in a changing Gulf region. *European Union External Action*. September 30, 2021. https://www.eeas.europa.eu/eeas/eu's-stakes-and-options-changing-gulf-region_en

36 Ibid.

37 Cornelius Adebahr and Olivia Lazard. How the EU Can Help Iran Tackle Water Scarcity. *Carnegie Endowment for International Peace - Europe*. July 7, 2022. <https://carnegieeurope.eu/2022/07/07/how-eu-can-help-iran-tackle-water-scarcity-pub-87281>

38 Joint Communication to the European Parliament and the Council: A strategic partnership with the Gulf.

39 Co-Chairs' Statement of the 27th GCC-EU Joint Council and Ministerial Meeting. Council of the European Union. October 10, 2023. <https://www.consilium.europa.eu/en/press/press-releases/2023/10/10/co-chairs-statement-of-the-27th-gcc-eu-joint-council-and-ministerial-meeting/>

meeting, GCC-EU officials also agreed on expanded “exploitation of services provided by space systems, such as the Copernicus Earth observation data supporting environmental policy decision making, or Galileo’s High Accuracy Service applied to urban planning or automotive applications.” This is a clear example of how Europeans can support regional environmental action in the region. The EU has numerous other platforms and mechanisms that could be used as well.

European expertise can help the region find ways to jointly tackle environmental issues that have worsened and resulted in spill over effects, such as increased food and water insecurity. What is required now is to regionalise existing EU projects in the Gulf and for them to be more inclusive and multilateral. Many of the ongoing projects with the GCC states have the room to include Iran and Iraq, and European participants can encourage the expansion of such initiatives, particularly in addressing matters that have regional cooperation as a prerequisite to finding solutions for shared challenges.

Private European companies that have participated in the Global Europe Instrument, the main EU funding platform to promote the green transition worldwide, could get involved in environmental initiatives in the region. These include Danish Vestas, French Engie and EDF Renewables, German Siemens-Gamesa, Italian Enel Green Power, and Spanish Abengoa and Acciona, to name a few.⁴⁰ The existence of a myriad of projects between European and GCC players also allows for envisioning similar projects within the region itself. Providing funds from European instruments will help guarantee European involvement in such inclusive multilateral green projects in the region as well as their continuation in the face of possible re-emergence of tensions in the region.

To implement the recommendations set forth in this chapter, the European Union’s External Action Service (EEAS) must take charge in activating a reinvigorated effort in engaging the Gulf region as a whole. The current EU-GCC dialogue and cooperation and the separate dossiers in regard to Iran and Iraq need to be better merged. The 2023-established EU Special Representative for Gulf affairs, led by Luigi Di Maio, should directly oversee and coordinate initiatives related to supporting inclusive environmental initiatives. Particularly, the Special Representative must aim to find areas where Europe can add value in terms of concretely bringing all sides together and exploring ideas on how Europeans can deploy incentives to achieve the desired goals.

For Tehran, Arab capitals, and European governments to realise the vast potential of economic exchanges in the region, however, the sustained lifting of many of the sanctions on Iran is integral. Nevertheless, there are numerous non-sanctioned areas in which greater regional cooperation can be envisioned.

40 Amine Bennis. North Africa's Energy Transition: A Key Asset in the War?. *Istituto per gli Studi di Politica Internazionale (ISPI)*. April 4, 2022. <https://www.ispionline.it/it/pubblicazione/european-way-north-africas-energy-transition-32916>

Co-investments

For regional initiatives to be successful, co-investments including sovereign wealth funds, co-investment programmes, economic zones, and multi-party investment initiatives through regional banks or multinational institutions are crucial.⁴¹ In the past, the Islamic Development Bank, state-owned sovereign wealth funds in the GCC, the European Investment Bank (EIB), and the European Bank for Reconstruction and Development (EBRD) have all supported projects with regional outlooks. This could also happen through matching funds allocated to the initiative by involved parties.

The European Union has instruments that could be used to foster regional economic cooperation in the Gulf. The EU's €300 billion Global Gateway aims to tackle the most pressing global challenges, from fighting climate change to improving health systems and boosting competitiveness and security of global supply chains.⁴² It is part of a European strategy to boost smart, clean, and secure links in digital, energy, and transport and strengthen health, education, and research systems across the world.⁴³ In its simplest form, Global Gateway brings together the EU member states with their financial and development institutions, including the EIB and EBRD, to mobilise the private sector to leverage investments for a transformational impact.⁴⁴ The EU has proposed more than 70 international infrastructure projects through Global Gateway to rival China's Belt and Road infrastructure spending.⁴⁵

The European Green Deal and the EU's Global Europe Instrument are other mechanisms that could be used in this context as well. The Instrument aims to fund international cooperation through grants, technical assistance, financial instruments, and budgetary guarantees. Its goal is to stimulate investments as a means of contributing to sustainable and inclusive growth.⁴⁶ The Global Europe Instrument also foresees projects and investments in Iraq, and the platform could be used to support trilateral or multilateral cooperation inside Iraq and Iran with the GCC states as partners to Europeans.

41 Mehran Haghirian. *New Horizons for Regional Economic Diplomacy in the Persian Gulf*. *Bourse & Bazaar Foundation*. March 9, 2022. <https://www.bourseandbazaar.com/research-1/2022/03/09/new-horizons-for-regional-economic-diplomacy-in-the-persian-gulf>

42 Global Gateway: up to €300 billion for the European Union's strategy to boost sustainable links around the world. *European Commission*. December 1, 2021. https://ec.europa.eu/commission/presscorner/detail/en/ip_21_6433

43 *Ibid.*

44 *Ibid.*

45 Barbara Moens. EU lines up 70 projects to rival China's Belt and Road infrastructure spending. *Politico*. January 23, 2023. <https://www.politico.eu/article/eu-sets-outs-projects-to-make-global-gateway-visible-on-the-ground/>

46 Amine Bennis. North Africa's Energy Transition: A Key Asset in the War?. *Istituto per gli Studi di Politica Internazionale (ISPI)* April 4, 2022. <https://www.ispionline.it/it/pubblicazione/european-way-north-africas-energy-transition-32916>

Cooperation on water scarcity

To deal with issues related to water scarcity, Europeans could help find common ground with regard to the usage and management of shared water resources in both rivers and groundwater in the Gulf.⁴⁷ This could be done through an EU-mediated mechanism-based approach in which international environmental law and European expertise are used to reach mutually acceptable solutions.

