



# Revisiting Natural Resources in the Middle East and North Africa

Edited by Luigi Narbone

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Published by

European University Institute (EUI)

Via dei Roccettini 9, I-50014

San Domenico di Fiesole (FI)

Italy

doi:10.2870/082270

ISBN:978-92-9084-953-7

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With the support of the  
Erasmus+ Programme  
of the European Union



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# INTRODUCTION

Luigi Narbone



Since the times of the colonial scramble in the 19<sup>th</sup> and early 20<sup>th</sup> centuries, natural resources have played a central role in the history of modern Middle East and North Africa (MENA). The region's rich endowment of natural resources, and particularly the abundance of fossil fuels, has been a factor contributing to the shaping of the state system and regional order in post-colonial times. It has also marked MENA's national and regional economic structures, its political economies and the way the region has integrated into the global economy. Moreover, while hydrocarbons have brought income and wealth to the region, they have created rentier economies and have contributed to consolidating authoritarianism and patrimonialism in the region, which has hindered the development of participatory and accountable governance. Autocratic governments in the region have produced and perpetuated a very specific social contract in which democratic rights are forsaken in exchange for the redistribution of rent accruing from resource extraction.

All these features are well-documented in the scholarly literature. Natural resources have predominantly been analysed through the oil curse lens and its role in consolidating authoritarianism in the region.<sup>1</sup> However, existing studies generally fail to transcend the paradigm of rentierism and to capture how the role of natural resources is changing in the new political order that has emerged in the MENA after the 2011 Arab uprisings.

Over the past decade, instability and conflicts have spread across the region. Geopolitical rivalries, proxy wars and external intervention have intensified. Statehood has weakened and the proliferation of failed and fragile states has resulted in social fragmentation and in peripheral areas has heightened struggles by local forces for greater autonomy. Borders have become porous and new power groups have emerged, many with regional and international connections. Crippled economies, conflicted geographies and violent radicalism have led to environmental ruin and

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1 Ross, Michael L. *The oil curse: How petroleum wealth shapes the development of nations*. Princeton University Press, 2013; Beblawi, H. (1987). *The rentier state in the Arab world*. *Arab Studies Quarterly*, 383-398; Schwarz, Rolf. (2008). *The political economy of state-formation in the Arab Middle East: Rentier states, economic reform, and democratization*. *Review of International Political Economy*, 15(4), 599-621.

to the normalisation of illicit economic activities. Even in several of the states not hit by conflicts, which have often witnessed a reconsolidation of authoritarianism, internal political and economic challenges and a volatile regional and global context have hindered central state governance and put into question the viability of the old social contract.

Once more, the role of natural resources in fuelling many of these dynamics and trends has been key. State and non-state actors have clashed over the control of oil or greater access to resources. Armed militias have survived through resource plundering, while strategic energy objectives have fuelled the geopolitical confrontation between regional and international actors.

This ebook developed out of the “*Conflicts and Natural Resources in the MENA Region and its Immediate Neighbourhood*” conference held by the Middle East Directions programme in October 2019 at the European University Institute in Florence, Italy and provides a timely opportunity to revisit natural resources in the MENA in the light of the various transformations that the region has witnessed. The ebook takes natural resources as a prism for understanding the newly emerging order in the region and tries to explore the various channels through which natural resources influence these transformations and are in turn influenced by them. It eschews strictly technical analysis and focuses instead on the power-ridden contestation underlying the struggle for the control of natural resources in broader national, regional and international political contexts.

The ebook further avoids the tendency in the literature to frame each resource in isolation, expanding the focus beyond oil and natural gas to also look at water, minerals and food in a holistic approach that contributes to exploring common trends and which can assist in the effort to broaden theorisation while grounding it in a multi-layered and granular understanding of the region. Furthermore, this ebook adopts a multidisciplinary approach that is informed by diverse theoretical and practical perspectives, with contributors from academia, industry, think tanks and civil society. It draws on a wide range of cases.

While the analysis presented in this ebook can appear to offer pessimistic prospects of a bleak future in which

natural resources perpetuate the region's crises and lead to further disastrous developments, the ebook seeks to show that this trajectory is not inevitable and that the disruptive role of natural resources can be transformed to contribute to socioeconomic development, conflict-resolution and geopolitical de-escalation.

## The structure of the ebook

In exploring these cross-cutting themes, the chapters in this ebook illustrate a range of approaches and considerations to show how the nature of resource exploitation in the region has contributed to the reproduction of a dysfunctional political order and to suggest ways to reformulate nature-society relations in the region.

The ebook is divided into three sections. Section One examines the changing relationship between geopolitics and natural resources in the region. In it, starting with Chapter Two, Eckart Woertz analyses the ramifications of the end of the oil age on the region. Combining insights from political economy and geopolitics, Woertz's chapter situates MENA countries amidst the global renewable energy transitions. Central to these analysis is the utilisation of the remaining fossil fuel infrastructure to invest in renewable energies in the region. While some countries in the region, such as Egypt, Saudi Arabia, Morocco and the UAE, have implemented large renewable energy programmes, there continues to be speculation about whether renewable energy can supplant oil in sustaining rentierism in the region. The chapter analyses scenarios of how renewable energy transitions will impact MENA societies.

In Chapter Three, Laury Haytayan analyses the geopolitical obstacles that Lebanon faces in developing its oil and gas sector. Haytayan situates her analysis within broader developments in the regional and international energy scene. She focuses on how the recent discoveries of natural gas reserves in the eastern Mediterranean have likely to have major transnational repercussions such as the move away from Russia to the eastern Mediterranean of the Europe's gas supply. The chapter looks at how geopolitics and internal politics impact the potential for hydrocarbon production in Lebanon.

In Chapter Four, Tamer Badawi examines the impacts of US sanctions on Iran's food and water security. Adopting a historical approach, the chapter traces the evolution of the agricultural policies adopted by the Iranian government to cope with climate change and its international isolation. It shows how in seeking to offset the effects of sanctions Iran's drive for food self-sufficiency has pushed it to diminish its water resources. Owing to transboundary rivers flowing from Iran into Iraq, the adverse effects of these sanctions have extended beyond its borders to also impact Iraq's water security.

Chapter Five, by Amine Ghoulidi, examines how the EU's revised fertiliser legislation on phosphates can impact North African countries. For North African countries, non-energy raw materials, particularly phosphates, represent a strategic resource. North Africa boasts over 75% of the world's phosphate reserves, making its economies heavily dependent on the exports of this mineral. In his chapter, Ghoulidi analyses an EU law on fertilisers that was adopted in 2019 and that disincentivises importing North African phosphate and looks at the geopolitical and economic consequences of this legislation. He also examines how this will impact the external trade of North African economies which continue to rely predominantly on trading with the EU.

Section Two examines the nexus between conflict, security and natural resources in the region. In Chapter Six, Ahram looks at how war economies have produced new types of social institutions in Libya. The chapter analyses the role of rebel oil companies and unravels the symbolic dimensions underlying the establishment of authority over natural resources.

In Chapter Seven, Karen Meijer, Susanne Schmeier and Ruben Dahm adopt a comparative approach to analyse the relationship between climate, water and conflict in the region. Agricultural land and water are the two resources that most affect food security and human conditions. However, in recent decades, as agricultural sectors were hollowed out across the region several countries went from being net agricultural exporters to net importers. The Middle East became the world's least food-self-sufficient region, importing between 30 and 35 percent of its food resources. With the Middle

East being the world region most dependent on imported grain and with limited export diversification, the region has become increasingly vulnerable to commodity price swings in international markets, which has increased the risk of food crises and unrest. This chapter uses a risk model to disentangle the pathways from water-related hazards to increased conflict risks.

In Chapter Eight, Robert Mogielnicki continues the analysis of water security by examining desalination in the Gulf and the threats confronting it. Drawing on the case of Saudi Arabia, the chapter identifies infrastructure vulnerabilities in the Saudi desalination system while assessing the likely impacts of external shocks and disruptions. The chapter has important implications for other countries in the region as they continue to struggle to meet increasing water demands.

Lastly, Section Three analyses the political economy of extractive industries to explore the mechanisms through which minerals widen the disparities in socioeconomic development between rich urban centres and poor yet resource-rich rural areas. The two chapters in this section examine the socioeconomic impacts of the mining activities on local communities and on socioeconomic development. Chapter Nine, by Rami Alrawashdeh, applies a quantitative approach to Jordan, while Chapter Ten, by Manel Ben Achour, applies a qualitative approach to the case of Tunisia. Both chapters shed light on the disruptions to local livelihoods that are caused by mineral extraction.



## **SECTION 1**

# THE GEOPOLITICS OF NATURAL RESOURCES

# The Geopolitics of Renewable Energy Transitions in the MENA

Eckart Woertz

## Executive Summary

Oil has been crucial in domestic politics and international relations in the MENA since World War II. Renewable energy transitions will change the role of oil in MENA societies and these societies will change in the process. The social contract of the region's rentier states is 'no taxation and no representation.' Political acquiescence is bought with services, public sector jobs and welfare payments. Population growth, steeply rising domestic oil consumption and declining production profiles in some countries (e.g. Egypt and Syria) have led to reduced rents per capita. The various manifestations of MENA rentier states have become increasingly tenuous, whether they are rich, middling or poor rentier states or only semi-rentier states that rely on oil rents indirectly through regional recycling of oil rents (e.g. through strategic transfer payments and remittances). The supply shock in the wake of the US shale revolution and more recently the global demand destruction as a result of the Covid-19 crisis have accelerated this dilemma. In the longer run, a lasting paradigm shift could come from renewables. Renewables play a growing role in power generation and can increasingly compete with hydrocarbons in the transportation sector. E-mobility grows because of price declines and technology breakthroughs, for example in PV cells and batteries. Green hydrogen could be another technology that impacts oil demand after 2030. Saudi Aramco and other oil producers anticipate a peak oil demand by the mid-2030s. Only some sectors of the petroleum product markets such as petrochemicals will remain robust. This strategic scenario raises the question of whether rentier states in the MENA face a future without rents and how this would affect their domestic politics and international relations. As the global energy mix transitions towards

renewables, technology is becoming strategically more important than location. Energy systems as a whole will change – their infrastructure, regulations and markets, not just the source that powers them. MENA countries have three options to successfully carve out their niche in global renewable energy transitions over the coming decades: (a) by using renewables for domestic consumption to safeguard oil for export, (b) by trading renewable-based electricity within and outside the region, for example to Europe, provided the necessary grid connections are established, and (c) by producing green hydrogen with the help of renewables and exporting it. If these transitions are successful in the MENA, power relations in the new energy systems will be different. Labour and capital will capture most of the remuneration along renewable value chains, not the owners of a particular resource. New economic actors (e.g. SMEs rather than centralised utility companies) will emerge which might articulate political interests over time. As former rentier states need to have recourse to taxation and are unable to maintain their side of the old social contract, the lack of political participation will be less acceptable than before. Renewable energy transitions are likely to engender socio-political change too.

**Keywords:** renewable energies; rentier states; Middle East and North Africa; oil; geopolitics

## Introduction

Since World War II, oil has played a prominent role in the analysis of domestic politics and international relations in the MENA region. Oil rents have been crucial in the social contracts of the region's rentier and semi-rentier states. Services, welfare systems and public sector employment have been used to buy acquiescence from populaces that are without the right to political participation. Even non-oil exporters have relied on oil rents indirectly as they have received recycled petrodollars via strategic transfer payments and remittances from oil exporting countries. Internationally, oil has been the reason for much of the great power involvement in the region since it became a strategic commodity on the eve of World War I, when the British navy switched from coal to oil as its fuel of choice.



There has been a steady downward trend in rent endowments per capita in MENA countries since the oil boom of the 1970s and early 1980s, countervailing price movements notwithstanding.<sup>1</sup> The rent per capita ratio is under pressure as a result of population growth, steeply rising domestic consumption and declining production profiles in some countries (e.g. Egypt and Syria). Since 2014, lower oil prices in the wake of the shale revolution in the US have added to these woes. Production cuts after the initial OPEC+ agreement in 2017 with Russia and other non-OPEC producers were unable to stave off the negative impact. This coalesced into a short-lived price war between Russia and Saudi Arabia in March 2020, when they could not agree on a continuation of production cuts and embarked on a strategy of raising production, regaining market shares and crowding out high-cost producers in the US. Faced with the massive demand destruction by Covid-19 and US pressure, they agreed on renewed production cuts in early April. Still, WTI oil prices on futures markets for delivery in May turned negative for the first time in history on 20 April 2020, illustrating the magnitude of the massive oil demand destruction that the Covid-19 recession has caused.

In the longer run, a lasting paradigm shift could come from renewables. In its optimistic Transforming Energy Scenario, the International Renewable Energy Agency (IRENA) in Abu Dhabi anticipates that the share of modern renewables such as hydropower, wind and solar in total global final energy consumption will increase from 10 percent today to 28 percent by 2030 and 66 percent by 2050.<sup>2</sup> Renewables can increasingly compete with hydrocarbons in the transportation sector. E-mobility grows because of price declines and technology breakthroughs, for example in PV cells and batteries. Green hydrogen could be another technology that impacts oil demand. The German government is promoting green hydrogen, which is

produced from renewable energy sources, as part of a long-term strategic plan for climate change mitigation. Unlike e-mobility, green hydrogen can not only be used for cars but also for trucks, ships, airplanes and heavy industry because of its higher energy density.

This strategic scenario raises the question of whether rentier states in the MENA face a future without rents and how this would affect their domestic politics and international relations. This article first gives a short overview of the importance of oil in the region, the impact of the US shale revolution and that of the Covid-19 recession. It then discusses how renewable energy transitions will lead to economic, but also geopolitical, shifts in the energy world. Such shifts will affect the MENA region, but some countries in different ways than others.

## Oil, Societies and Geopolitics in the MENA

Oil has thoroughly influenced the MENA's economic, social and political structures since the post-war decades. In about half of the MENA states, oil revenue dominates state income to varying degrees, ranging from very high rents per capita (Kuwait, Qatar, UAE), to middling rentiers (Saudi Arabia, Oman, Bahrain, Libya) and poor rentiers where the high share of oil is only predicated on the fact that they do not produce much else (Iran, Iraq, Algeria, Yemen).<sup>3</sup> The region is heterogeneous, but resource endowments and oil revenues are of such importance that they have influenced the developmental classification of different countries, which range from resource rich/labour poor (the Gulf countries and Libya) to resource rich/labour abundant (Algeria, Iran, Iraq) to resource poor/labour abundant (Morocco, Tunisia, Egypt, Jordan, Palestine, Lebanon). Syria, Yemen and Sudan used to be classified as resource rich/labour abundant too, but oil production has fallen as a result of conflict and maturing oil fields so their status more and more resembles that of resource poor/labour abundant countries. Israel and Turkey are outliers in the region

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1 See Woertz, E. (2019), "The Energy Politics of the Middle East and North Africa (MENA)," in *The Oxford Handbook of Energy Politics*, ed. Kathleen Hancock and Juliann Allison (Oxford; New York: Oxford University Press), from which parts of this essay have been adapted.

2 (International Renewable Energy Agency) IRENA (2020), *Global Renewables Outlook: Energy transformation 2050* (Abu Dhabi: IRENA).

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3 Herb, M. (2014), *The wages of oil: Parliaments and Economic Development in Kuwait and the UAE* (Ithaca: Cornell University Press).

as they are OECD member countries with diversified economic structures.<sup>4</sup>

The social contract in the region's rentier states is 'no taxation and no representation.' Political acquiescence is bought with services, public sector jobs and welfare payments.<sup>5</sup> Semi-rentier states such as Egypt, Syria and Jordan have an indirect dependence on oil rents via migrant remittances and strategic transfer payments from the oil rich Gulf countries. Egypt and Syria also had a modest oil export capacity until the end of the 2000s. The Arab Spring uprisings were an indication that the social contract was under stress. The region's rentier and semi-rentier states struggle to maintain their side of the bargain given their population sizes and new labour market entries (i.e. transfer payments, services and public sector jobs). The richer oil exporters in the Gulf managed to stave off protests at home by increasing public spending using oil revenue and the repatriation of foreign assets; poorer MENA countries were less fortunate. Plummeting oil prices in the wake of the Covid-19 recession might push even the richer countries to the brink. Saudi Arabia had to triple its recently introduced VAT in May 2020 to make up for the shortfall in oil revenue.<sup>6</sup> When people are taxed, they might be less willing to accept a lack of representation and ask for political participation.

The demise of the Ottoman Empire and the international struggle over the division of its remains put the Middle East on the geopolitical map in the 19<sup>th</sup> century. In the 20<sup>th</sup> century it was oil. When the British navy switched from coal to oil before World War I, oil became a strategic commodity. Thereafter, diversity of supplies and secure transportation routes loomed large in military calculations. The Abadan oil refinery and later the Kirkuk-Haifa pipeline (1935-48) became crucial pieces of infrastructure for the British government. After World War II, the proliferation of automobiles and

petrochemical-based white goods such as refrigerators, washing machines and air conditioning led to a surge in demand. Now oil consumption became essential for more and more of the civilian population as well. MENA oil production set in earnest in the post-war decades. The region became an important pillar of the world economy and essential for reconstruction in Europe, where the energy mix shifted from coal to oil. In 1946, 77 percent of Europe's oil was imported from the US; by 1951 80 percent of it came from the Middle East. Whereas coal still dominated Western Europe's energy consumption in 1955 with 75 percent, it was relegated to secondary status by 1972, when it only accounted for 22 percent. Oil was now the new king of the energy world, providing 60 percent of Western Europe's energy needs. A bespoke pipeline, the Tapline, was built from Saudi Arabia to Lebanon in 1950 and the importance of the Suez Canal as a logistical choke point grew exponentially.<sup>7</sup>

Oil therefore shaped international relations in the region, which Carl Brown described as a "penetrated system" of overlapping national, international and local interests.<sup>8</sup> Oil motivated the involvement of external powers in the MENA. Oil exporters, on the other hand, sought to maximise their advantages through the price and production policies of OPEC and the nationalisation of oil companies.<sup>9</sup> Success in economic diversification varied greatly. Some Gulf countries (the UAE, Saudi Arabia and later Qatar) built up refining, petrochemicals and heavy industries, such as aluminium and fertiliser production.<sup>10</sup> In other countries, such economic diversification was limited (e.g. Libya, Kuwait) or failed (e.g. the import substituting industrialisation drives in Iraq and Algeria).

The occasional successes in economic diversification in the Gulf region justify a more nuanced reading of

4 Cammett C., et al. (2015), *A Political Economy of the Middle East*, Fourth ed. (Boulder: Westview Press); Henry, C.M. and Springborg, R. (2010), *Globalization and the politics of development in the Middle East*, 2nd ed., The contemporary Middle East (Cambridge, UK; New York: Cambridge University Press).

5 iBeblawi, H. and Luciani, G., eds. (1987), *The Rentier state, Nation, state, and integration in the Arab world* (London; New York: Croom Helm).

6 <https://www.bbc.com/news/business-52612785>.

7 Yergin, D. (1991), *The prize: the epic quest for oil, money and power* (New York: Simon & Schuster).

8 Brown, L. C. (1984), *International politics and the Middle East: old rules, dangerous game*, Princeton studies on the Near East (Princeton, N.J.: Princeton University Press).

9 Marcel, V. (2006), *Oil Titans: National Oil Companies in the Middle East* (Washington D.C.: Brookings Institution Press).

10 Luciani, G., ed. (2012), *Resources Blessed: Diversification and the Gulf Development Model* (Berlin; London: Gerlach Press).

the impact of oil than the resource curse literature suggests.<sup>11</sup> However, even the relative success stories display downsides typical of resource-based economies. Apart from Kuwait, MENA currencies are pegged to the dollar but tradeables struggle to compete as a result of a real effective appreciation of the exchange rate that the inflow of commodity revenues engendered in the 2000s. A Dutch disease-like boom in non-tradeables such as real estate followed. The private sector remains underdeveloped and dependent on sub-contracting from the state, which dominates the economy. Educational shortcomings and resource capture by the elite further limit the potential of non-oil sectors that are crucial for employment and productivity growth.

With declining rents per capita, the various manifestations of rentier states have become increasingly tenuous. Energy demand in the MENA has skyrocketed since the 1970s as a result of population growth, fuel subsidies, the energy-intensive design of car-centred cities and economic development. The Middle East now consumes close to 30 percent of its oil production and more than 80 percent of its natural gas production. Apart from Qatar, no country in the region currently has a meaningful natural gas export capacity, despite substantial reserves. Many MENA countries have turned into natural gas net importers or burn diesel and fuel oil in power stations. The growth in domestic oil demand threatens oil export capacity. To safeguard this capacity, the regions' rentier states have begun to cut subsidies to rein in consumption and to try to develop alternative energies (additional natural gas, nuclear, renewables and even coal) to preserve oil for export, the foreign exchange generation of which is crucial for the budgetary needs of the social contract.<sup>12</sup>

This unfavourable constellation has been aggravated by oil price declines since 2014. The shale revolution in the US has added some three million barrels of tight oil a day to the global supply mix. This has made up for geopolitical supply disruptions elsewhere (e.g.

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11 Ross, M. L. (2012), *The oil curse: how petroleum wealth shapes the development of nations* (Princeton, NJ: Princeton University Press); Hertog, S. (2010), "Defying the Resource Curse: Explaining Successful State-Owned Enterprises in Rentier States," *World Politics* 62, no. 2, pp. 261-301.

12 Krane, J. (2019), *Energy Kingdoms: Oil and Political Survival in the Persian Gulf* (New York: Columbia University Press).

Libya, Iran, Nigeria, Sudan, Syria and Yemen). On the other side of the ledger, sluggish demand in the wake of the Great Recession has weighed on prices. Oil prices below budget breakeven levels have forced oil producers to cut back spending, issue debt and repatriate assets. Those on the Arabian Peninsula also fear that reduced American reliance on imported oil could prompt a partial disengagement from the region.

So far, the US shale revolution is unique. It remains to be seen whether it can be replicated in other countries such as Argentina, China and in eastern Europe that do not have a similar business ecosystem of oil service companies and venture capital, have less accommodating political regulatory environments and more challenging geological deposits. Until Covid-19 the assumption was that the surge in US unconventional oil production might peak by the mid-2020s, which would have implied a renewed importance of traditional exporters in the MENA.<sup>13</sup> Now the scenario has changed. Plummeting prices threaten the high costs to producers in the US. MENA oil exporters produce the cheapest oil globally. Commercially, their national oil companies can win a price war, but the states that rely on the income of such companies will face risks of political instability. Should global oil demand recover, US unconventional oil production would do so too after a wave of bankruptcies and industry consolidation. If demand depression is here to stay, oil prices will stay low even after a slump in US production. In either case there is a ceiling on oil prices. Any recovery to pre-2014 levels is unlikely in the foreseeable future. MENA oil exporters face falling revenues. The demand destruction of the Covid-19 crisis might only foreshadow another more lasting demand destruction as a result of energy transitions.

The US shale revolution is a shift within the system, not unlike the emergence of new oil supplies from the North Sea, Alaska and the Gulf of Mexico in the 1980s. A more paradigmatic and lasting shift could occur as a result of renewable energy transitions and legislation to reduce greenhouse gas emissions. Worries about peak oil supplies have given way to concerns about

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13 IEA (International Energy Agency) (2018), "Outlook for Producer Economies: What do changing energy dynamics mean for major oil and gas exporters?," *World Energy Outlook Special Report* (Paris: IEA).



peak oil demand. When Saudi Aramco went public in 2019, it admitted as much in its IPO prospectus, where it listed a plateauing of global oil demand by 2035 as one of the business risks that the company is facing. Such a peak could prompt oil producers to turn to a high volume/low price strategy out of fear that their precious oil resources could end up as stranded assets in the longer run.<sup>14</sup> Seen from this perspective, the price war between Saudi Arabia and Russia in March 2020 would be a harbinger of things to come.

## Renewable Energy Transitions – Globally and in the MENA

Renewable energies have witnessed dramatic cost declines over the past decade. The levelised cost of electricity (LCOE) for utility-scale PV projects fell by 73 percent globally between 2010 and 2017. For concentrated solar power (CSP) the respective figure was 33 percent and for onshore wind it was 23 percent. The International Renewable Energy Agency (IRENA) in Abu Dhabi argues that “electricity from renewables will soon be consistently cheaper than from fossil fuels.”<sup>15</sup> The main challenge for the competitiveness of renewables is no longer cost, but intermittency. It is difficult to integrate renewables into electricity grids unless there are backup capacities, storage solutions and integrated smart grids that can even out supply/demand mismatches.

Such technical solutions exist already. CSP can be combined with heat storage of energy in molten salts, but due to more rapid cost decreases of PV cells and advances in electricity storage in batteries PV has become more competitive compared to CSP. Battery costs decreased by 40 percent between 2010 and 2016 and the IEA expects further falls by about two-thirds towards 2040.<sup>16</sup>

14 Dale, S. and Fattouh, B. (2018), "Peak Oil Demand and Long-Run Oil Prices," in *Energy Insight* (Oxford: The Oxford Institute for Energy Studies).

15 IRENA (International Renewable Energy Agency) (2018), "Renewable Power Generation Costs in 2017," (Abu Dhabi: IRENA).

16 IEA (International Energy Agency) (2017), *World Energy Outlook 2017* (Paris: IEA).

A stronger than expected uptick in electric mobility could open avenues for renewables into the transportation sector, where so far they have not competed with oil as a fuel of choice. Planes will still need kerosene and ships diesel or fuel oil because of their high energy density, but there could be significant demand destruction in the market for petrol and diesel for cars. On the other hand, the new marine reduced sulphur fuel standards of the International Maritime Organisation (IMO) that took effect in January 2020 will reduce global fuel oil demand and are likely to lead to a shift to diesel-like products in the maritime fuel market, which accounts for about seven percent of global oil demand.<sup>17</sup> Demand for petrochemicals will also continue to rise. With economic growth, more and more people in the developing world are able to afford things made from plastics and other hydrocarbon-based materials such as refrigerators and other white goods. MENA countries with ample refining capacity (e.g. Saudi Arabia, UAE, Qatar) will be in a better position to react to such demand shifts than those without (e.g. Kuwait, Libya, Iran, Iraq).

The domestic energy mixes of MENA countries are dominated by oil and natural gas, with shares in primary energy consumption of 47 percent and 51 percent respectively. So far, the renewable energy share of MENA countries is limited. Only Morocco is slightly above the global average of 3.6 percent; all other MENA countries are way below that mark.<sup>18</sup> Against this backdrop, headline-grabbing announcements by Gulf countries about expansions of renewable energy capacity must be taken with a pinch of salt, as they often have been rescinded or only implemented at a fraction of the scale announced. In 2006, the UAE announced its pioneering Masdar initiative, comprising a carbon-neutral city, research and development, and several

17 Halff, A. (2017), "Slow Steaming to 2020: Innovation and Inertia in Marine Transport and Fuels," (New York: Columbia University Center on Global Energy Policy).

18 BP, (2017) "Statistical Review of World Energy 2017," <https://www.bp.com/en/global/corporate/energy-economics/statistical-review-of-world-energy.html>. Note that because of lower transformation losses the share of renewables in final energy consumption (Fn. 2) is typically higher than in primary energy consumption. For a discussion of methodologies, see <https://ec.europa.eu/eurostat/statistics-explained/pdfscache/43297.pdf>.

multibillion renewable energy projects. This resulted in a reputational gain that Abu Dhabi leveraged to attract the seat of the International Renewable Energy Agency (IRENA) in 2009, outbidding international competitors like Bonn and Copenhagen. However, in the same year Masdar's ambitions were downsized significantly. As a result of the global financial crisis less money was available and the goal to make the Masdar City project the first zero-carbon city in the world was abandoned.

Renewable energy plans in the region have been announced with much fanfare, but often have lacked details and clarity. The source document of the UAE Energy Vision 2050, which was launched in 2017, is not even in the public domain. Its content is only known from press releases and media reports that do not use terms with precision and hardly add to the transparency of such visions. They speak of a 44 percent share of renewables by 2050 in "the energy mix" of the UAE, although the context suggests that they only mean the electricity sector and it is not clear whether they speak of power generation capacity or actual power generation, which is lower for renewables because of intermittency.<sup>19</sup>

Saudi Arabia is another example of ambitious yet murky renewable energy plans. In 2013, the King Abdullah City for Atomic and Renewable Energy announced plans for 16 GW of solar photovoltaics by 2032, which it upgraded to 41 GW of solar, wind and other renewables in 2015. In 2016, the Saudi Vision 2030 had an intermediate goal of 9.5 GW of solar power by 2023. The Public Investment Fund (PIF) topped all of this when it announced a \$200 billion 200 gigawatt solar power project in March 2018 together with Japan's SoftBank. The project would have been almost double Saudi Arabia's likely peak demand of 100-120 GW by 2030 and equivalent to about two-thirds of the existing global solar capacity today, requiring two years of the world's current entire solar panel output. However, after a report in the *Wall Street Journal* in September 2018 that the project had been shelved, the Ministry of Energy, Industry and Mineral Resources spoke only vaguely of a "long-term goal." Observers took this as an indication of a behind-the-

19 <https://gulfnews.com/news/uae/environment/solar-energy-costs-to-see-record-lows-in-2017-1.1964780> .

scenes power struggle between the ministry and the PIF over the country's renewable energy strategy and the challenging implementation environment for such mega projects. How many of these plans will see the light of day remains to be seen. By 2017 Saudi Arabia had only 50 megawatts of centralised solar power.<sup>20</sup>

Ambitious plans for renewable electricity trade across the Mediterranean have also faced issues.<sup>21</sup> The Desertec Industrial Initiative was launched in 2009 with the ambitious vision of producing 15 percent of Europe's power needs by 2050 from Concentrated Solar Power (CSP) plants in North Africa. Transport of the electricity to Europe was planned via direct-current cables, which have less transmission losses than alternating current. By 2014, the export-based part of the vision collapsed. Most of the mainly German companies (e.g. Siemens, Bosch, E.ON, Bilfinger) withdrew from the consortium. In the wake of the global financial crisis and the Arab Spring, the project was deemed too risky. Even solar proponents had argued that electricity exports over such large distances are questionable and solar production should focus primarily on domestic and regional markets. The expected incentives for local stakeholders were limited to the forms of employment and knowledge transfer. To some, the project appeared to be a contrivance of European engineers. CSP can be combined with heat storage of energy in molten salts and/or conventional gas-fired plants. It thus offers solutions to intermittency, but due to more rapid cost decreases of PV cells and advances in electricity storage in batteries, PV is seen as increasingly attractive compared to CSP. Siemens actually closed down its CSP department.