Europeans should consider presenting modern and water-efficient agricultural and irrigation technologies and practices that could be shared across the region, taking into account the varying financial capabilities of the eight Gulf states. While most GCC states, such as the UAE and Qatar, have invested heavily in new technology, particularly in partnerships with US-based companies, the sanctions on Iran and financial inabilities of Iraq have inhibited knowledge sharing and the transfer of such technologies to these countries. The inclusive European approach towards the region allows for such region-wide climate initiatives to be realised, and the Global Europe Instrument and Global Gateway can provide the required funding for projects inside Iraq.

Saudi Arabia inaugurated the Global Water Organization (GWO) in Riyadh in September. The new centre seeks to exchange expertise, advance water technology, foster innovation, and share research and development experiences to ensure the accessibility of water resources to everyone.⁴⁸ The EU and individual European countries such as France, Italy, and Germany can directly engage the GWO to support its processes. Such an organisation, which has already received much funding from the state, would be suitable for more direct regional cooperation on matters related to water issues in the Gulf directly. Smaller technical groups could be created to tackle shared issues among neighbouring Gulf states with the inclusion of technical experts from Europe and elsewhere.

Cooperation on heatwaves

The region would benefit from extreme heat planning, and European companies can help design and sell the technology for cool roofs and pavements, providing strategies for energy efficiency, as well as forecasting and monitoring.⁴⁹ Using new cooling technologies to decrease the heat being added to the air from pavements and roofs have become important elements in heat island mitigation strategies. They absorb more solar energy and evaporate less water than traditional materials, so they can help decrease temperatures in roads, car

47 Anchal Vohra. The Middle East Is Becoming Literally Uninhabitable. *Foreign Policy*. August 24, 2021. <https://foreignpolicy.com/2021/08/24/the-middle-east-is-becoming-literally-uninhabitable/>

48 Crown Prince Announces Establishment of Global Water Organization. *Saudi Press Agency*. September 4, 2023. <https://www.spa.gov.sa/en/5c628bb9a5p>.

49 Resilience Strategies for Extreme Heat. *Center for Climate and Energy Solution*. November 2017. <https://www.c2es.org/wp-content/uploads/2017/11/resilience-strategies-for-extreme-heat.pdf>.

parks, and roofs.⁵⁰ Planting trees is also a key mitigation strategy to not only capture heat but also to contain carbon dioxide and pollution. Europe can also aid Gulf countries in designing best practices and identifying main areas for planting, particularly for the Saudi-backed Middle East Green Initiative. In addition, Europeans could provide their expertise in energy conservation and public awareness campaigns to decrease the severity of the impacts by heatwaves.

Cooperation on sand and dust storms

The West Asia Regional Master Plan to Combat Sand and Dust Storms, which includes Bahrain, Iran, Iraq, Jordan, Kuwait, Oman, Qatar, Saudi Arabia, Syria, Turkey, and the UAE, is coordinated by the United Nations Environment Programme (UNEP) and the World Meteorological Organization (WMO) Regional Office for West Asia based in Manama.⁵¹ The Master Plan aims to establish a regional monitoring, forecasting, and early warning network for SDS and to invest in strengthening mitigation measures against root causes of SDS in the regional source areas.⁵²

These efforts are in line with work by UN agencies, specifically those in close coordination with the UN Convention to Combat Desertification. In 2019, the UN Coalition on Combating Sand and Dust Storms was launched, which committed to a proactive approach to combat SDS and to enhance cooperation and coordination on SDS at global, regional, and sub-regional levels.⁵³ A workshop co-led by the Iran Meteorological Organization and the Turkish State Meteorological Service took place in May 2023 in Tehran on SDS monitoring and forecasting.

In July 2023, the UN Secretary General released a report on the progress of UN bodies in combatting SDS, lauding regional efforts in and around the Gulf.⁵⁴ In September, Iran, with the support of and in coordination with the UN office in Iran and 12 UN entities worldwide, organised the International Conference on Combatting Sand and Dust Storms. Iran had organised a similar conference in 2017 as well.⁵⁵ At the 2023 conference, attended by the Iranian president as well as representatives from most GCC states and more than 40 other countries, UN Secretary-General Antonio Guterres urged participants to “use your time

50 Adapting to Heat. *United States Environmental Protection Agency*. July 15, 2021. <https://www.epa.gov/heatislands/adapting-heat>.

51 Sand and Dust Storms in the Middle East and North Africa (MENA) Region. *The World Bank*. Fall 2019. <https://documents1.worldbank.org/curated/en/483941576489819272/pdf/SAND-AND-DUST-STORMS-IN-THE-MIDDLE-EAST-AND-NORTH-AFRICA-MENA-REGION-SOURCES-COSTS-AND-SOLUTIONS.pdf>

52 Kuwait, Iran sign agreement to combat sand storms. *Kuwait News Agency*. July 5, 2022. <https://www.kuna.net.kw/ArticleDetails.aspx?id=3044260>

53 The United Nations Coalition on Combatting Sand and Dust Storms. *Food and Agriculture Organization*. Accessed on October 1, 2023. <https://www.fao.org/land-water/land/sds/sds-coalition/fr/>

54 Combating sand and dust storms: Report of the Secretary-General A/78/237. *United Nations General Assembly*. July 26, 2023. <https://documents-dds-ny.un.org/doc/UNDOC/GEN/N23/220/55/PDF/N2322055.pdf>.

55 WMO supports international conference on sand and dust storms. *World Meteorological Organization*. July 3, 2017. <https://public.wmo.int/en/media/news/wmo-supports-international-conference-sand-and-dust-storms>.

in Tehran to build partnerships, increase cooperation, and commit to practical action.⁵⁶ Nevertheless, regional countries, with high-level support of expert groups from around the world, have yet to convincingly move past consultations and capacity building. Having progressed to this level, though, is a major accomplishment for regional countries and the joint efforts needed to tackle these shared environmental challenges. Now is time to move towards implementing practical solutions, and the region needs even more external assistance and support to succeed in mitigation efforts.

Regional countries are largely unaware of possible mitigation strategies and ways to combat or reduce the impacts of SDS. European expertise and technology can assist. Europeans could get directly involved by linking and providing existing projects and initiatives to support the West Asia Regional Master Plan to Combat Sand and Dust Storms. Specifically, monitoring and data elements related to SDS and drying waterbeds from the EU's Earth Observation data through the Copernicus system, research support through various EU-level environmental bodies, and funding through the Green Deal and Global Gateway should be considered.

Fencing and windbreaks, for example, are part of the solution, and European companies should aim to find new designs that more efficiently deal with sudden storms sweeping through dust beds, particularly in areas on country borders. European companies could design and produce region-wide prediction and early warning, monitoring, and forecasting systems with the investment and involvement of regional countries, including closer coordination with the Regional Center of the Sand and Dust Storm Warning Advisory and Assessment System (SDS-WAS) programme based in Barcelona and the WMO Regional Office for West Asia based in Manama.⁵⁷ The Copernicus system could be used to help regional countries monitor pollution or water vapour measurements. While the majority of the data is freely available online, there is a need for establishing inclusive expert groups where key regional players and European specialists could engage in critical debate and present concrete ideas to decision-makers. The EU has the capacity to form such a group and the funding to support its mission.

Iraq as an arena for regional cooperation

The annual Baghdad Conference for Cooperation and Partnership that first took place in August 2021 and then in Amman, Jordan, in December 2022, is a unique opportunity for countries that had not sat around the same table for years to hold talks. Leaders and foreign ministers of Iraq, Iran, Kuwait, Qatar, Saudi Arabia, and the UAE, in addition to Egypt,

56 UN supports Iran in holding an international conference on combating sand and dust storms. *United Nations Office in Iran*. September 11, 2023. <https://iran.un.org/en/245453-un-supports-iran-holding-international-conference-combating-sand-and-dust-storms>.

57 Sand and Dust Storms in the Middle East and North Africa (MENA) Region. *The World Bank*

Jordan, Turkey, and France, participated in the first conference.⁵⁸ The gathering led the way towards a series of bilateral and regional dialogues. With the goal that the talks will lead to a structured EU-facilitated dialogue process, the Joint Communication views the Baghdad Conference and its follow-up process with EU involvement as a useful example for region-led processes.⁵⁹

Iraq is in dire need of foreign investments following the defeat of the Islamic State and ongoing reconstruction efforts (for more on Iraq, read chapter 7 of this volume). The UN ranks Iraq as the fifth-most vulnerable country to the effects of climate change.⁶⁰ Given the shuttle diplomacy conducted by Iraqi officials between Iran and Saudi Arabia to promote de-escalation efforts and France and the EU's involvement with launching the Baghdad Conference, it would be fitting to start a trilateral EU-GCC-Iran environmental project in Iraq.

The EU can draw in the GCC states and Iran to help with environmental efforts in Iraq. Through the Global Gateway, the EU and regional partners could “explore joint initiatives in third countries through triangular cooperation, financial support, capacity building, and technical assistance.”⁶¹ Cooperation on developing a particular port or completing a segment of the national railway should be the priority. Exploring joint GCC-Iran-EU investments in Iraq's oil and gas industry as well as renewable energy transition should also be considered.

Conclusion

The growing water scarcity, relentless heatwaves, and disruptive sand and dust storms are confronting all Gulf states. Recognising the intractable nature of these issues, leaders in the region have come to a consensus that collective action is the only viable path toward confronting and mitigating these shared environmental threats. Recent diplomatic developments in the Gulf, such as the re-establishment of ties between Iran and Saudi Arabia, offer opportunities for regional collaboration.

In examining shared challenges related to water scarcity, heatwaves, and SDS in the Gulf, this chapter identifies areas where European support and involvement can facilitate cooperative efforts. European interests in supporting regional diplomacy in the Gulf have evolved, recognising that environmental challenges and climate change are now central to regional security. The chapter emphasises the need to expand engagement with the entire Gulf region, moving beyond a focus on the GCC states to include Iran and Iraq in the dialogue.

58 Mehran Haghirian. Attendance in Baghdad Shows Iran's Commitment to Regional Diplomacy. *Bourse & Bazaar Foundation*. August 31, 2021. <https://www.bourseandbazaar.com/articles/2021/8/31/attendance-in-baghdad-shows-irans-commitment-to-regional-diplomacy>

59 Joint Communication to the European Parliament and the Council.

60 Winthrop Rodgers. The Cradle of Civilization is Drying Up. *Foreign Policy*. July 25, 2023. https://foreignpolicy.com/2023/07/25/iraq-kurdistan-climate-change-rivers-tigris-euphrates/#cookie_message_anchor.

61 Global Gateway.

Identifying the common challenges and tapping into potential economic linkages among the GCC states, Iran, and Iraq provides a tangible pathway for Europeans to support the diplomatic process for de-escalation currently taking place in the region. Doing so would further guarantee European security and economic interests and bring stability and economic prosperity to the Gulf region.

Finding solutions to the transborder issues across the Gulf requires regional cooperation, particularly investments in joint research as well as technology procurements. The EU can engage regional countries by supporting the construction of the required infrastructure through new mitigation designs in major cities and rural areas, specifically more specialised shelters for sand and dust storms and heatwaves, green industrial cooling mechanisms, and air-purifying machines. Europeans must also get involved in energy efficiency and conservation strategies in the region, a root cause of pollution in major cities.

It is imperative for the Gulf states, Europe, and other stakeholders to seize this moment of diplomatic thaw and leverage it for collective action. By addressing shared environmental challenges together, they can not only enhance the region's resilience but also build sustainable ties and promote a more inclusive approach to diplomacy. As the Gulf strives to mitigate the adverse impacts of climate change, Europe's involvement can add significant value, fostering a greener, more stable, and interconnected future for the Gulf region and beyond.



Chapter 9

Examining Gulf-Southeast Asia Interregional Environmental Cooperation

Aisha Al-Sarihi¹ and Muhammad Shidiq^{2,3}

Abstract

Essential for regional stability, security, and development, the Gulf states have established several regional institutions and initiatives to address common environmental challenges, including water scarcity, food security, biodiversity loss, and extreme weather events, such as sand and dust storms. However, given the slow pace of regional integration in the Gulf, the current arrangements for regional environmental cooperation remain weak and largely uncoordinated and materialise in barely any major action-oriented initiatives and partnerships. This has led to minimal meaningful cooperation with other regional organisations such as the Association of Southeast Asian Nations (ASEAN). This chapter argues that enhancing Gulf regional integration can create more strategic space for cooperation with ASEAN, which in comparison presents advanced frameworks and institutions to address shared environmental

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3 *Disclaimer: The views expressed in this paper are the views of the authors and do not necessarily reflect the views or policies of ASEAN Centre for Energy (ACE) or the governments it represents. ACE does not guarantee the accuracy of the data included in this paper and accepts no responsibility for any consequences of their use. The terminology used may not necessarily be consistent with ACE's official terms. Discussion papers are subject to formal revision and correction before they are finalised and considered published.*

challenges. Regionalism opens windows of opportunities for both sides to collaborate and complement each other in numerous areas, including in low-carbon technologies, water management, food security, exchange of knowledge, finance, innovation, and research and development.