Afterwards, the thrust of the initiative focused on an intergovernmental cooperation effort under the umbrella of the Mediterranean Solar Plan (MSP), which was championed by the Union for the Mediterranean (UfM) in Barcelona. The MSP hoped to deploy 20 GW of renewable energy capacity by 2020,

20 Mills, R. (2018), "Saudi Arabia shelves Softbank solar effort, reflecting challenges with megaprojects," The Arab Gulf States Institute in Washington, <https://agsiw.org/saudi-arabia-shelves-softbank-solar-effort-reflecting-challenges-with-mega-projects/>.

21 The following has been adapted from Woertz, "The Energy Politics of the Middle East and North Africa (MENA)."

which would have entailed a surge in transmission capacity and interconnections across borders. The MSP failed too. Regulatory and infrastructure issues on the European side were major impediments. The Iberian Peninsula is an 'energy island' within Europe. Its grid interconnection with France is limited, with only three percent of daily capacity. As a result, Spain is unable to export the renewable energy surpluses which it generates on sunny and windy days. It would have only agreed to interconnections with southern Mediterranean countries if those in the north had also increased, to which France objected as it feared increased competition for its electricity producers.<sup>22</sup>

Therefore, renewable energy development in North Africa has focused on projects for domestic energy provision, such as the 160 MW/ \$3.9 billion Noor CSP plant in Ouarzazate, Morocco, which relied on World Bank financing. Morocco is already the leader in renewable energies in the MENA and Chinese BYD has established a factory for electric cars in Tangier. As a non-oil producer, Morocco is not held back by considerations of stranded hydrocarbon assets in pushing for renewable energies and can build on its first-mover advantage. In contrast to European countries, it has, however, not yet specific support schemes in place like feed-in tariffs while it still maintains considerable subsidies for butane and other fossil fuels.<sup>23</sup>

Climate policies play a subdued role in politics and policy formulation in the MENA. These continue to revolve around hydrocarbons because the export revenue from them is essential in financing many MENA governments and their subsidised pricing is essential for the social contract, including in many

non-oil exporters such as Morocco.<sup>24</sup> Climate policies are not the main driving force for renewable energy transitions in the MENA, but instead the improved economics of solar power and its possible contribution to diversification of domestic energy consumption. Grid integration within and across borders remains an important task in renewable energy transitions. A lack of this was a major factor behind the failure of the MSP. If the region tackled this infrastructural challenge in collaboration with southern Europe it could provide additional impetus for renewables in the MENA. The same is true for the German government's Green Hydrogen plan mentioned in the introduction. It is still in its infancy and does not anticipate large German imports of green hydrogen before 2030, but North Africa plays a crucial role in it because of its solar radiation coupled with large open spaces, infrastructure like ports, the possibility of pipeline transportation, its proximity to Europe and favourable political and economic frameworks. Only its limited water resources, which are needed for electrolysis, constitute a drawback in some countries such as Tunisia and Egypt. A recent study by a German consultancy agency lists Tunisia, Morocco and Turkey among the most suitable countries for investment up to 2030 and Egypt, Algeria, Qatar, Oman, the UAE and Saudi Arabia as countries with good potential. The largest MENA export potential for green hydrogen up to 2050 in absolute terms is seen in Egypt, Algeria and Saudi Arabia, followed by Iran, Morocco, Oman, Qatar, Tunisia, Turkey and the UAE.<sup>25</sup>

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22 Carafa, L. and Escribano, G. (2017), "Renewable energy in the MENA: Why did the Desertec approach fail?," in *Handbook of Transitions to Energy and Climate Security*, ed. Robert E. Looney (London; New York: Routledge).

23 Carafa, L., Frisari, G. and Vidican, G. (2016), "Electricity transition in the Middle East and North Africa: a de-risking governance approach," *Journal of Cleaner Production* 128, pp. 34-47.

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24 Verdeil, E., (2016), "Beirut, metropolis of darkness and the politics of urban electricity grids," in *Geographies of the Electric City*, ed. A. Luque-Ayala and J. Silver (London: Routledge); Verdeil, E., (2014), "The Contested Energy Future of Amman, Jordan: Between Promises of Alternative Energies and a Nuclear Venture," *Urban Studies* 51, no. 7, pp. 1520-1536; Éric Verdeil et al. (2015), "Governing the transition to natural gas in Mediterranean Metropolis: The case of Cairo, Istanbul and Sfax (Tunisia)," *Energy Policy*, 78, pp. 235-245.

25 Jensterle, M. et al. (2019), "Grüner Wasserstoff: Internationale Kooperations-potenziale für Deutschland: Kurzanalyse zu ausgewählten Aspekten potenzieller Nicht-EU-Partnerländer," (Berlin: Dena, GIZ, Navigant, adelphi).

## Conclusion

The scope and detail of renewable energy transitions in the MENA will emerge over the coming two decades, but two things are certain: they will not provide export income and rents to MENA rulers comparable to those hydrocarbons provide today. In 2015, the then Saudi oil minister Ali Al-Naimi argued that Saudi Arabia could export electricity from renewables in the future instead of oil.<sup>26</sup> This is an unlikely scenario. Compared to oil, solar and wind power are distributed much more evenly around the globe. Electricity transportation over thousands of kilometres is also uneconomical with increasing distance because of transmission losses with existing technologies. MENA oil exporters have much sun and can benefit from it, but their solar radiation hardly has the same scarcity value as oil has today. As the global energy mix transitions towards renewables, technology is becoming strategically more important than location. Energy systems as a whole will change – their infrastructure, regulations and markets, not just the source that powers them.<sup>27</sup> The relative importance of commodities will decline and will partially shift to other raw materials such as rare earth minerals, cobalt and lithium. These materials are located in other world regions and can be recycled after use, which might limit the need for continual production increases once a certain global stock has been produced. Chile, China, Argentina and Australia account for more than 99 per cent of global lithium reserves, and more than 80 per cent of global cobalt reserves are located in just five countries: the Democratic Republic of Congo, Australia, Cuba, the Philippines and Zambia.<sup>28</sup> Geopolitical interests and conflict will gravitate towards such regions and away from the MENA during the process of renewable energy transitions.

MENA countries have three options to successfully carve out their niche in global renewable energy transitions: (a) by using renewables for domestic consumption, oil exporters can safeguard oil and gas for export that they have hitherto burnt in power

plants, assuming that even in a peak oil demand scenario there are still sufficient takers for their low-cost oil because part of the petroleum products markets (e.g. petrochemicals and plastics) will remain robust. Non-oil exporters among the MENA countries can use increased domestic consumption of renewable energy to reduce their hydrocarbon import bills. A second opportunity (b) could arise in a nascent market for the export of electricity, provided the necessary grid connections are established within the region and with Europe. The third opportunity (c) would be to export green hydrogen. This scenario is more distant but could be of great potential. It would require close collaboration with industrialised countries, which would constitute major markets for green hydrogen and would provide a large part of the necessary investment and technology transfers.

If these transitions are successful in the MENA, power relations in the new energy systems will be different. Labour and capital will capture most of the remuneration along renewable value chains, not the owners of a particular resource. As the wind and the sun come for free, they do not generate rent, apart from the land needed to erect renewable power systems. As renewable energy production and consumption are more decentralised than hydrocarbon- and nuclear-based systems, they will empower new economic actors. Small and medium-sized enterprises (SMEs) that are specialised in the provision of energy services and the maintenance of renewable energy plants are more likely to benefit than centralised utility plants and national oil companies. Individual households that produce their own renewable energy and feed surpluses into the grid will be less dependent on government subsidies for hydrocarbons. Such new actors might articulate political interests over time. They might object to the lack of political participation as MENA governments will increasingly rely on tax income in a low rent environment. Renewable energy transitions are likely to engender socio-political change as well.

26 <https://www.ft.com/content/89260b8a-ffd4-11e4-bc30-00144feabdc0>.

27 Scholten, D., ed. (2018), *The Geopolitics of Renewables*, vol. 61, Lecture Notes in Energy (Cham: Springer).

28 <https://www.ft.com/content/bf083d92-e43e-11e9-b112-9624ec9edc59>.



# Lebanon's Hydrocarbons: Geopolitical Challenges Facing a Nascent Sector

Laury Haytayan

## Executive Summary

Lebanon has had a disappointing year on its path towards becoming an oil and gas producer. The results of the first drilling were negative and the second licensing round has been postponed to the end of 2021 due to Covid19 and low oil prices. All eyes are turned towards block 9 in the south of the country for the drilling of another exploratory well by early 2021. Drilling in block 9 comes with political and geopolitical challenges with Israel and paves the way to a painful debate within the country about its future political and economic orientations. Today, with a full economic collapse of the country, Lebanon is at a crossroads: any political or economic decision made today will affect the oil and gas sector in one way or another. This chapter evaluates the geopolitical implications of oil and gas in Lebanon and the options to unlock opportunities to export its gas within and outside the region.

**Keywords:** Hydrocarbons, East Med, Geopolitics, Lebanon, EastMed Gas Forum, Israel

## Introduction: Lebanon's Nascent Hydrocarbon Sector in the Waiting Room

Lebanon is yet to become a hydrocarbon producer. The results of the first exploratory drilling in block 4 to the north of Beirut were negative. Total, the operator of the block, was unable to find a reservoir similar to those in Israel and Cyprus. However, there were traces of gas in various layers.<sup>1</sup> With its partners ENI and Novatek, in

early 2021 Total will be drilling another exploratory well in block 9 to the south of Beirut. The second licensing round, which was intended to award more offshore blocks by the end of 2020, has been postponed to the end of 2021.<sup>2</sup> The political hype around the oil and gas sector has not been matched by the disappointing results of block 4 and the postponement of the second licensing round.<sup>3</sup> These recent developments in the hydrocarbon sector come at a time when the country is witnessing a severe economic and political crisis. On 17 October 2019, thousands of Lebanese people took to the streets of Beirut and the main cities in the country to demand their basic rights and an end to corruption, nepotism and clientelism. The government of prime minister Saad Hariri resigned, and a new government was formed headed by Hassan Diab, a professor at the American University of Beirut. The new government prepared a rescue plan and presented it to the International Monetary Fund asking for help. Lebanon is facing bankruptcy, and some had hopes that hydrocarbons could bring benefits to the ailing economy while others, more sceptical about the role of the sector in the country, saw it as a new source of revenue for the political parties. Lebanon has a long way to go before it becomes a producer: 1) companies need to find gas; 2) the government needs to define the role of gas revenue in the country's wider economy and take into account the new realities after the recent collapse; 3) the overall governance of the country needs to be strengthened, not only governance of the oil and gas sector; and 4) there needs to be a focus on energy diplomacy to unlock opportunities for Lebanese gas to find markets outside the country.

The above looks like a reasonable roadmap to follow for the Lebanese people to benefit from the sector. However, the political divisions in the country make any plan impossible to implement. Lebanon is divided between two camps with different political and

1 Total E&P Liban. "Exploration and Production", <https://www.total-liban.com/en/who-we-are/total-lebanon/exploration-and-production>

2 Lebanese Petroleum Administration. (2020), "Postponement of the deadline for the submission of applications to participate in the Second Offshore Licensing Round", <https://www.lpa.gov.lb/english/news-amp-media/news/postponement-of-the-deadline-for-the-submission-of-the-solr-applications>

3 Azhari, Timour. (2020), "Lebanon's first offshore gas drill is a huge disappointment", <https://www.aljazeera.com/ajimpact/lebanon-offshore-gas-drill-huge-disappointment-200427182315344.html>

economic views: pro-Iran, led by Hezbollah and its allies,<sup>4</sup> and anti-Iran, led by political parties such as the Future movement, the Lebanese Forces, the Progressive Socialist Party and the Kataeb. After the civil war, the new political system imposed unity governments, which required all the major political parties to be represented in the government and made it very difficult to agree on a common political and economic vision and sometimes led to political gridlock. This political division has implications for the oil and gas sector, as was witnessed when the political vacuum in 2013 directly affected the progress of the sector.<sup>5</sup> Moreover, the lack of a unified vision for the oil and gas sector has led to three drafts of the sovereign wealth fund submitted by three different political parties in the parliament. There is little trust among citizens that the government knows what it wants to do with the revenue from the sector. The economic direction of the country is unclear, especially today with the collapse of the economy and the banking system.

Besides the economic and governance challenges facing the country in general and the oil and gas sector in particular, Lebanon needs to overcome geopolitical challenges related to the oil and gas sector. If discoveries are made and the country moves on to the development and production phase, it will face major market-related challenges. The internal market

is small, and this requires the country to find external markets, which in turn require transportation, either pipelines or liquefied natural gas (LNG) shipments. If Lebanon were to export its oil and gas, how would it overcome the geopolitical challenges? Who will be its partners in the region? How can Lebanon resolve its maritime border disputes with Israel and Syria?<sup>6</sup>

This chapter will discuss the regional complexities facing Lebanon, its ability to negotiate maritime borders with its neighbours and the different options for exporting to the region, Europe and Asia. The chapter analyses the geopolitical challenges Lebanon faces and the requirements needed to remove these challenges for it to become a new producer. The chapter will focus on the disputed borders between Lebanon and its neighbours and the export options available to Lebanon together with the challenges that come with these options. The analysis is based on secondary research reviewing documents and monitoring oil and gas developments in Lebanon and the Eastern Mediterranean (EastMed).

## Geopolitical Implications with Border Disputes and Export Routes

### Lebanon quasi Isolated: Border Disputes with Neighbouring Countries

Lebanon is part of the East Mediterranean (EastMed) region, which includes Israel, Egypt, Syria, Turkey and Cyprus. The region is becoming more and more attractive to oil companies with every announcement of significant discoveries and with every political rapprochement between countries in the region. Since Lebanon's oil and gas sector is not being developed in a vacuum, it has to consider all developments in the region and assess its relations with its neighbours and their impacts on oil and gas development in the country.

The Lebanese government launched a second licensing round in mid-2019 and the results were expected to be announced in June 2020. However, due to the pandemic

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4 Allies of Hezbollah do not align with its external politics but have internal interests that make them ally with the Party of God.

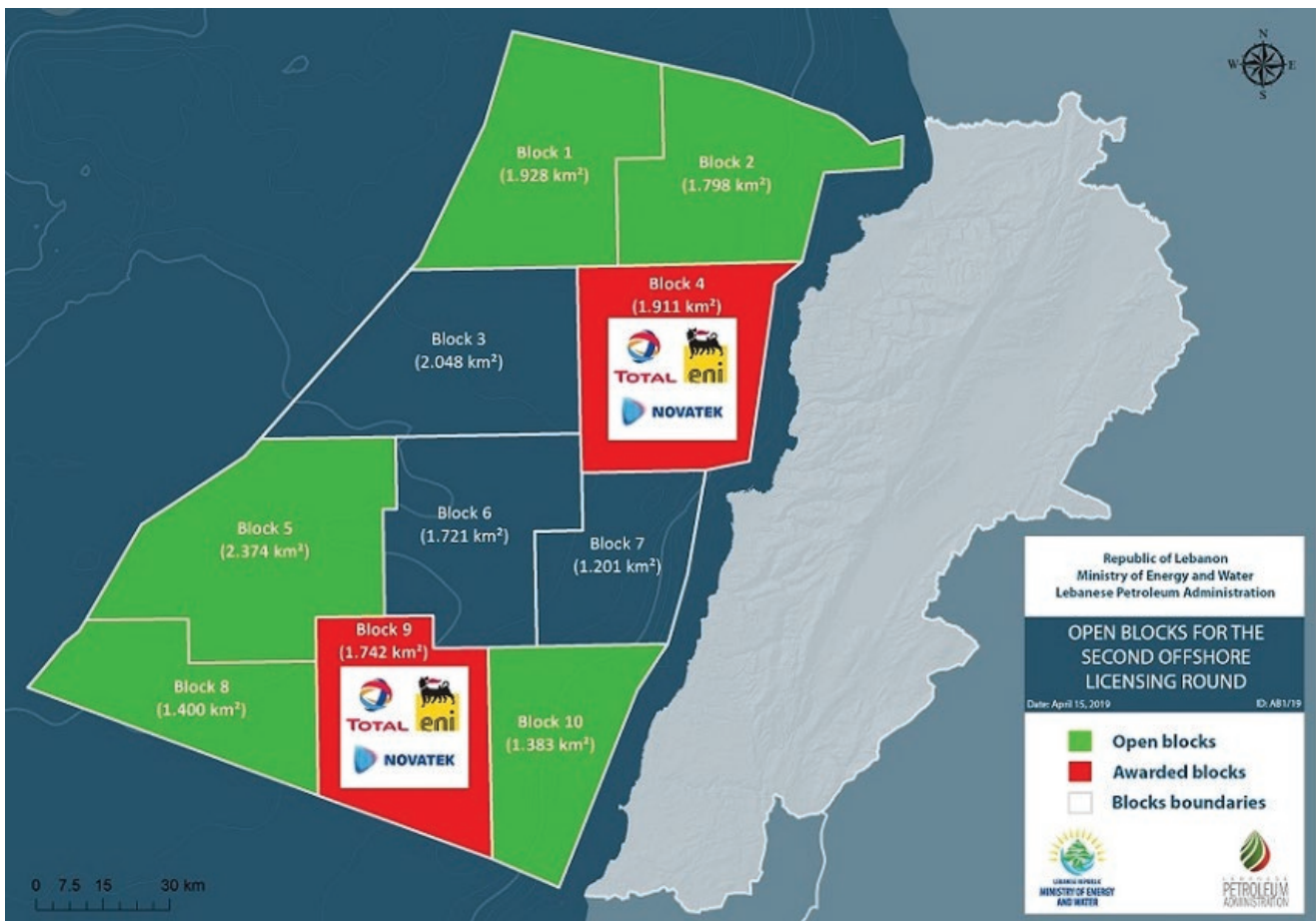
5 In 2013, while the Ministry of Energy was preparing for the launch of the first oil and gas licensing round, the then-Prime Minister, Najib Mikati, announced the resignation of his government after months of paralysis and disputes among its members over the parliamentary election and the re-appointment of a senior security official. This resignation was the first in a series of events that led to a political vacuum. After the caretaker government, parliamentary elections were postponed twice in 2013 and 2014 and the parliament was unable to elect a president of the republic until October 2016. This institutional paralysis led to a delay of four years in the oil and gas sector in Lebanon. While oil prices were around 110 USD a barrel in 2013, in 2017, when the Lebanese re-launched the licensing round, they were around 40 USD a barrel. Consequently, international oil companies (IOCs) did not want to invest in new regions, and the delays and deadlocks in politics definitely did not help attract many companies to apply.

6 The dispute with Israel is public and well-documented, while the dispute with Syria is less debated in the country.

and to low oil prices the round was postponed without a specific date, but a ministerial press release stated that it should be concluded before the end of 2021. Five offshore blocks were open for bids: two blocks (1 and 2) on the border with Syria, one (5) on the maritime border with Cyprus and two more (8 and 10) on the border with Israel (see Map 1).

Lebanon has unresolved political and maritime border issues with Israel and Syria and it is seeking to collaborate more with Cyprus. All the unresolved issues need to be tackled to enhance the country's opportunities in the oil and gas sector, but this does not mean that Lebanon cannot develop the sector if the disagreements are not resolved.

**Map 1: Blocks in Lebanon's EEZ**



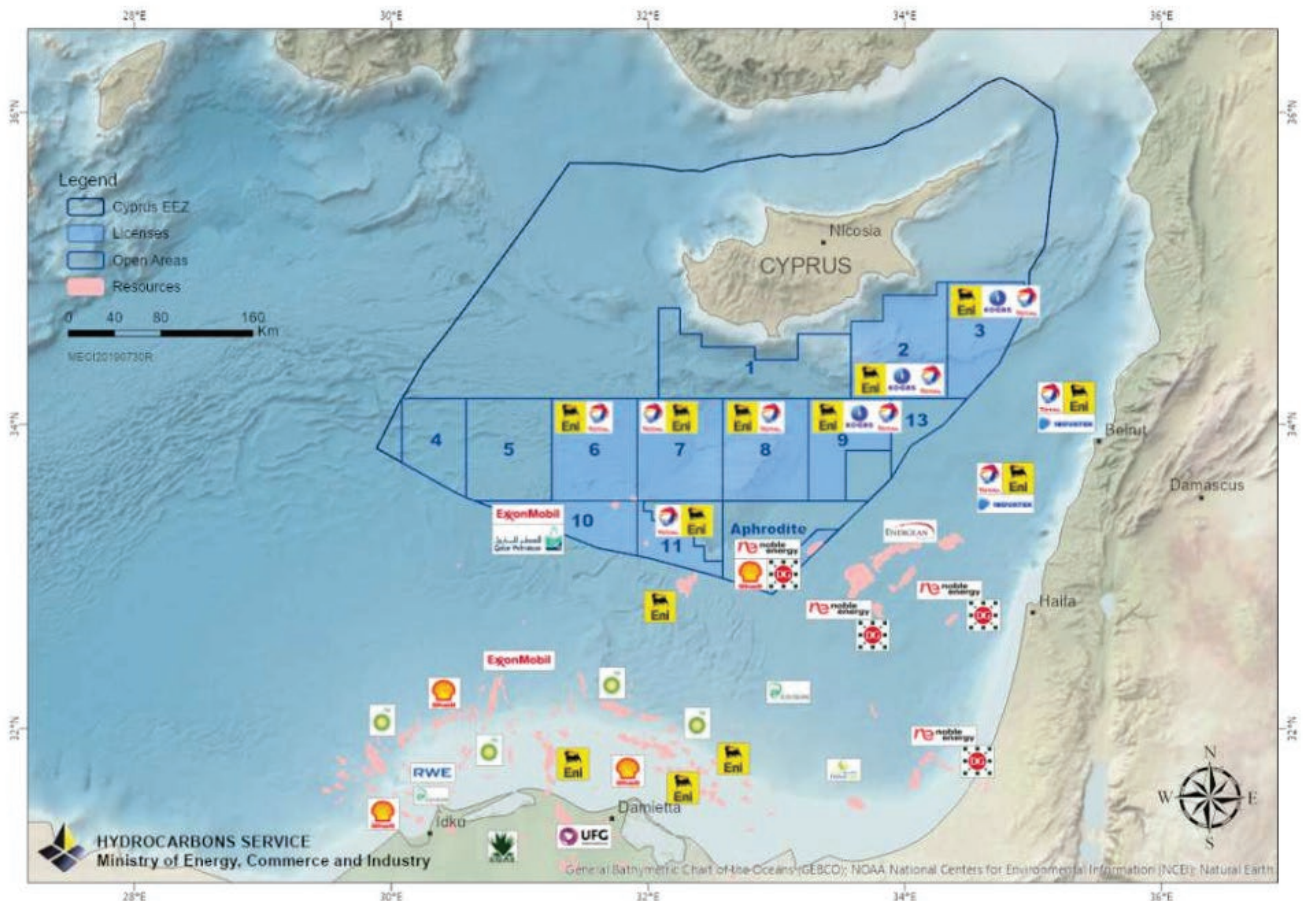
Lebanon has normal diplomatic relations with Cyprus. In 2007, the two countries negotiated an Exclusive Economic Zone (EEZ). Lebanon never ratified the agreement due to its internal political problems and later it objected to the EEZ agreement

between Cyprus and Israel and refused to recognise the tripoint indicated in that agreement. The Cyprus-Israel agreement used the unratified Lebanon-Cyprus agreement and created what is now called the maritime border dispute between Lebanon and Israel. However, this is not causing diplomatic tension between Lebanon and Cyprus and Lebanon is pushing for more strategic cooperation. Total and ENI have nine blocks in all near Lebanon and Cyprus (see Map 2) and they are pushing the two countries to collaborate to facilitate their work in the future if necessary. The countries are negotiating a unitisation agreement that would allow for sharing resources across the borders. Therefore, we expect to see further collaboration between them and companies being licensed across the border. In addition, in the future Cyprus could be very strategic

for Lebanon to export its gas if it decides to use Cyprus as a transit point to reach the Egyptian liquefied natural gas (LNG) terminals to export gas to Europe. More bilateral meetings between officials from the two sides have started.



Map 2: Total and ENI Blocks in the EastMed



## Lebanon and Syria: Beyond Energy

The Lebanese political parties are divided in their positions towards Syria, with the pro-Iran camp wanting to collaborate with Syria and the anti-Iran camp refusing to recognise the Assad Regime. In 2011, Lebanon submitted its official maritime borders to the United Nations, including the coordinates approved by the Lebanese state. Later, as mentioned, Lebanon divided its offshore hydrocarbon region into ten blocks, with two of them (blocks 1 and 2) on the maritime border with Syria, and offered the two blocks for investment in its first licensing round. In 2014, the Syrian government filed a complaint against Lebanon, refusing to recognise the ‘unilateral’ delimitation of the EEZ. However, since Lebanon was struggling with its own internal political crisis, nothing was done to handle this issue. Moreover, no company applied for block 1, which made it easier for the Lebanese

government to ignore the problem. In mid-2019, the Lebanese government took the decision to launch the second licensing round and opened blocks 1 and 2 for bidding. The Syrian government did not react.

Delineation of the border with Syria is a complicated issue. The Syrian government has always refused to agree the land and maritime borders with Lebanon as an objection to the creation of the State of Lebanon in 1926. However, knowing the important role of Russia in Syria, and knowing that the Assad regime has declared many times that Russian oil companies will be rewarded in Syria,<sup>7</sup> Lebanon hopes that Russia can mediate between the two countries if necessary. Last year, the former Lebanese minister of defence visited Moscow and declared that the Russian government

7 Katona, Viktor. (2018), “Russia is Taking Over Syria’s Oil and Gas”, Oil Price, <https://oilprice.com/Energy/Energy-General/Russia-Is-Taking-Over-Syrias-Oil-And-Gas.html>



was willing to play the role of mediator.<sup>8</sup> In addition, there were signs that Russian companies might be interested in Lebanon's blocks as part of their interest in enforcing their presence in the region.<sup>9</sup> Putting all these elements together, it may be possible to use the joint development approach as a way to solve the maritime border issue and help both countries benefit from the resources. This may allow Syria and Lebanon to go into the details of full delimitation of their border. However, some key questions would remain on the table. What if Syria asks for more than this agreement to seal an accord? Will the Lebanese government be able to agree on the level of political concessions to benefit from its oil and gas sector? Today, however, with the second licensing round postponed and with the US Caesar Act sanctioning any person or entity that supports or helps the Assad regime, the delimitation of the maritime borders between Lebanon and Syria is off the table.

## Lebanon and Israel: Failed US Shuttle Diplomacy

Lebanon and Israel signed an armistice agreement in 1949, but this did not prevent Israel from invading Lebanon, occupying land in the southern part of the country and engaging in violent conflict with Hezbollah. Since 2010, Lebanon and Israel have been contesting the delineated maritime border. As mentioned above, Lebanon and Cyprus signed an EEZ agreement in 2007 and later Israel used that agreement as a basis for its own agreement with Cyprus. However, point 1 (in the Lebanon-Cyprus agreement) was used as the final tripoint. Lebanon contested this, basing its position on a provision in the agreement that stated clearly that tripoints are to be agreed among all three parties. In 2011, Lebanon submitted its official maps to the United Nations with new coordinates for its EEZ.

This situation created a disputed zone of 860 km<sup>2</sup>.<sup>10</sup> Regardless of this dispute, Lebanon opened blocks 8, 9 and 10 in the south of the country on the Israeli maritime border in the first licensing round and block 9 was granted to a consortium composed of Total, Eni and Novatek. Later, Lebanon opened blocks 8 and 10 in the second licensing round.<sup>11</sup> Israel objected to the results of the first bidding round and specifically to Lebanon's decision to grant block 9 to the winning consortium<sup>12</sup> because part of the block was located in the disputed zone. However, the objection did not materialise into action. Total was quick to react to Israel's reaction and during the contract signing ceremony in Beirut the Total representative announced that the consortium would be drilling 25 km away from the disputed zone.<sup>13</sup>

The United States has been the most active mediator trying to solve this dispute between Lebanon and Israel. In 2011, Fredrick Hoff, assistant to the U.S. Special Middle East Peace Envoy, proposed a solution to the two countries that granted Lebanon around 550 km<sup>2</sup> of the 860 km<sup>2</sup>. This solution was rejected by Lebanon.<sup>14</sup> Later, Amos Hochstein, Special Envoy and Coordinator for International Energy Affairs and head of the Bureau of Energy Resources at the U.S. Department of State, proposed a more favourable deal (around 620km<sup>2</sup>). In addition, Hochstein had a more comprehensive plan for the region, using gas to

8 Middle East Monitor. (2019), "Lebanon seeks Russia mediation in maritime dispute with Syria", <https://www.middleeastmonitor.com/20190626-lebanon-seeks-russia-mediation-in-maritime-dispute-with-syria/>

9 Russia Business Today. (2019), "Russian Companies Want to Invest in Lebanon Oil, Gas Drilling", <https://russiabusiness-today.com/energy/russian-companies-want-to-invest-in-lebanon-oil-gas-drilling/>

10 Gowlland-Debbas, V. 2012, "The Legal Framework of Lebanon's Maritime Boundaries: The Exclusive Economic Zone and Offshore Hydrocarbon Resources," <http://lebcsr.org/wp-content/uploads/2017/12/LegalFramework.pdf>

11 Lebanon clearly stated that its decision to open the blocks in the disputed area was to affirm Lebanon's sovereignty of this area.

12 Barrington, Lisa & Williams, Dan. (2018), "Israel, Lebanon clash over offshore energy, raising tensions", <https://www.reuters.com/article/us-natgas-lebanon-israel/israel-lebanon-clash-over-offshore-energy-raising-tensions-idUSKBN1FK1J0>

13 Barrington, Lisa. (2018), "Lebanon to begin offshore energy search in block disputed by Israel", Reuters, <https://www.reuters.com/article/us-lebanon-israel-natgas/lebanon-to-begin-offshore-energy-search-in-block-disputed-by-israel-idUSKBN1FT218>

14 Dakroub, Hussein & Lakkis, Hasan. (2018), "Lebanon to reject U.S. plan to end sea border dispute", The Daily Star, <https://www.pressreader.com/lebanon/the-daily-star-lebanon/20180214/281505046683976>

advance cooperation and collaboration among all the EastMed countries.

At that time, Lebanon was stuck in its own political crisis, which lasted from 2013 until 2016, and it was unable to strike any deal with the Americans or the Israelis. In early 2019, David Satterfield, Acting Assistant Secretary of State for Near Eastern Affairs, engaged in shuttle diplomacy to solve the maritime dispute. Lebanon proposed parameters to agree on before entering into negotiations with the Israelis. The proposal included the following: 1) linking sea and land border negotiations; 2) the US playing the role of facilitator; 3) the negotiations taking place under the auspices of the UN; and 4) Israel providing a written guarantee that it accepted these conditions.