Introduction

The Gulf states face common climate and environmental challenges, including rising temperatures, water scarcity, food security, sea level rise, biodiversity loss and extreme weather events, such as heatwaves, tropical cyclones, and sand and dust storms (SDS). The Gulf states have established several regional institutions and initiatives essential for regional stability and security to address these common challenges. However, given the slow pace of regional integration in the Gulf, the current arrangements for regional environmental cooperation remain weak and largely uncoordinated and barely materialise in any major action-oriented initiatives and partnerships. Regional tensions, lack of political will and a focus on national priorities are factors that have stood in the face of enhanced regional environmental cooperation in the Gulf. This chapter argues that strengthening environmental cooperation, including through the establishment of a focal point with clear mandates, can benefit the region in developing meaningful collaboration with other well-established regional organisations, such as the Association of Southeast Asian Nations (ASEAN).

Water resource management, food security, energy transition, and coping with extreme weather events are common challenges in the Gulf states and ASEAN member states (AMS). However, the extent of existing cooperation initiatives varies among individual Gulf states and AMS, as each country has its own set of priorities. While the Gulf Cooperation Council (GCC) has institutional relations with ASEAN and both regional blocs have expressed interest in enhancing environmental cooperation on various fronts, formal and comprehensive cooperation agreements have not yet been established. This chapter examines the current state of interregional environmental cooperation between the Gulf and ASEAN, assesses the regional environmental cooperation and governances within the two blocs, and identifies key areas for cooperation that promise mutual co-benefits for both regions.

Environmental cooperation in the Gulf

Climate change presents unique challenges for the Gulf countries, which have arid and semi-arid climatic conditions and are endowed with hydrocarbon wealth. Gulf countries are not only affected by the adverse physical impacts of climate change but also by the impacts of climate response measures implemented elsewhere, especially efforts associated with the global transition away from fossil fuels, which puts their hydrocarbon wealth and economic diversification at risk. Faced with these common challenges, Gulf countries can benefit from cooperative approaches in addressing shared challenges instead of depending

on silo approaches. Cooperation is particularly meaningful given the transboundary nature of some natural resources, such as rivers, aquifers, gas fields, and marine environments, as well as the transboundary implications of environmental pollution and climate change effects, such as SDS (for more on SDS, read chapter 4 of this volume). Neglecting regional cooperation could render ineffectual the efforts of individual countries to address these challenges, given the inherent interconnectedness of shared environmental challenges, which could potentially create tension and conflict among countries.

The Gulf governments have recognised the importance of regional cooperation to tackle common environmental and climate change challenges. Regional institutions have been established to tackle various environmental and climate-related challenges (see Table 1). However, current regional environmental institutions are weak and have yet to materialise in any major action-oriented initiatives and partnerships.⁴ Further, current regional frameworks lack inclusive platforms that include all littoral Gulf states, which is essential for effective regional cooperation. The Regional Organization for the Protection of the Marine Environment (ROPME) is the only organisation that includes Iran along with the GCC states (for more on ROPME, read chapter 1 of this volume).

Signs are emerging that Gulf governments, even rivals, could start engaging in regional dialogues and bilateral and multilateral relations to address regional climate and environmental issues. In July 2022, the Iranian government hosted a ministerial conference with 11 regional countries, and participants discussed environmental issues, including SDS.⁵ Iran has signed memorandums of understanding with the United Arab Emirates (UAE), Iraq, Syria and Kuwait for cooperation and information exchange on SDS.⁶ Tehran also hosted a UN-supported international conference on SDS in September 2023.⁷ These developments, in tandem with the rapprochement between Iran and Saudi Arabia in March 2023, have the potential to enhance environmental cooperation between the GCC states and Iran.

4 Al-Sarihi, A. and Luomi, M. 2019. Climate Change Governance and Cooperation in the Arab Region. EDA Insight. New Governance for the Environment in the Arab Region Series. *Emirates Diplomatic Academy*. https://www.agda.ac.ae/docs/default-source/Publications/eda-insight_gear-i_climate-change_en_web-v2.pdf

5 Iran, UAE sign environmental document. 2022. *Islamic Republic News Agency*. <https://en.irna.ir/news/84819411/Iran-UAE-sign-environmental-document>

6 Hamid Pouran, Chris Aylett, Glada Lahn. 2023. Dust storms: A shared security challenge for the Middle East. *Chatham House*. London, UK. <https://www.chathamhouse.org/2023/07/dust-storms-shared-security-challenge-middle-east>

7 United Nations Iran. 2023. UN supports Iran in holding an international conference on combating sand and dust storms. <https://iran.un.org/en/245453-un-supports-iran-holding-international-conference-combating-sand-and-dust-storms>

Table 1. Existing institutional platforms that oversee environmental cooperation in the Gulf

Area of Cooperation	Organisation	Members	Institutions, Legislations, and Initiatives	Mandate
Water	GCC Ministerial Water and Electricity Cooperation Committee	Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the UAE	GCC Unified Water Strategy and Implementation Plan 2016–2035	To implement a framework that unifies the GCC states' national water strategies and master plans in line with an overall GCC water management strategy.
	UN Economic and Social Commission for Western Asia	Algeria, Bahrain, Egypt, Iraq, Jordan, Kuwait, Lebanon, Libya, Morocco, Mauritania, Oman, Palestine, Qatar, Saudi Arabia, Somalia, Sudan, Syria, Tunisia, the UAE, and Yemen	Committee on Water Resources, established in 1995	To address regional water security during biannual sessions.
	League of Arab States	Algeria, Bahrain, Comoros, Djibouti, Egypt, Iraq, Jordan, Kuwait, Lebanon, Libya, Mauritania, Morocco, Oman, Palestinian Authority, Qatar, Saudi Arabia, Somalia, Sudan, Syria, Tunisia, the UAE, and Yemen	Arab Ministerial Water Council, established in 2009	To find solutions to increasing water scarcity in the region.
Wildlife	GCC Permanent Committee for the Conservation of Wildlife and its Natural Habitats	Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the UAE	Convention on the Conservation of Wildlife and their Natural Habitats in the GCC, signed in 2001 and came into force in 2003	To conserve and protect the natural environment.
Marine environment	Regional Organization for the Protection of the Marine Environment	Bahrain, Iran, Iraq, Kuwait, Oman, Qatar, Saudi Arabia, and the UAE	Kuwait Regional Convention for Cooperation on the Protection of the Marine Environment from Pollution	To coordinate a common action to protect the marine environment semi-enclosed by the sea surrounded by the eight coastal states.