Israel did not agree on point four and wanted to add a six-month timeframe, which was rejected by the Lebanese authorities. Later, the Israeli authorities were preoccupied with the second parliamentary election in September 2019 and consequently the shuttle diplomacy was halted. David Schenker, who replaced David Satterfield at the end of 2019, visited Lebanon and demanded a clear commitment from the Lebanese side to engage with the Israelis to resolve the maritime border issue.<sup>15</sup>

Today, more than ever, the border dispute with Israel is resurfacing. Lebanon is relying on drilling in block 9 as a last resort to save a sector that has not been born yet. Drilling in block 9 is expected to happen before May 2021. If the results are negative as in block 4 it would mean there is no sector in the short to medium term. If there were positive results, Israel might object and decide to go to court to halt any kind of activity beyond exploratory drilling on the grounds that part of the block lies in the disputed zone. If the reservoir discovered extended into the disputed zone or into the Israeli EEZ, again Israel would want to halt activity until a resolution is found. Therefore, resolving the maritime dispute should be one of the Lebanese government's top priorities. However, despite the economic pressure on the government we are not seeing any signs of readiness to relaunch any sort of

15 Haboush, Joseph. (2019), "Resolving the Lebanese-Israeli border dispute: What's in it for Washington?", Middle East Initiative, <https://www.mei.edu/publications/resolving-lebanese-israeli-border-dispute-whats-it-washington>

indirect negotiations. It seems that Lebanon is isolated because of geopolitical considerations and its lack of political unity makes it hard to unify the positions.

## Lebanon and Eastern Mediterranean Developments: Exploring Export Routes

Lebanon is not alone in its gas rush; all the EastMed region countries are in competition to find gas fields, and more importantly gas markets (see Table 1). Egypt and Israel are the only producers in the region, while Cyprus is still waiting to move to production in its discovered fields. Regional conflicts are affecting the oil and gas sector in the region and have an impact of the formation of alliances that look like gas alliances but have a political flavour. This section will discuss the new alliances and Lebanon's options to unlock market routes for its gas.

Egypt is the most experienced oil and gas producer in the region. It is one of the providers of gas to Israel and its neighbours, such as Lebanon and Syria, and the country's first liquefied natural gas (LNG) export terminal commenced operations in January 2005. With the Zohr discovery in 2015 and with production having started in 2018, Egypt is becoming self-sufficient and discoveries are continuing onshore and offshore. Additionally, Egypt has attracted major companies such as ENI, BP, Shell, ExxonMobil and Rosneft to invest more in the energy sector. Moreover, the government has passed a new natural gas act that allows private companies to buy and sell gas and use the national infrastructure, thus helping Egypt become a transit hub.

Israel announced significant discoveries in the Tamar field in 2009 and in Leviathan in 2010, and companies started producing for the local and regional markets<sup>16</sup> However, Israel has failed to attract major companies

16 The Tamar field helped provide gas to the local market while the Leviathan field, which started production at the end of 2019, has led Israel to engage in diplomatic activities to remove all political obstacles to companies investing in the sector, such as Noble Energy and Delek, finding regional and external markets for the upcoming gas. Energean is active near the Lebanese maritime border and is working on starting production in the Karish field in 2021.

in the same way that Lebanon, Egypt and Cyprus have. Moreover, the political dimension of the Israeli-Arab conflict and the difficulty in finding buyers for gas from the fields has discouraged investors. This is why Israel is the most active diplomatically, trying to strike political deals with its neighbours to unlock market opportunities and held routine meetings with Greece, Cyprus and Egypt, which have led to the signing of a memorandum of understanding (MoU) with Greece and Cyprus to support the building of the EastMed pipeline. The pipeline will be used to transport Israeli gas through Cyprus and Greece to Europe. This has helped Noble, the operator of the Leviathan field, to sell gas to Egypt and Jordan. In addition, Israel's energy diplomacy has helped it to become part of the EastMed Gas Forum (EMGF).

Besides Egypt, Cyprus has lately been very active in announcing new discoveries.<sup>17</sup> Cyprus has attracted companies such as Total, ENI, Kogas, ExxonMobil and Qatar Petroleum. Facing challenges in finding markets for its natural resources it has embarked in active energy diplomacy with Israel, Greece and Egypt and has engaged in multilateral and bilateral understandings with all its friendly neighbours, including Lebanon. However, production has not yet started in Cyprus and there are no signs that there will be any production soon.

**Table 1: Examples of Proven Oil and Gas Reserves and Field Discoveries in the Eastern Mediterranean**

Country	Discovery Year	Field Name	Estimated Gas Reserves (tcf)
Cyprus	2011	Aphrodite	5.00
	2018	Calypso	6-8
	2019	Glaucus	5-8
Egypt	2015	Zohr	30.00
Israel	2009	Tamar	10.00
	2010	Leviathan	19.00
	2013	Karish	1.80

Source: EIA, 2013; EIA, 2018; ENI, 2015, 2019

17 After its main discovery in the Aphrodite field (block 12) in 2011, new discoveries have been announced since 2018 in Calypso (block 6) and Glaucus (block 10).

## Lebanon and EastMed Gas Forum: Join or Bypass

The EastMed might be rich in resources but it is also entrenched in conflicts and political complexities. These include the conflict between Lebanon and Israel, the one between Greek and Turkish Cypriots and Turkey's problematic diplomatic relations with Cyprus, Egypt and Israel. The Turkish government's agreement with the UN-recognised government of Libya to delineate the maritime borders between the two countries has recently raised concerns in both the EastMed and Europe about Turkey's actions in the region as it ignores the United Nations Convention on the Law of the Sea.

Lebanon's local market desperately needs natural gas for its electricity sector. The country currently uses heavy fuel oil for its old power plants and many technical and non-technical factors are causing its only power generator and distributor, the publicly owned Electricity du Liban (EDL), to lose around USD 1.2 billion a year.<sup>18</sup> All the government's plans and studies conducted by the World Bank recommend switching to gas for the power plants. However, if there are considerable discoveries that exceed local needs, the companies will be looking for external markets.

## Transporting the gas: Pipelines or LNG?

What options will Lebanon have to transport gas it produces? It currently has very limited transport infrastructure. For a short period of time it used the Arab Gas Pipeline to import gas from Egypt, but this stopped after Egypt's 2011 revolution. The pipeline starts in Egypt, passes through Jordan and crosses Syrian territory heading towards Turkey (the last part was never built). Lebanon has built a pipeline from southern Syria to northern Lebanon. Any use of the Arab Gas Pipeline will require political understanding with Syria. However, as was mentioned in the first section, relations between the Lebanese government and the Syrian regime are problematic and if there are discoveries and if Lebanon plans to export to its Arab neighbours, it will have to reconsider how to handle

18 Renewable Energy Outlook Lebanon, Background Paper, Ministry of Energy and Water, 2019.

relations with the Syrian regime, or its successor. Good relations with Syria are necessary for Lebanon to benefit from its oil and gas sector.

If geopolitical challenges remain, Lebanon will have to assess whether to use LNG for its gas exports and to find markets outside the neighbourhood and the EU. All global analyses show that Asia will be the first market for gas consumption. Moreover, from 2012 to 2018, China accounted for half of the growth in the global LNG supply.<sup>19</sup> In addition, the companies investing in Lebanon, mainly Total and Novatek, are experienced in LNG and have established markets, which could favour the LNG option in the future.

It is not the objective of this chapter to evaluate the economic value of LNG exports and the readiness of companies to invest in LNG in Lebanon as an export option. This analysis considers options that can be studied to create viable export routes bypassing the political complexities between Lebanon and its neighbours.

Under the Obama administration, the US pushed the EastMed countries to overcome their differences and use gas as a commodity for cooperation and collaboration. However, at that time the countries in the region were more preoccupied with developing their own sectors by promoting exploration and granting contracts. In addition, Egypt was going through political turmoil and Cyprus was focused on its peace deal in the divided island.

However, with the many discoveries in Israel, Egypt and Cyprus, the need to find markets for the new discoveries urged many of the countries to seek partnerships and collaboration. This led to the launch of the EastMed Gas Forum (EMGF). Israel, Palestine, Jordan, Cyprus, Greece, Italy and Egypt announced the formation of this platform based in Cairo in January 2019. At a second meeting in July, the US and the EU announced their endorsement of the forum. In addition, the European Commission announced it would support the Forum's activities with significant

financial assistance.<sup>20</sup>

The participants' stated aim for the forum is to strengthen collaboration between the gas producing countries and have declared that it is open to all the countries in the region with no not aim to exclude any interested country. However, Turkey, Syria and Lebanon are not part of the forum. There have been several meetings at the ministerial level, but so far no concrete common policies, common projects or unlocking new markets have been agreed and little is known about the structure. The forum seems rather a political gathering, a sort of 'coalition of the weak' trying to face Turkey's actions in the Cyprus EEZ and in Libya.

This forum is a serious challenge to Lebanon's role as an exporter in the region. Lebanon has four options to face this obstacle. Option 1 would be to join the forum. The Lebanese government has officially announced that it will not join as long as Israel is part of it and is playing an active role and the platform is a venue for common infrastructure and common gas market policies. Therefore, the only way for Lebanon to join would be if comprehensive peace agreements were signed between Israel and its neighbours. Lebanon joining the EMGF is unlikely.

Option 2 would be to join another forum. Is there another forum in the making? There are signs of growing influence of Russia in the EastMed, which could be the basis for a counter-forum that would include Iran, Iraq, Syria, Turkey and Lebanon and is sponsored by Russia. This forum could impose Turkey as the transit hub, challenging Egypt's position as the hub through the EMGF. Russia is present in Iraq, Syria and Lebanon though its oil companies and has strategic ties with Iran and Turkey. If the forum were established, it would break the monopoly that the EMGF is trying to set up in the EastMed. Lebanon could be a part of it, but it would be the first time in its history that Lebanon would shift towards the Russian camp and leave the US-EU umbrella. Since that would be a heavy political price to pay, it is unlikely that Lebanon would join such a forum unless the current political system collapses

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19 Tsafos, N. September 2019, "The Era of the Gas Mega-Players," Center for Strategic & International Studies.

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20 Geropoulos, Kostis. (2019), "East Med Gas Forum wants worldwide upgrade", New Europe, <https://www.neweurope.eu/article/east-med-gas-forum-wants-worldwide-upgrade/>



under severe economic crisis and Hezbollah takes over the country completely.

Option 3 would be to not depend on inland pipelines and to go for LNG. As discussed above, the LNG option is the ideal way to overcome all the geopolitical challenges and the national and local political divisions. However, this option will only be viable if Lebanon's LNG is competitive and it can find markets in Asia and in Europe. Total and Novatek have the experience and the ability to explore this option. LNG is a plausible option.

Option 4 would be to strengthen strategic partnerships with Cyprus and Egypt. Bilateral relations between Cyprus and Egypt are advanced and the two countries have signed an MoU to connect the Aphrodite gas field in Cyprus to Egypt's liquefaction plants for re-exportation.<sup>21</sup> Total and ENI are active in Lebanon and Cyprus, which would facilitate using the same logistical base and common infrastructure if necessary. Lebanon and Cyprus are currently finalising a unitisation agreement. These elements help strengthen the strategic partnership between the countries and could lead to building a pipeline between Lebanon and Cyprus that can be linked to the Cyprus-Egypt pipeline. This option is the long-term strategic plan that is the most plausible.

Option 5 would be to open up to Turkey with an offshore pipeline trying to bypass Syria's EEZ and going through Turkish Cyprus. This would put Lebanon directly into confrontation with the anti-Turkey camp (Cyprus, Greece, Egypt and the EU).

## Conclusion

Lebanon is yet to become a gas-producing country. Now more than ever, exploration and drilling in block 9 will attract much attention, not only because of the maritime border dispute but also because the results will draw the future trajectory of the sector. Block 4 drilling turned out to be negative and the second licensing round is postponed until the end of 2021.

21 Egypt Today. (2018), "Egypt, Cyprus sign deal to link Aphrodite's gas to liquefaction plants", <https://www.egypttoday.com/Article/3/57811/Egypt-Cyprus-sign-deal-to-link-Aphrodite-s-gas-to>

This means that if block 9 drilling is not positive, the country will have to wait for new exploratory drillings between 2021 and 2023 and will have to launch bidding rounds to attract new companies. However, before anything else, Lebanon has to strengthen its governance structure from politics to management and emphasis on energy diplomacy.

Enforcement of good governance will be needed in the near future. The fear is that due to the global economic crisis and to low oil prices companies may not be interested in investing in new frontier markets such as Lebanon's. This might open the door for politicians in the country to establish a national oil company (NOC) to undertake drillings. This scenario has two major challenges. 1) Who is going to invest in this NOC, especially given that Lebanon's economic situation does not allow Lebanese banks to invest? And 2) if funding were available, how can it be ensured that the company is well managed and that it is not used as a tool for clientelism and political employment? Lebanon is in a deep economic crisis but its politicians have always found ways to surprise the Lebanese even in the worst moments. Therefore, signs will appear that a consensus is being built around the establishment of an NOC. Civil society and members of parliament that oppose the system and political parties in the opposition should make sure the NOC law enforces transparency and is clear on the role of the NOC as a small-sized commercial entity with strict regulations on employment.

Emphasis on energy diplomacy is a must to unlock Lebanon's potential. It needs to monitor regional and global developments to adequately assess its options. The EMGF requires Lebanon to make diplomatic efforts and to explore strategic partnerships, especially with Cyprus and Egypt, to absorb the negative implications of not joining this forum and to explore potential markets such as Turkey. In addition, Lebanon needs to manage international developments that could affect its nascent sector. The US Eastern Mediterranean Security and Energy Partnership Act of 2019,<sup>22</sup> which aims to promote security and energy partnerships in the EastMed, does not include Lebanon among the US's

22 Congress. (2019), "Eastern Mediterranean Security and Energy Partnership Act of 2019", <https://www.congress.gov/bill/116th-congress/senate-bill/1102/text>

allies and contains a clause that gives the US the right to attack any country or entity that attacks its allies, mainly Israel, Cyprus and Greece. This means that Lebanon will need to control its borders, especially its southern border, to avoid deadly retaliation, not only from Israel but also from the US. Lebanon will also need to define how much influence to grant Russia, whose energy influence is growing in the region, and what price it would be ready to pay for such influence.

# The Impacts of Climate Change and Sanctions on Iran's Water-Food Security Nexus

Tamer Badawi

## Executive Summary

For decades, Iran has sought to realise food self-sufficiency to hedge against growing economic sanctions, which threaten its food security by disrupting food supplies from abroad. Iran's endeavour to achieve food security has varied in its intensity according to the level of political and economic openness of the international community towards Iran and also vying among Iranian political elite members who either tilt towards left-leaning and inward-looking policies or liberalisation. However, the long-term endeavour to procure food supplies domestically, especially strategic crops such as wheat and barley, has put pressure on Iran's scarce water resources. This chapter argues that sanctions imposed on Iran have worsened its scarce water resources as they have resulted in inefficient agricultural practices that have harmed these resources. A key example of such policies and practices has been an excessive building of dams. Financial incentives and approaches targeting low-cost solutions have encouraged the pursuit of unsustainable policies by segments of the Iranian government and state/quasi-private sector firms. On the other hand, in the long term scarce water resources are not the only impediment to achieving greater food self-sufficiency, as also less employment and investment in the agricultural sector will make the domestic procurement of food more difficult in the future. Over recent years, Iran's pursuit of greater food self-sufficiency has been impacting transboundary water resources and downstream countries such as (south) Iraq because the key agricultural areas in Iran are in its western part and border Iraq. Suffering from poor governance and high levels of violence, Iraq is at

risk of more unrest due to scarcer water resources. The EU can help devise solutions to alleviate Iran and Iraq's water crisis. Such interventions can be developed into a platform for dialogue on both shores of the Persian Gulf.

**Keywords:** Iran; sanctions; water security; food security; climate change; Persian Gulf

## Introduction

Economic self-sufficiency has been a key objective for Iranian policymakers since the 1979 revolution. However, Iran's quest for economic self-sufficiency has not been linear as it has been commensurate with the country's relationship with the international community, with greater diplomatic engagement and foreign trade slowing down government plans for self-sufficiency. Economic liberalisation has opened the door to acquiring technologies to expand industrial and agricultural capabilities for self-sufficiency at times and to expanding imports at other times, depending on the government in power. However, in most cases political isolation and economic coercion of Iran have encouraged its establishment to embark on self-sufficiency schemes through a domestication of technologies and reverse-engineering.

The economic fruits gained from intermittent Iranian diplomatic engagement with Western countries have often been hampered by the US, making liberalisation a tactical means to acquire tools that can further achieve self-sufficiency. The US has imposed sanctions on Iran in five stages (1979-1995, 1995-2006, 2006-2010, 2011-2015 and since 2018) with different aims. During these periods, the instrumental deployment of liberalisation was the outcome of compromises between anti-liberalisation and left-leaning elite members on the one hand and on the other mercantile elite members who saw these periods as opportunities for establishing trade relations with the international community, while both sides agreed on the need to maintain and develop economic independence.<sup>1</sup>

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1 Pesaran, Evaleila. (2011), *Iran's Struggle for Economic Independence Reform and Counter-Reform in the Post-Revolutionary Era*, Routledge, 2011, 190.

This chapter explores how the economic sanctions imposed on Iran, especially those following 2010, have worsened its water crisis and how the Iranian government has coped with this. It shows how, in moving to pursue food self-sufficiency, Iran has required intensive use of water resources and the deployment of hydrological instruments that have had detrimental environmental repercussions. Following this introduction, the second section, which is divided into three subsections, starts by explaining Iran's water endowments and how climate change has impacted its economic growth. It then moves on to elaborate on how Iran's scarce water resources have been misused due to inefficient hydrological practices. Lastly, it focuses on how economic sanctions have encouraged the building of dams for water preservation. The third section provides a historical analysis of Iran's quest for food self-sufficiency in three periods: the war with Iraq, the post-war period and 2010 onwards, which has been an intensive phase of sanction imposition that has led Iran to accelerate its self-sufficiency schemes. These sanctions have had a toll on water security. The fourth and final section analyses the transboundary impacts of Iranian water and agricultural policies on Iraq.

The chapter shows that Iran's quest for economic self-sufficiency has had far-reaching implications for the sustainability and security of its water resources as the quest has focused on realising food security by cultivating essential crops, including wheat, barley, corn and potatoes. The availability of water resources for crop cultivation is becoming one of the major challenges to the medium-to-long-term advancement of agricultural self-sufficiency. The water scarcity problem grew gradually, in part due to expansion of the development and modernisation course set by the former royal establishment, which had a long-lasting impact on water management and consumption in Iran.

Despite the varying policies of successive administrations, Iran has pursued maximal hydroelectrical policies characterised by overconsumption and only modest consideration of environmental security to achieve more food and energy security and independence. Economic sanctions worsen Iran's water security through three mechanisms: 1) the expansion of water-intensive activities perceived

as strategic (e.g. sugar and wheat production) contributes to inefficient use of water resources; 2) economic policies encouraged by economic sanctions contribute to sustaining a policy of excessive dam building, which in several cases has led to desertification and environmental degradation; 3) excessive economic sanctions do not allow Iran's water and agricultural sectors to acquire advanced techniques that can help them address deep-seated water mismanagement and mitigate the impacts of worsening climate change. Building on these dynamics, the chapter argues that, as Iran's agricultural areas are concentrated in provinces neighbouring Iraq, Iraq's water security will consequently be harmed, which will have adverse repercussions on transboundary resources.

## The Role of Climate and Sanctions in Shaping Iran's Hydrological and Agricultural Policies

### Climatic Changes and Agricultural Growth

Climate change is increasingly shaping growth in agricultural output, especially that of essential crops such as wheat, barley and rice. Iran is an arid or semi-arid country with 73% of its land characterised by dry weather, 14% by a moderate climate and only 13% by cold weather.<sup>2</sup> Its climate extremity includes the magnitude and spatial distribution of precipitation. Average annual precipitation varies from 1500 mm in the western and northern parts of Iran to just 50 mm in the eastern, central and southern parts of the country.<sup>3</sup> It is estimated that 75% of Iran's precipitation falls on only 25% of the country's area.<sup>4</sup> According to one estimate, Iran's average precipitation is around 250 mm a year, which represents less than a third of global

2 Yazdandoost, Farhad. (2006), "Dams, Drought and Water Shortage in Today's Iran, *Iranian Studies*", 49:6, 1018, <https://www.tandfonline.com/doi/abs/10.1080/00210862.2016.1241626?journalCode=cist20>

3 Ibid., 1018.

4 Madani, Kaveh. (2014), "Water management in Iran: what is causing the looming crisis?" *Journal of Environmental Studies and Sciences*, 4: 315, 315. <https://link.springer.com/article/10.1007/s13412-014-0182-z#citeas>



average annual precipitation. In addition, 75% of Iran's precipitation falls offseason, meaning that it falls when it is little needed by the agricultural sector.<sup>5</sup>

Annual reports by the Central Bank of Iran and article IV consultation reports by the International Monetary Fund draw a clear link between Iran's changing climatic conditions and the level of agricultural output. A drought that hit Iran in 1999 significantly reduced the growth of its agricultural sector in the financial year 1999/2000 to 0.5%,<sup>6</sup> compared to 9.5% in 1998/1999.<sup>7</sup> Growth in the sector partially recovered to 2.8% in 2000/2001.<sup>8</sup> A World Bank report saw this episode of droughts as extraordinary. Given Iran's expanding population, the droughts prompted it to import nearly 80% of its domestic wheat supply.<sup>9</sup> Following 2002, precipitation in Iran increased substantially, increasing agricultural output. According to the IMF's 2004 article IV consultation report, growth in the agricultural sector skyrocketed to 11.4%.<sup>10</sup> According

to an estimate by the World Bank, a small decrease of even 1 mm below the historical rainfall average can cause around \$90 million in economic losses in Iran, and they would mostly take place in the agricultural sector.<sup>11</sup>

Since Iran is a (semi-)arid country, only 10.5% of its land is estimated to be fertile.<sup>12</sup> Iran's current total cultivation area is estimated to be around 15 million hectares, with wheat occupying 6.6 million hectares after 2010. The average production of wheat (a strategic crop which I will focus on in the following sections) is around 13.4 million tons, which, according to the US Department of Agriculture, makes Iran among the top 15 global wheat producers.<sup>13</sup>

## Water overconsumption and inefficiency

Iran's long-term water problem is caused by overconsumption and inefficiency and is compounded by worsening climatic conditions. It is estimated that over 90% of Iran's population is in areas where water withdrawals have exceeded sustainable utilisation and 90% of its Gross Domestic Product (GDP) comes from these areas.<sup>14</sup> This enormous overconsumption of water is mainly driven by the agricultural sector, which consumes 92% of Iran's water resources, compared to the global average of 70%.<sup>15</sup> Water consumption in the sector is half as efficient as the global average.

5 Ibid., 316.

6 International Monetary Fund. (2002), "Islamic Republic of Iran: Staff Report for the 2002 Article IV Consultation", <https://www.imf.org/en/Publications/CR/Issues/2016/12/30/Islamic-Republic-of-Iran-Staff-Report-for-the-2002-Article-IV-Consultation-16086>

7 Islamic Republic of Iran: Recent Economic Developments (IMF Staff Report No. 00/120), International Monetary Fund, September 1999, 12. <https://www.imf.org/en/Publications/CR/Issues/2016/12/30/Islamic-Republic-of-Iran-Recent-Economic-Developments-3707>

8 International Monetary Fund. (1999), "Islamic Republic of Iran: Recent Economic Developments", IMF Staff Report No. 00/120), [https://www.elibrary.imf.org/view/IMF002/03814-9781451818925/03814-9781451818925/03814-9781451818925\\_A001.xml?redirect=true](https://www.elibrary.imf.org/view/IMF002/03814-9781451818925/03814-9781451818925/03814-9781451818925_A001.xml?redirect=true)

9 Karakurum-Ozdemir, Kamer; Kazemi Najaf Abadi, Majid; Hayati, Fayavar; Pallares-Miralles, Montserrat; Sadoff, Claudia W.; Borgomeo, Edoardo; Rehberger Bescos, Irene. (2017), "Iran economic monitor: oil-driven recovery" (English). World Bank, <http://documents.worldbank.org/curated/en/344651498863986174/Iran-economic-monitor-oil-driven-recovery>

10 "Islamic Republic of Iran: Staff Report for the 2004 Article IV Consultation, the International Monetary Fund, September 2004, 9. <https://www.imf.org/en/Publications/CR/Issues/2016/12/31/Islamic-Republic-of-Iran-Staff-Report-for-the-2004-Article-IV-Consultation-17743>

11 Karakurum-Ozdemir, Kamer; Kazemi Najaf Abadi, Majid; Hayati, Fayavar; Pallares-Miralles, Montserrat; Sadoff, Claudia W.; Borgomeo, Edoardo; Rehberger Bescos, Irene. (2017), "Iran economic monitor: oil-driven recovery" (English). World Bank, <http://documents.worldbank.org/curated/en/344651498863986174/Iran-economic-monitor-oil-driven-recovery>

12 Mirzaei, A., Saghafian, B., Mirchi, A., Madani, K. (2019), "The Groundwater-Energy-Food Nexus in Iran's Agricultural Sector: Implications for Water Security". *Water*, 11, 3.

13 Mesbah, Motamed. (2017), "Developments in Iran's Agriculture Sector and Prospects for U.S. Trade," *USDA*, 4. <https://www.ers.usda.gov/publications/pub-details/?pubid=84407>

14 Ibid., 36.

15 Yazdandoost, Farhad. (2006), "Dams, Drought and Water Shortage in Today's Iran, *Iranian Studies*", 49:6, 1018, <https://www.tandfonline.com/doi/abs/10.1080/00210862.2016.1241626?journalCode=cist20>

Inefficiency and overconsumption are partially caused by generous water and energy subsidies that the Iranian government provides to the agricultural sector.<sup>16</sup>

Over 25% of water consumption in Iran exceeds the amount that can be replenished.<sup>17</sup> This overconsumption of water puts pressure on groundwater resources, which constitute 55% of the total demand for water.<sup>18</sup> It is estimated that more than 75% of groundwater withdrawals are allocated to the agricultural sector.<sup>19</sup> As rainfall decreases in periods of drought, farmers dig illegal wells. Such illegal withdrawals of water are considerably facilitated by energy subsidies to farmers. It is estimated that 42 billion cubic metres (BCM) of water are legally withdrawn from underground wells and nearly 5 BCM are withdrawn illegally.<sup>20</sup> In its sixth development plan (for 2016-2021), the Iranian government aims to curtail withdrawal from ground wells by 11 BCM.<sup>21</sup> In fact, between 2002 and 2017 Iran successfully reduced underground water withdrawal by an estimated 18%, despite the high growth in the population and droughts.<sup>22</sup>

## Economic Sanctions and Dam Building

Since Iran's 1979 Revolution, the prioritisation of food self-sufficiency has made dam-building a central instrument in its water policy. Since the war with Iraq (1980-1988), Iran has also been incentivised to rebuild its agricultural infrastructure and capability, especially by procuring essential crops domestically in response to external pressures (I explain this more thoroughly in the second section). These factors have worsened Iran's growing water crisis as the quest for agricultural self-sufficiency put pressure on Iran's limited water resources. Economic sanctions have also exacerbated water mismanagement as political factionalism and corruption have grown. While sanctions during the war and the post-war reconstruction periods were not economically crippling and did not impede food imports, they were indicative of a broader and a more long-term threat to Iran's food security.

One important by-product of economic sanctions in terms of long-term water security has been a sharp increase in dam building across Iran to serve agricultural and hydroelectrical production. In response to changing climate conditions that produced harsher droughts and floods, Iran is estimated to have built over 600 dams since 1979.<sup>23</sup> According to Kaveh Madani, "the considerable spatial and temporal precipitation variability in Iran has been an important driver for the construction of numerous dams and large reservoirs to regulate water flows."<sup>24</sup> Indicating the significant proliferation of the practice, Darvish, an Iranian official, said in 2015, "We certainly can say that, after the [1979] revolution, the highest volume of investment after oil projects was in dam construction." Darvish also said, "If we had renewable energy, we could spend less money and generate more electricity ... without damaging the environment."<sup>25</sup> Beyond

16 Mirzaei, A., Saghafian, B., Mirchi, A., Madani, K. (2019), "The Groundwater-Energy-Food Nexus in Iran's Agricultural Sector: Implications for Water Security". *Water*, 11, 3.

17 Karakurum-Ozdemir, Kamer; Kazemi Najaf Abadi, Majid; Hayati, Fayavar; Pallares-Miralles, Montserrat; Sadoff, Claudia W.; Borgomeo, Edoardo; Rehberger Bescos, Irene. (2017), "Iran economic monitor: oil-driven recovery" (English). *World Bank*, <http://documents.worldbank.org/curated/en/344651498863986174/Iran-economic-monitor-oil-driven-recovery>

18 Ibid., 38.

19 Mirzaei, A., Saghafian, B., Mirchi, A., Madani, K. (2019), "The Groundwater-Energy-Food Nexus in Iran's Agricultural Sector: Implications for Water Security". *Water*, 11, 3.

20 Badawi, Tamer. (2018), "Iran's Water Problem", Sada (*Carnegie Endowment for International Peace*), <https://carnegieendowment.org/sada/77935>

21 Ibid.

22 Mirzaei, A., Saghafian, B., Mirchi, A., Madani, K. (2019), "The Groundwater-Energy-Food Nexus in Iran's Agricultural Sector: Implications for Water Security". *Water*, 11, 3.

23 Khalaj, Monavar. (2015), "Iran's Rouhani rolls back on dam projects", *Financial Times*. <https://www.ft.com/content/56704462-ccb7-11e4-b5a5-00144feab7de>

24 Madani, Kaveh. (2014), "Water management in Iran: what is causing the looming crisis?" *Journal of Environmental Studies and Sciences*, 4: 315, 315, <https://link.springer.com/article/10.1007/s13412-014-0182-z#citeas>

25 Khalaj, Monavar. (2015), "Iran's Rouhani rolls back on dam projects", *Financial Times*. <https://www.ft.com/content/56704462-ccb7-11e4-b5a5-00144feab7de>

environmental degradation, the excessive building of dams has had two repercussions. First, in some cases dams have led to desertification and population displacement due to river diversions. Second, many dams have been unable to properly store water due to the increasingly extreme climate leading to water evaporation.