Sand and dust storms	Middle East Green Initiative	<i>Endorsed by</i> Bahrain, Côte d'Ivoire, Djibouti, Egypt, Iraq, Jordan, Kuwait, Mauritania, Morocco, Oman, Pakistan, Palestine, Qatar, Somalia, Sudan, Tunisia, the UAE, Uzbekistan, and Yemen	Saudi Arabia's Sand and Dust Storm Warning Regional Center	To enhance regional cooperation and create the infrastructure needed to mitigate the impacts of climate change in the region. To plant 50 billion trees across the Middle East.
	GCC	Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the UAE	GCC Disaster Control Centre, established in 2007	To provide science-based policy guidance on monitoring and managing natural disasters.
	World Meteorological Organization	Bahrain, Iran, Iraq, Kuwait, Oman, Qatar, Saudi Arabia, and the UAE	Sand and Dust Storm Warning Advisory and Assessment	To provide early warning for sand and dust storms.
Energy	GCC	Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the UAE	GCC Interconnection Authority	To trade electricity.
	International Renewable Energy Agency (IRENA)	196 members, including Bahrain, Iraq, Kuwait, Oman, Qatar, Saudi Arabia, and the UAE	Peer-to-peer collaboration and knowledge exchange on key aspects of the energy transition	To serve as the principal platform for international cooperation and to support countries in their energy transitions, and to provide data and analyses on technology, innovation, policy, finance, and investment.

The Gulf states have already established essential regional institutions to address major regional environmental challenges, including water management, SDS, biodiversity protection, energy transition, and marine environment protection. However, these initiatives remain fragmented, and most are not inclusive of all countries in the region. With the slow pace of regional integration and the lack of a focal point or working group, these initiatives remain peripheral and are used only on an ad hoc basis.

Environmental cooperation within ASEAN

Endowed with rich natural resources, most of which are transboundary, the member states of ASEAN (Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, the Philippines, Singapore, Thailand and Vietnam) have recognised the importance of environmental cooperation since 1977.⁸ This cooperation stems from the understanding that individual approaches to protecting natural resources, water, food and energy may be inefficient and can result in competition or conflict.

The ASEAN Strategic Plan on Environment (ASPEN) is being developed to serve as a comprehensive guide for ASEAN cooperation on the environment for the next decade. It includes seven strategic priorities for cooperation: nature conservation and biodiversity, coastal and marine environment, water resources management, environmentally sustainable cities, climate change, chemicals and waste, and environmental education. The institutional framework of environmental cooperation consists of the ASEAN Ministerial Meeting on Environment (AMME), ASEAN Senior Officials on the Environment (ASOEN) and seven subsidiary working groups that focus on the seven strategic priorities for cooperation (see Figure 1). AMME meets every two years, while ASOEN and its subsidiary bodies meet annually to oversee the implementation of ASPEN and the ASEAN Socio-Cultural Community (ASCC) Blueprint 2025.

ASEAN Centre for Energy (ACE) is an intergovernmental organisation that independently represents the interests of ASEAN member states in the energy sector. The centre facilitates multilateral collaborations as well as joint and collective activities on energy. It has three key roles: Catalyst, Knowledge Hub, and Think Tank. Catalyst means to unify and strengthen ASEAN Energy Cooperation by providing a platform for sharing, policy advisory, best practices, and capacity building. Knowledge Hub provides a knowledge repository for AMS and services through data management, publication, and dissemination. Think Tank assists AMS in researching and identifying practical and specific areas for policy, legal and regulatory frameworks, technology procurement, and innovative solutions.

In 2004, AMS launched the ASEAN Plan of Action for Energy Cooperation (APAEC).⁹ The APAEC is a series of guiding policy documents that aims to promote multilateral energy cooperation and integration to attain the goals of the ASEAN Economic Community (AEC). It serves as the platform for deeper cooperation within ASEAN as well as with Dialogue Partners and International Organisations to enhance energy security, accessibility, affordability, and sustainability within the framework of the AEC.

To further understand the energy and climate nexus, ACE established the ASEAN Climate Change and Energy Project (ACCEPT).¹⁰ Phase I of the project was initiated in 2019 to improve

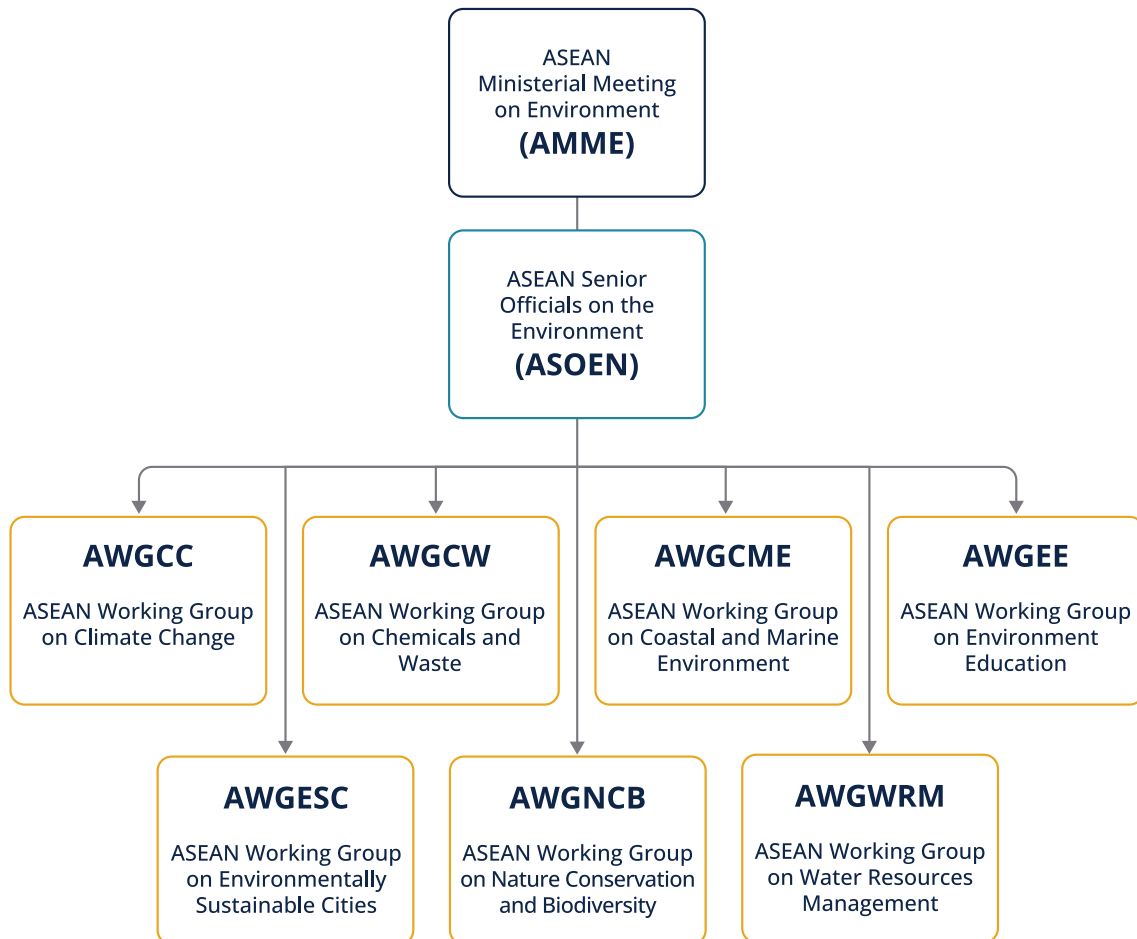
8 The ASEAN Secretariat. 2017. ASEAN Cooperation on Environment: At A Glance. Jakarta, ASEAN Secretariat, November 2017. <https://asean.org/wp-content/uploads/2018/02/50.-December-2017-ASEAN-Cooperation-on-Environment-At-A-Glance.pdf>

9 ASEAN Centre for Energy. 2020. ASEAN Plan of Action for Energy Cooperation (APAEC) 2016-2025 Phase II: 2021-2025. <https://aseanenergy.org/asean-plan-of-action-for-energy-cooperation-apaec-phase-ii-2021-2025/>

10 ASEAN Centre for Energy ACCEPT. 2023. ASEAN Climate Change and Energy Project. <https://accept.aseanenergy.org/about/project/accept-phase-2/>

and enhance coordination between ASEAN’s energy and climate policies and to contribute to climate-friendly development of the energy sector. Phase II of the project kicked off in 2022, and its key objective is to support the AMS and ASEAN’s capacity to transition to a low-carbon energy system and contribute to carbon neutrality or a net-zero future.

Figure 1. Institutional framework for environmental cooperation in ASEAN.¹¹



Environmental cooperation between the Gulf and Southeast Asia

The countries in the Gulf and Southeast Asia have common but unique environmental challenges, including food and water security, extreme weather events and a high carbon footprint from the energy sector. Natural synergies also exist between the two regions. They have youthful demographics that underpin growth prospects, and most governments are investing in digitalisation, manufacturing, and logistics infrastructure. These natural

¹¹ The ASEAN Secretariat. 2017. ASEAN Cooperation on Environment: At A Glance. Jakarta, ASEAN Secretariat, November 2017. <https://asean.org/wp-content/uploads/2018/02/50.-December-2017-ASEAN-Cooperation-on-Environment-At-A-Glance.pdf>

synergies create potential for environmental cooperation between the two regions, which can set a model for cooperation among Global South countries.

Institutionally, cooperation occurs between the GCC and ASEAN. The GCC-ASEAN Economic Centre was established in 2008. In October 2023, during the inaugural ASEAN-GCC Summit in Riyadh, the two blocs welcomed the new framework for cooperation (2024–2028).¹² The two groups have explored areas for regional environmental collaboration including in clean energy and forestry, but formal and comprehensive environmental cooperation agreements have not been established.

Renewable energy and hydrogen beyond fossil fuels are major sectors that will dominate the future of cooperation between the Gulf and Southeast Asia. For instance, during Abu Dhabi Sustainability Week in January 2020, the Indonesian president called for collaboration between the UAE and Indonesia on clean energy and a low-carbon lifestyle.¹³ In the same year, the UAE-based renewable energy company, Masdar, signed a power purchase agreement with Perusahaan Listrik Negara, Indonesia's state electricity company, for the first floating solar photovoltaic plant in the country.¹⁴ It was completed in 2022.¹⁵ A similar call for clean energy cooperation was brought up during a meeting between the Saudi energy minister and his Indonesian counterpart in 2022.¹⁶ Renewable energy and the green economy were among the areas that the Singaporean Minister for Foreign Affairs, Vivian Balakrishnan, and his Saudi Arabian counterpart, Prince Faisal Farhan Al Saud, agreed on to foster cooperation, commemorating the 45th anniversary of diplomatic relations in 2022.¹⁷ In July 2023, Masdar signed a memorandum of understanding with Malaysian company Citaglobal Berhad to develop a range of renewable energy projects in Malaysia.¹⁸

Beyond energy, the two regions have shown signs of cooperation in other sectors, such as forestry, especially in the preservation of mangroves.¹⁹ In 2020, the Indonesian government and the UAE's Ministry of Climate Change and Environment signed an agreement for the rehabilitation of 600,000 hectares of mangrove lands in Indonesia. Some of the land will be

12 ASEAN Secretariat. 2023. Joint Statement ASEAN-GCC Riyadh Summit. <https://asean.org/wp-content/uploads/2023/10/FINAL-Joint-Statement-ASEAN-GCC-Summit.pdf>

13 Mahdani, Jokowi to deliver keynote speech at Abu Dhabi Sustainability Week, 2020. Antara news. <https://kalsel.antaranews.com/berita/139960/jokowi-to-deliver-keynote-speech-at-abu-dhabi-sustainable-week>

14 Zawya. 2020. Masdar and PLN enter partnership to develop first floating solar power plant in Indonesia. <https://www.zawya.com/en/press-release/masdar-and-pln-enter-partnership-to-develop-first-floating-solar-power-plant-in-indonesia-t4gzk2sr>

15 Gulf News. 2021. Abu Dhabi's Masdar starts construction at Indonesia's first floating solar power plant. <https://gulfnews.com/business/energy/abu-dhabis-masdar-starts-construction-at-indonesias-first-floating-solar-power-plant-1.1627976889332>

16 Arab News. 2022. Saudi energy minister to boost cooperation with Indonesian, Portuguese counterparts. <https://www.arabnews.com/node/2193406/business-economy>