In addition to increasing agricultural output, producing hydroelectricity and shielding the country against droughts, Iran's dam policy was also motivated by two additional factors. First, the Islamic Revolutionary Guard Corps (IRGC), the military backbone of the new Islamic establishment, drove excessive dam building since its conglomerates and engineering firms participated in the post-war economic reconstruction, which drove dam-building to assist in undertaking such projects.<sup>26</sup> Second, in the 1990s, Iran had the ambition of exporting water to neighbouring Gulf countries, arguably with political aims. Iran was in talks with Qatar, Kuwait and allegedly Saudi Arabia on exporting water through pipelines. This water export policy dictated capturing and preserving more water in dams for domestic use to compensate for what would be exported. However, none of these plans to export water to Gulf countries eventually materialised.<sup>27</sup>

The excessive building of dams was further aggravated under the presidency of Ahmadinejad when he changed the management of water boundaries from the government to the provinces, with local authorities having more influence over water policy. This increased competition among the provinces to build dams to secure water supplies for each region produced a 'tragedy of the commons,' in which individualist competition over resources produces overconsumption and underinvestment that depletes a resource. Excessive dam building was reversed by Ahmadinejad's successor, President Hassan Rouhani, who sought to halt the construction of dams. After taking office, Rouhani halted the construction of

14 dams<sup>28</sup> and embarked on building underground storage facilities and pipelines instead. However, the government continued to build dams, such as the Karam Abad Dam in the province of Western Azerbaijan (adjacent to Iraq's Sulaymaniyah province), which was inaugurated in May 2019.<sup>29</sup>

## Iran's Quest for Agricultural Self-sufficiency

### The War Period

Early legacies of economic insecurity help explain Iran's policy of excessive dam building and water mismanagement. From 1979, Iran emphasised protecting the agricultural sector, which had been marginalised by the former establishment of Mohamad Reza Pahlavi in favour of industrial development. This was evident in the economically left-leaning discourse of the Islamic Republican Party, which dominated Iran's Islamic Revolutionary Council. The quest for economic independence was embodied in article 43 of the constitution, which calls for the "prevention of foreign economic domination over the country's economy."<sup>30</sup> The war with Iraq solidified the goal of economic independence for a wide segment of the new regime's political ruling elite because of the vulnerability created by the multitude of countries threatened and because potential maritime disruptions in the Persian Gulf meant that food imports were under threat.

28 Fararu. (2017), "How did the 11th government fight the water crisis?" (Farsi), <https://fararu.com/fa/news/315164/%D8%AF%D9%88%D9%84%D8%AA-%DB%8C%D8%A7%D8%B2%D8%AF%D9%87%D9%85-%DA%86%DA%AF%D9%88%D9%86%D9%87-%D8%A8%D8%A7-%D8%A8%D8%AD%D8%B1%D8%A7%D9-%86-%D8%A2%D8%A8-%D8%AC%D9%86%DA%AF%DB%8C%D8%AF>

29 Tehran Times. (2019) "Development projects worth \$1b inaugurated", <https://www.tehrantimes.com/news/436195/Development-projects-worth-1b-inaugurated>

30 Pesaran, Evaleila. (2011), *Iran's Struggle for Economic Independence Reform and Counter-Reform in the Post-Revolutionary Era*, Routledge.

26 Dowlat Yāzdahom Chegüeneh bā bohrān Āb Janged." (What is the Eleventh Government Fighting the Water Crisis With?), *Fararu*, 9 May 2017, <https://bit.ly/2YLzUpY>

27 Taremi, Kamran. (2005), "The Role of Water Exports in Iranian Foreign Policy Towards the GCC." *Iranian Studies* 38, no. 2: 311-28. <http://www.jstor.org/stable/4311727>

The economic doldrums which the war produced coupled with the economic sanctions that the US imposed following the occupation of the US embassy in Tehran both deepened the state's role in the economy. However, while economic isolation was not advocated, the extent to which foreign trade would be expanded, especially imports, was not very clear. Statistics on the ratio of imports to GDP show a substantial reliance on imports in almost the first half of the war with Iraq, growing from 43% in 1980 to 50% in 1983. This was followed by a downward trend from 42% in 1984 to 24% in 1988.<sup>31</sup> Rather than achieving higher domestic production, it is likely that the reduction in imports was due to financial distress and a considerable loss of manpower as the war with Iraq caused attrition in Iran.

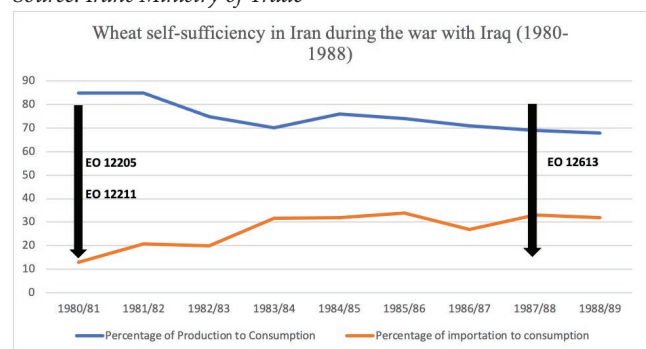
Iran's Supreme Leader, Ayatollah Khomeini, declared the quest for agricultural self-sufficiency an embodiment of *jihad* as the sector was the "major axis" of Iran's economy.<sup>32</sup> Supported generously with water and energy subsidies, Iran's agricultural sector performed comparably better than other sectors prior to and during the war with Iraq. The contribution of the sector to Iran's GDP increased from 12.4% in 1977/1978 to more than 18% by the end of the decade.<sup>33</sup> Government investment in agriculture constituted 19.6% of total government investment in the 1988/1989 period, which was 11.3% higher than the 1979/1980 period.<sup>34</sup> However, between 1979 and 1991, employment in the agricultural sector increased by only 10%.<sup>35</sup>

Despite the agricultural sector's comparably better performance, Iran was far from achieving self-sufficiency. In line with the ratio of imports to GDP in the war period (mentioned above), the ratio of Iran's wheat production to wheat consumption (an essential crop used as a benchmark for self-sufficiency) decreased from 85% in 1980 to 68% in 1988 (see

Figure 1).<sup>36</sup> Two factors account for the inability of wheat production to catch up with consumption of the crop. First, in the war period, large segments of land distributed by the new establishment to peasants were categorised as 'land under temporary cultivation' as part of a land reform law approved by the revolutionary council in April 1980 which only expired in October 1991.<sup>37</sup> Arguably, peasants were disinclined to invest and increase the output of the land they cultivated if it could be taken from them. Second, while the price of wheat increased six-fold, production of it increased by a factor of 5% to 20%. Revenue from wheat production was spent mainly on consumer and capital goods.<sup>38</sup>

**Figure 1**

Source: Iran's Ministry of Trade



## The Post-War Reconstruction Transformative Period

Despite the inability of wheat production to keep up with consumption, the war period strongly solidified the agricultural sector's strategic importance in maintaining Iran's food security. In the post-war period, marking the second transformative economic phase, the Iranian government sought to advance the agricultural sector through a number of neoliberal policies that were pursued by Iranian President Hashemi Rafsanjani, such as creating a less subsidised foreign exchange system and increasing foreign trade

31 Ibid., 59.

32 Haghayeghi, Mehrdad. (1990), "Agricultural Development Planning under the Islamic Republic of Iran." *Iranian Studies* 23, no. 1/4: 5. <http://www.jstor.org/stable/4310725>

33 Amuzegar, Jahangir. (2014), *The Islamic Republic of Iran: Reflections on an Emerging Economy*, Routledge, 2014, 36.

34 Haghayeghi, Mehrdad. (1990), "Agricultural Development Planning under the Islamic Republic of Iran." *Iranian Studies* 23, no. 1/4: 5. <http://www.jstor.org/stable/4310725>

35 Amuzegar, Jahangir. (2014), *The Islamic Republic of Iran: Reflections on an Emerging Economy*, Routledge, 2014, 36.

36 Iranian Ministry of Commerce. (2001), "Researching the state of wheat subsidies in Iran and their impact on the costs of urban and rural families" (Farsi).

37 Haghayeghi, Mehrdad. (1990), "Agricultural Development Planning under the Islamic Republic of Iran." *Iranian Studies* 23, no. 1/4: 5. <http://www.jstor.org/stable/4310725>

38 Ehsani, Kaveh. (2006), "Rural Society and Agricultural Development in Post-Revolution Iran: The First Two Decades", *Critique: Critical Middle Eastern Studies* 15, no. 1: 90. <https://doi.org/10.1080/10669920500515143>



and privatisation. Rafsanjani's post-war economic agenda reflected a departure from the war period's agenda which concentrated on the agricultural sector, as the development of the agricultural sector in Iran's first five-year plan was changed from a "major axis" to a "high priority."<sup>39</sup> Mehrdad Haghayeghi argues that the agricultural sector was "demoted to the third largest recipient of development funds, far below industry and transportation."<sup>40</sup> However, Rafsanjani's relative downgrading of agriculture's importance in development might have been driven in part by the sector having received higher priority compared to others in the war period. Balanced development in other key sectors of the economy was required. In a way, the prioritisation of other non-oil sectors in the economy had indirectly supported the agricultural sector's performance, considering the economic linkages between them such as with transportation and industry, which may have helped advance agriculture by facilitating mobility and increasing value-added production.

From the beginning of the 1990s, Rafsanjani's neoliberal policies, particularly in the agrarian sector, had two implications. First, the Iranian state became oriented towards gradually removing agriculture subsidies and directing investment in the sector towards expanding agricultural exports in a growingly non-oil export-oriented economy. Nevertheless, government statistics show that subsidies of wheat production continued to nominally grow. This can be explained by the steep devaluation of the Iranian Rial, which might have prompted the government to mitigate its adverse impact on the agriculture sector by providing exceptions to several strategic economic realms despite its overall policy of reducing subsidies, which led to stable increases in production in most of the 1990s (see Figure 2). The second implication was the government's shift from supporting small-scale agricultural activity based on cooperative societies to large-scale production schemes.<sup>41</sup> The land

39 Haghayeghi, Mehrdad. (1990), "Agricultural Development Planning under the Islamic Republic of Iran." *Iranian Studies* 23, no. 1/4: 5. <http://www.jstor.org/stable/4310725>

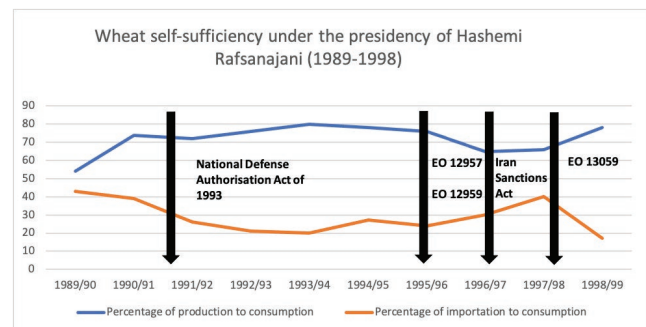
40 *Ibid.*, 21.

41 *Ibid.*, 22.

fragmentation that was driven by the proliferation of cooperative societies contributed to unsustainable agricultural investment and production in the absence of proper infrastructure. This produced an agricultural sector that combined small-scale cooperative societies with large-scale production schemes.

In President Rafsanjani's first year in office in 1989, the ratio of wheat production to consumption in Iran was at 54%, down from 85% when the war with Iraq started in 1980. By the end of his first term in 1992/1993, this figure had jumped to 76%. In the first year of his second term in office, it peaked at 80%, which represented the highest point since the end of the war. However, by the end of Rafsanjani's second term, the ratio of wheat production to consumption had declined to 66% (see Figure 2).<sup>42</sup>

Figure 2



Source: Iran's Ministry of Trade

## The Post-2010 Period: Unprecedented Economic Sanctions

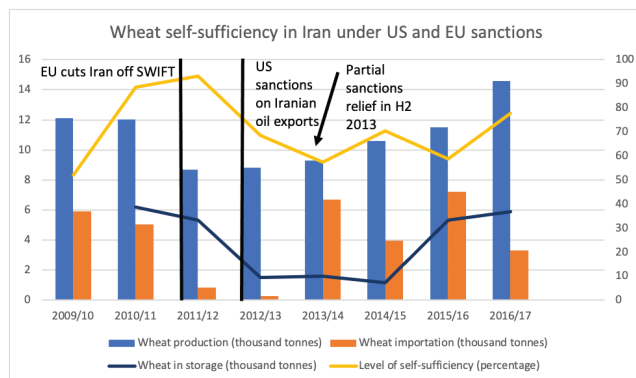
In the late 2000s, the dispute between Iran and the US and European countries grew over Iran's nuclear programme. This dispute led to an unprecedented imposition of economic sanctions by the United Nations Security Council, the US and the EU. To use US sanctions as an example of Washington's vanguard role in countering Iran's nuclear ambitions, the US imposed 18 executive orders on Iran in the form of sanctions between 1979 and 2012. Of these, 9 were issued between 2010 and 2012, constituting half the orders. The US directed 10 pieces of congressional legislation

42 Iranian Ministry of Commerce. (2001), "Researching the state of wheat subsidies in Iran and their impact on the costs of urban and rural families" (Farsi).

against Iran between 1992 and 2012, of which 6 were issued between 2010 and 2012, constituting 60%.<sup>43</sup> These sanctions harshly damaged Iranian oil exports and, more importantly, Iran's banking transactions by cutting it from the SWIFT banking system.

Cutting off Iran's banking relations with the international banking system via SWIFT caused a shock that adversely impacted Iran's external food trade. In early 2012, Iran resorted to bartering to procure food supplies as most global banks refused to carry out transactions despite exemptions for humanitarian items, including food imports among others.<sup>44</sup> By the end of 2012, the knock-on effects of sanctions on Iran's food market were strongly felt in the form of skyrocketing inflation and food shortages.<sup>45</sup> Cutting Iran off from SWIFT took a large toll on its wheat imports, yet they recovered as Iran advanced its bartering trade. Despite increasing wheat production from 2012 to hedge against external pressures, wheat in storage continued to slump until 2014. This overall reduced Iran's wheat self-sufficiency, but it partially recovered from 2013 to 2016 (see Figure 3).

**Figure 3**



Source: Iran's Ministry of Agriculture Jihad, Iran's Parliament Research Centre and Tasnim News Agency

43 These percentages are calculated based on a list of sanctions imposed on Iran from 1979 to 2012 in the International Crisis Group's report entitled "Spider Web: The Making and Unmaking of Iran Sanctions" in 25 February 2013.

44 Parent, Valerie & Hafezi, Parisa. (2012), "Iran turns to barter for food as sanctions cripple imports," *Reuters*, <https://www.reuters.com/article/us-iran-wheat/iran-turns-to-barter-for-food-as-sanctions-cripple-imports-idUSTRE8180SF20120209>

45 Saul, Jonathan & George, Marcus. (2012), "Sanctions side effect hits Iran's food system," *Reuters*, <https://www.reuters.com/article/us-iran-food-idUSBRE8AR0DG20121128>

By February 2014, the immense economic pressure that Iran faced led Iran's Supreme Leader, Ayatollah Ali Khamenei, to introduce what he proclaimed to be a "resistance economy," which targeted increased and systematic self-reliance in production.<sup>46</sup> The proclamation came after Iran was provided with partial sanctions relief after it reached a preliminary agreement with world powers, which exemplified how the Iranian establishment was reaffirming and continuing to prioritise expanded domestic production as a strategic target, regardless of short-term changes in Iran's relations with the US, the EU and the international community. When the US unilaterally re-imposed sanctions in late 2018, Iran once again faced the problem of global food suppliers and banks halting their deals and transactions with it due to fears of US sanctions, despite the provision of waivers on humanitarian items.<sup>47</sup> Despite Iran's commitment to agricultural self-sufficiency, consecutive administrations pursued different sets of macroeconomic and agricultural policies that had varying outcomes in achieving self-sufficiency, and this is likely to continue.