17 The Straits Times. 2022. Renewable energy, green economy areas where Singapore, Saudi Arabia can forge closer cooperation. <https://www.straitstimes.com/singapore/politics/renewable-energy-green-economy-areas-where-singapore-saudi-arabia-can-forge-closer-cooperation>

18 Renew. 2023. Masdar inks Malaysian MoU. <https://renews.biz/87237/masdar-inks-malaysian-mou/>

19 Muhammad Zulfikar Rahmat and Diwangkara Bagus Nugraha. 2023. Indonesia-GCC cooperation in climate action: Progress and ways forward. *Orient*. <https://orient-online.com/shop/articles/indonesia-gcc-cooperation-in-climate-action-progress-and-ways-forward/>

named Khalifa bin Zayed Mangrove Park.²⁰ On a multilateral level, at the 27th UN Conference on Climate Change (COP 27) in 2022, the UAE and Indonesia led the establishment of the Mangrove Alliance for Climate, aiming to increase awareness about mangroves as a nature-based solution for climate change.²¹ Other countries such as Australia, Japan, India, Spain and Sri Lanka have joined the alliance. In 2022, a Saudi delegation visiting Indonesia showed a similar interest in supporting mangrove plantations in Indonesia.²²

The aforementioned examples show that the extent of cooperation varies among individual Gulf states and AMS, as each has its own set of national priorities. These examples show the preferred mode of engagement has been bilateral ties between the Arab grouping and individual AMS, with a minimal multilateral cooperation between ASEAN and the GCC. That is largely due to the absence of a strategic alignment between the two blocs. Another factor is that the GCC countries are engaged in a form of zero-sum competition between themselves, instead of complementing each other by leveraging on their individual strengths.²³ Evidently, these emerging initiatives are exclusive of other regional Gulf countries, Iran and Iraq. There is no collaboration or co-investments between Iran and Iraq and AMS because security and political stability have been a concern for AMS investors especially in Iran²⁴. Iraq and AMS have only recently restored ties. Malaysia, for example, re-opened its embassy in Baghdad in 2023, and the existing initiatives have focused on basic infrastructure development, such as Petronas investments in Iraq's conventional energy sector.²⁵

Policy recommendations

The two regions have different paces of setting institutions and mobilising resources. The institutional arrangement for regional environmental cooperation in ASEAN is more advanced compared to that of the Gulf. Despite diversity in economic size, cultures, and languages, ASEAN has defined key priorities for strategic environmental cooperation, institutional frameworks and the responsibilities of the working groups tasked with overseeing the implementation of the ASEAN Strategic Plan on Environment (ASPEN). In comparison, the institutional arrangements for environmental cooperation in the Gulf, while emerging, are

20 Ministry of Foreign Affairs. 2021. MoCCAIE, Indonesian ministry sign agreement on sustainable mangrove management. <https://www.mofa.gov.ae/en/mediahub/news/2021/2/18/18-02-2021-uae-indonesia>

21 The Straits Times. 2022. Mangrove alliance formed at COP27. <https://www.straitstimes.com/singapore/environment/mangrove-alliance-formed-at-cop27>

22 Antara. 2022. Indonesia seeks cooperation on climate change with Saudi Arabia. <https://en.antaranews.com/news/223497/indonesia-seeks-cooperation-on-climate-change-with-saudi-arabia>

23 Al-Sarihi and Seah. 2023. Will ASEAN-GCC Summit Revive Bloc-to-Bloc Relations?. Think-In. Middle East Institute, National University of Singapore.

24 John Benny and Deena Kamel. 2023. Iran welcomes renewable energy investments from 'all countries', minister says. The National. Available at: <https://www.thenationalnews.com/business/economy/2023/10/18/iran-welcomes-renewable-energy-investments-from-all-countries-minister-says/>

25 Malay Mail. 2023. PM Anwar meets Thailand, Iraq counterparts and US climate envoy in New York. Available at: <https://www.malaymail.com/news/malaysia/2023/09/22/pm-anwar-meets-thailand-iraq-counterparts-and-us-climate-envoy-in-new-york/92266>

not fully inclusive and are fragmented, without a clear identification of key priorities and a focal point to facilitate cooperation.

Accordingly, the two regions can learn from and complement one another by identifying the suitable platforms to maximise benefits and fill respective gaps. As former Vietnamese president Nguyen Minh Triet said in 2010, “You [the Gulf states] have what we [the Southeast Asian states] don’t have, and we have in plenty of what you don’t have, so we need to join hands together.”²⁶

The Gulf and ASEAN show growing economic, diplomatic, and environmental relations between the two regional blocs as well as between individual states, albeit at a slow pace. The slow process of integration of the two regions has created challenges in deepening their quest for interregional environmental cooperation, which has been mainly dominated by clean energy and forestry sectors. Given common but differentiated environmental challenges, the two regions have a range of opportunities to foster regional environmental cooperation that can maximise mutual benefits, especially as the two regions are now charting pathways towards achieving net-zero emission goals, as well as the 2030 sustainable development goals. Natural synergies between the Gulf and Southeast Asia on environmental cooperation include the following:

Exchange of knowledge

Both regions have made strides in developing human capacity and know-how and in setting policies and regulations to address environmental challenges at the national and regional levels. However, countries in both regions have had different paces of setting institutions and mobilising resources. For instance, the Gulf countries can draw lessons from the ASEAN experience on regional environmental integration, which is more advanced on its institutional setup and is backed by regional action plans, such as ASPEN, and dedicated working groups that meet regularly and oversee the implementation of these plans. The two regions could benefit from creation of knowledge-exchange platforms, such as conferences, workshops and forums, and expert exchange between the two regions to build deeper understanding and foster knowledge sharing from current practices and lessons learned. The annual ASEAN-GCC Economic and Investment Conference, agreed at the recent ASEAN-GCC summit held in October 2023 in Riyadh, could be a good platform for exchange on environmental issues as well.

Finance

By leveraging their financial capabilities, the GCC states can support their economic diversification plans by investing domestically and globally, such as in ASEAN, as finance

26 Song, NIU. 2010. The Economic and Trade Cooperation between ASEAN and the Gulf Cooperation Council, *Journal of Middle Eastern and Islamic Studies (in Asia)*, 4:4, 82-101, DOI: 10.1080/19370679.2010.12023169.

is a major challenge in achieving its environmental and climate investment goals. In the power sector, for instance, ASEAN requires a total investment of US\$159 billion between 2021 and 2030, and the investment in renewables can be used for further development into hydropower, geothermal, and solar energy.²⁷ These initiatives would allow the GCC states to gain valuable experience, build capacities and diversify their national incomes in line with their economic diversification visions. However, these efforts also necessitate that ASEAN countries establish clear regulations and governance frameworks, which is still a major challenge, thereby reducing uncertainties within the market.

Innovation, research, and development

Both regions face formidable challenges in innovation, research, and development, which stand as barriers to addressing their unique environmental challenges. The integration of technology-driven solutions, underscoring the pivotal role that innovative strategies play in this endeavour, is imperative to align solutions harmoniously with the environmental and contextual costs pertinent to each region, while also bolstering competitiveness and catalysing economic growth. Consequently, a pronounced emphasis is required from both regions to augment investments that boost capacities for innovation. This entails a concerted push to fortify public-private partnerships and foster collaborative initiatives spanning academic and corporate spheres.

Agriculture and food security

During the 43rd ASEAN Summit in September 2023, ASEAN leaders declared that strengthening food security and nutrition in response to crises is imperative.²⁸ They agreed to accelerate the adoption of innovative technologies, technical cooperation, and transfer programmes to increase productivity and resilience in agri-food production, reduce food loss and waste, ensure food safety, and meet consumer needs. Given the GCC's growing reliance on food imports from Southeast Asia, ASEAN and the GCC can enhance the collaboration between the two regions' think tanks and private sectors to promote public-private partnerships and find long-term solutions to food security issues in both regions.

Water management and security

AMS have established the ASEAN Working Group on Water Resources Management. Its mandate is to address the main challenges facing ASEAN water management, including

27 Abdullah, I., et al. 2023. Mobilising finance support ASEAN's low carbon energy transition: challenges and policy options. <https://aseanenergy.org/mobilising-finance-to-support-aseans-low-carbon-energy-transition-challenges-and-policy-options/>

28 ASEAN. 2023. ASEAN Leaders' Declaration on Strengthening Food Security and Nutrition in Response to Crises. <https://asean.org/wp-content/uploads/2023/09/ASEAN-Declaration-on-Strengthening-Food-Security.pdf>

increasing water demands; uncertainty in availability of freshwater resources; degradation of water quality; dealing with severe floods, droughts and sea level rise due to climate change; and strengthening coordination and cooperation among AMS and relevant agencies in implementing Integrated Water Resources Management.²⁹ GCC states, which are presented with similar challenges, have also implemented the GCC Unified Water Strategy and Implementation Plan 2016–2035. The two regions can initiate knowledge-collaboration platforms to foster information sharing from current practices and lessons learned.

Carbon capture and storage technologies

The GCC states have set ambitious targets anchored in Carbon Capture and Storage (CCS) projects that presently capture approximately 10% of the annual CO₂ emissions.³⁰ Meanwhile, CCS is central to AMS' energy transition pathway, as well as a vital technology to decarbonise energy systems and achieve net-zero targets.³¹ The GCC is home to three CCS plants in Saudi Arabia, Qatar, and the UAE, and the bloc's expertise could significantly contribute to initiatives that have just been established by Indonesia, Malaysia, Singapore, and Timor-Leste in building and advancing similar projects. Among other project activities may include capacity building to share knowledge of CCS, discussion on new co-investment opportunities by inviting business entities, and discussions on CCS policy by inviting government officials.

Hydrogen

Demand for hydrogen is expected to grow globally. ASEAN countries consider hydrogen a future source of energy to achieve net-zero targets and strengthen regional energy security. ASEAN has the potential to start from grey hydrogen. Indonesia and Brunei Darussalam, for example, have an abundance of natural gas resources.³² Most Gulf countries also have an abundance of natural gas and are implementing grey hydrogen projects. The similarity in resources between the two regions and the growing demand of hydrogen present a big opportunity for the two regions to collaborate on the research and development of hydrogen. Particularly, they should focus on opening a hydrogen market between Gulf and Southeast Asian countries with the goal of creating more job opportunities and increasing knowledge sharing and efficiency in both regions.

29 ASEAN Environment. 2023. Water Resources and Management. <https://environment.asean.org/water-resource-management/about>

30 Al-Sarihi, 2023. The GCC and the road to net zero. Middle East Institute, Washington DC. Available at: <https://www.mei.edu/publications/gcc-and-road-net-zero>

31 Suwanto, et al. 2022. Role of CCUS in low carbon development in ASEAN. <https://aseanenergy.org/role-of-carbon-capture-utilisation-and-storage-ccus-in-low-carbon-development-in-asean-2/>

32 Suryadi, B., et al. 2021. Hydrogen in ASEAN: Economic, Prospects, Development and Applications. <https://aseanenergy.org/hydrogen-in-asean-economic-prospects-development-and-applications/>

Carbon markets

A cooperative approach based on carbon-trading mechanisms, underpinned by equitable burden sharing and the exchange of CO₂ sinks, is indispensable in realising global CO₂ removal objectives at minimal costs.³³ Herein lies the potential offered by ASEAN countries, enriched by their forest carbon reservoirs and rich biodiversity, a great potential carbon reservoir. On the other hand, the Gulf is known for its arid environment, limiting its options for carbon offset in the region. ASEAN-GCC carbon trading and offsetting can thus help the two regions complement each other.

Conclusion

While the Gulf countries have realised the importance of regional environmental cooperation, slow regional integration has led to minimal multilateral cooperation with other regional organisations, such as ASEAN. While ASEAN-GCC relations started in the 1990s, their relations developed only modestly until 2009 when the first Ministerial Meeting was held between the two blocks in Bahrain. The reason for minimal multilateral cooperation between the two blocs is that both sides have been preoccupied by their respective regional integration, and this led to an absence of strategic alignment. While today ASEAN has more advanced integration, both sides have common grounds to align their strategic priorities. The inaugural ASEAN-GCC Summit held in October 2023 in Riyadh has created a new momentum for cooperation between two blocks, albeit some regional countries such as Iran and Iraq are not included in the dialogue.

On the environment front, the two regions have a range of opportunities to foster regional environmental cooperation to maximise mutual benefits, especially as the blocs are now charting pathways towards achieving net-zero emission goals and the 2030 Sustainable Development Goals. Both sides can tap into natural synergies for enhanced environmental cooperation in areas such as low-carbon energy, as well as water and food security through different collaboration platforms that enable the exchange of knowledge, the flow of finance, innovation, and research and development.

33 Fajardy, Mathilde, and Niall Mac Dowell. "Recognizing the value of collaboration in delivering carbon dioxide removal." *One Earth* 3, no. 2 (2020): 214-225.