An emerging challenge to agricultural sustainability has been the declining size and rising age of the sector's labour force. Government statistics show that in 2005 the sector employed 5.1 million people, representing 25% of the workforce. In 2016, this figure plummeted to 4.1 million, representing 18% of the workforce.<sup>48</sup> In terms of age, the proportion of the workforce in the agricultural sector aged over 55 rose from 36.17% in 2004 to 41.04% in 2014. In terms of perceptions of challenges that hinder the sustainable growth of the agricultural sector, rather than climatic conditions and economic sanctions, a report by the Iranian Parliamentary Research Centre sees the declining

46 . Khajepour, Bijan. (2019), "Decoding Iran's 'resistance economy,'" *Al-Monitor*, <https://www.al-monitor.com/pulse/originals/2014/02/decoding-resistance-economy-iran.html>

47 Saul, Jonathan & Hafezi, Parisa. (2018) "Exclusive: Global traders halt new Iran food deals as U.S. sanctions bite – sources," *Reuters*, <https://www.reuters.com/article/us-iran-nuclear-food-exclusive/exclusive-global-traders-halt-new-iran-food-deals-as-us-sanctions-bite-sources-idUSKCN1OK1OR>

48 Iran's Parliamentary Research Centre, (2017), "Assessing the Policies and Regulations of the Labour Market in Iran: Knowing the Existing Situation in the Labor Market With an Emphasis on Regional Differences" (Farsi), <https://rc.majlis.ir/fa/report/show/1040015>  
<https://rc.majlis.ir/fa/report/show/1040015>

quality of the agricultural sector's workforce as the biggest challenge to its productivity and sustainability for 2019/2020.<sup>49</sup>

## Repercussions for Iraq's Water Security

Iran and Iraq share five key rivers and tributary rivers that are affected by Iran's water usage. Several variables impact the downstream flow of water into Iraq: worsening climate change and economic sanctions on Iran restricting access to advanced technologies amid a continued drive for water-intensive self-sufficiency schemes. All are likely to have contributed to exacerbating the inefficient use of water in Iran's agricultural sector, with a toll on Iraq's water security.

According to one estimate, if water consumption in Iran continues at current levels, of Iran's 31 provinces 12 provinces suffering from severe water scarcity will exhaust their water resources in the next 50 years.<sup>50</sup> In the second tier of provinces suffering from water scarcity, there are two major crop-producing provinces that border Iraq: Khuzestan (adjacent to Iraq's Basra province) and Western Azerbaijan (adjacent to the Iraq's Sulaymaniyah province). The bulk of Iran's agriculturally productive provinces lie in its western part, bordering Iraq. Other Iranian provinces adjacent to Iraq that are important in terms of agricultural production are Kermanshah and Kurdistan. Ilam is another adjacent province, but its agricultural yields are insignificant compared to the other provinces mentioned. The Lesser Zab river in Iran feeds the Tigris river, while the Karkheh and Karun rivers feed the Tigris and Shatt al-Arab rivers respectively in Basra province and the Alvand and Sirvan rivers in Iran's Kermanshah province, feeding Iraq's Diyala river in Iraq's Diyala province, which ends at the

Tigris river. According to one estimation, the Lesser Zab, Diyala and Karkheh rivers provide the Tigris river with between 9% and 13% of its water supply.<sup>51</sup> Iraq's downstream surface water resources flowing from Iran have been negatively impacted due to dam building on the Iranian side and this has compounded the water shortage in Iraq caused mainly by a substantial reduction in water flowing from Turkey as a result of constructing and filling a series of dams as part of the South-Eastern Anatolian Project.

According to Human Rights Watch (HRW), in 2019 Iran constructed twelve dams on the Sirvan tributary river, nine of which were constructed after 2011, with one being inaugurated in 2019. Prior to 2001, no dam was built on the Karkheh river but between 2011 and 2017 five were built. Prior to 2001, there were four dams on the Karun river. Between 2002 and 2013, eight more dams were constructed, and the biggest was built in 2012: the upper Gotvand dam.<sup>52</sup> Considering that roughly 75% of Basra's water consumption comes from the Karun river,<sup>53</sup> according to an HRW estimate, dam building has far-reaching repercussions for Basra. The consequent reduction in water supply to rivers feeding downstream Iraqi rivers has worsened the historical water tensions between Iran and Iraq. The intensification of dam building between 2010 and 2015 probably reflects the impact of sanctions pushing Iran towards maximal water, agricultural and energy policies. These dams, in part, are utilised to divert water supplies to south-eastern Iran, where water stress is felt more than in the north.

Despite the worsening climate in Iran, Khuzestan, which is Iran's biggest agriculture producing province, nonetheless increased its agricultural output after 2011/2012 despite its particularly scarce water resources. In 2011/2012, the province contributed 16.9%

49 . Iran's Parliamentary Research Centre. (2019) "The Challenges and Mechanisms of Reinvigorating Production", <https://rc.majlis.ir/fa/report/show/1153020>

50 Faramarzi, Monireh, Hong Yang, Rainer Schulin and Karim C. Abbaspour. (2010), "Modeling Wheat Yield and Crop Water Productivity in Iran: Implications of Agricultural Water Management for Wheat Production." *Agricultural Water Management* 97, no.11: 1873. <https://doi.org/10.1016/j.agwat.2010.07.002>

51 Lossow, Tobias von. (2018) "More than infrastructures: water challenges in Iraq," *Clingendael*, <https://www.clingendael.org/publication/more-infrastructures-water-challenges-iraq>

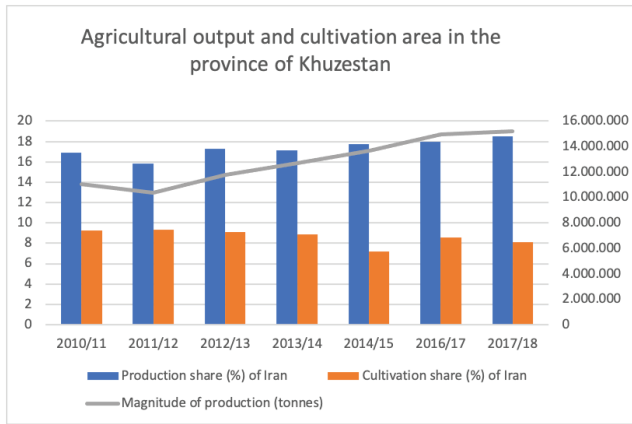
52 Human Rights Watch. (2019), "Iraq's Failure to Manage the Water Crisis", <https://www.hrw.org/report/2019/07/22/basra-thirsty/iraqs-failure-manage-water-crisis>

53 Ibid., 96.

of Iran's agricultural output.<sup>54</sup> In 2017, this figure rose to 18.5% (see Figure 4).<sup>55</sup> This growth in agricultural output was unlikely to take place without diverting and re-channeling river water supplies away from Iraq's Basra province through the Karkheh and Karun rivers.

**Figure 4**

Source: Iran's Ministry of Agriculture Jihad



## Conclusion

This chapter has explored how economic sanctions on Iran have exacerbated its historical water mismanagement and overconsumption, which extended back to before its 1979 regime change. Economic sanctions are likely to continue and to create difficulties in processing financial transactions that can hinder food procurement. Therefore, Iran will continue to pursue maximal agricultural policies to achieve self-sufficiency, although it has not managed to achieve it completely.

Without accessing advanced technology to address inefficiencies in the water and agricultural sectors, it is unlikely that Iran will easily increase the size of its agricultural output without harming its scarce water resources. Climate change will increasingly put

pressure on Iran's ambitious plans to achieve full food self-sufficiency as imports will continue to constitute a considerable source, despite economic sanctions, and may grow in the long term. As Iran is experiencing a decline in population growth, the agricultural sector will face more difficulties in attracting younger workers to produce a larger workforce, potentially posing a challenge to increasing output.

However, continuing maximal agricultural policies will further exacerbate water scarcity in southern Iraq, which has already seen repeated protests and unrest due to poor service provision and drinking water problems. Such instability in Basra, for example, can have dangerous implications for the country's oil supplies as they are imported through Basra's ports. If political conditions permit, the EU can concentrate its efforts on helping Iran to improve its water and agricultural policies and techniques in the western part of the country through specialised missions. On the one hand, EU support will help Iran avert the next episodes of extreme drought and keep the country from deteriorating economically. On the other hand, it may help reduce water security problems in Iraq in the long term. On a wider scale, a role for the EU in improving water policies in Iran and Iraq can provide a platform for dialogue between the countries on both shores of the Persian Gulf.

<sup>54</sup> Ministry of Agriculture Jihad. 1397 (2018-19), "Statistics on the output of the agricultural year of 1395-96", <https://www.maj.ir/Dorsapax/userfiles/Sub65/Amarnamehj1-95-96-site.pdf>  
<https://www.maj.ir/dorsapax/userfiles/file/amarnamehj11004.pdf>

<sup>55</sup> "Ministry of Agriculture Jihad. (2015), "Statistics on the output of the agricultural year of 1389-90", <https://www.maj.ir/dorsapax/userfiles/file/amarnamehj11004.pdf>



# Phosphate Geopolitics: Revised EU Legislation and its Impact on EU-North Africa Relations

Amine Ghouli

## Executive Summary

The European Union is highly dependent on phosphate imports, the majority of which come from North Africa and Russia. In 2019, the EU adopted fertiliser legislation that excluded from its market phosphate fertilisers containing 60 mg/kg or more of a naturally occurring but toxic contaminant called cadmium. Because many North African phosphates have high levels of cadmium, the new EU regulation is expected to disincentivise imports of them, potentially increasing the EU's dependency on Russian phosphate sources. This chapter contends that the fertiliser legislation will probably increase the EU's dependency on Russian phosphate sources and disrupt existing trade arrangements with phosphate-export-dependent North African countries. It also contends that, given the EU's strong partnership with these North African countries, its process of legislating on fertilisers should have built in additional consultative measures that would have helped assuage their concerns and provide opportunities for mutually beneficial engagement.

**Keywords:** Phosphate; EU; North Africa; Trade

## Introduction

On 21 May 2019, the Council of the European Union (EU) adopted a regulation that aimed to harmonise the requirements in the EU for fertilisers produced from phosphate minerals and from organic or secondary raw materials. The new legislation, which represents a seemingly technical requirement to limit toxins in agricultural produce, caps cadmium<sup>1</sup> levels in

1 Cadmium is a heavy metal naturally present in phosphate rocks which are mined for use as raw material in the manufacture of phosphate fertilisers. Cadmium at varying levels is regarded as harmful to human health.

phosphate fertilisers at 60 mg/kg, a limit subject to cyclical re-evaluation. The rule was the culmination of long negotiations between various stakeholders within the EU fertiliser ecosystem.<sup>2</sup>

While its passage was portrayed as a victory for European consumer groups, some observers stressed its potential strategic implications, especially with regard to the EU's resource security objectives.<sup>3</sup> A key concern has been that the new regulation will not only disrupt existing phosphate supply arrangements between the EU and exporting countries in North Africa but also that it may increase the Union's dependency on Russia, a country that has previously leveraged its energy market leadership for geopolitical purposes.<sup>4</sup> Once implemented, the legislation will provide phosphate rock with cadmium levels below the established 60 mg/kg threshold with a significant advantage. Such phosphates are primarily imported into the EU from Russia. Most importantly, for the purposes of this chapter, the legislation will disincentivise imports of phosphate rock with 60 mg/kg or more of cadmium, which is currently mostly sourced in North Africa and constitutes the majority of all phosphates imported into the EU.<sup>5</sup> In so doing, the legislation and its future iterations could unsettle a foundational building block in the EU's economic relationship with neighbouring countries in North Africa, disrupt their economies and in the process increase dependency on Russian phosphate sources.

2 EP (2018), "Fertilisers/cadmium: Parliament and Council negotiators reach provisional deal."

3 Fertilizers Europe. (2016), "Concerning proposal for new fertilizer regulation."

4 Siddi, M. (2018), "The Role of Power in EU–Russia Energy Relations: The Interplay between Markets and Geopolitics," *Europe-Asia Studies*, 70:10, pp. 1552-1571; <https://www.nytimes.com/2018/10/21/world/europe/russia-europe-fertilizer-regulation.html>

5 de Ridder, M., de Jong, S., Joshua, P. & Lingemann, S. (2012), "Risks and Opportunities in the Global Phosphate Rock Market: Robust Strategies in Times of Uncertainty"; <https://www.reuters.com/article/us-tunisia-protests/tunisia-phosphate-exports-halted-by-job-protests-idUSKCN1G01XP>

## The EU's phosphate policy and the cadmium debate

Phosphorus is produced almost exclusively from phosphate rock. Together with nitrogen and potassium, phosphorus is a critical building block in the production of mineral fertilisers and therefore “for global food security.”<sup>6</sup> It is also non-substitutable. Without it, plants cannot thrive, making it a limiting factor in agriculture.<sup>7</sup> Over four fifths of mined phosphate rock comes from sedimentary deposits, the absolute majority of which – between 83% and 87% – is used in the production of chemical fertilisers.<sup>8</sup>

The EU is almost entirely dependent on phosphate imports.<sup>9</sup> In 2011, the Union's import dependency rate for phosphate rock was around 92%, while a more recent assessment puts it at 88%.<sup>10</sup> Between 2010 and 2014, the annual phosphate rock consumption of the EU was estimated at approximately 7.3 million tonnes, a figure that has grown exponentially over the last decade.<sup>11</sup> Morocco and Russia are the two leading exporters of phosphate rock to the EU with 30-35% and 14% of the market respectively.<sup>12</sup> Similarly, the EU is highly dependent on imports of phosphate fertilisers, with approximately 1.2 million tonnes of them sourced from Russia, Morocco and Tunisia (with Russia being the largest exporter to the EU).<sup>13</sup>

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6 Geissler, B., Hermann, L., Mew, M. C. & Steiner, G. (2018). “Striving Toward a Circular Economy for Phosphorus: The Role of Phosphate Rock Mining.” *Minerals*, 8:9; de Ridder, M., de Jong, S., Joshua, P. & Lingemann, S. (2012), “Risks and Opportunities in the Global Phosphate Rock Market: Robust Strategies in Times of Uncertainty”; <https://blogs.ei.columbia.edu/2013/04/01/phosphorus-essential-to-life-are-we-running-out/>

7 Ibid.

8 Ibid.

9 EC (2016), “Circular economy: New Regulation to boost the use of organic and waste-based fertilisers.”

10 EC (2017), “Study on the review of the list of Critical Raw Materials: Criticality Assessments.”

11 EC (2017), “Study on the review of the list of Critical Raw Materials. Critical Raw Materials Factsheets.”

12 Lécuyer, B. (2014), “The world phosphates market: What risk for the European Union?”

13 Ibid.

According to the European Commission, P<sub>2</sub>O<sub>5</sub> phosphate fertilisers sold in the EU have average cadmium levels of 32 to 36 mg/kg.<sup>14</sup> However, cadmium levels in phosphate rock vary greatly depending on the rock's country of origin. Rock mined in Saudi Arabia, Russia and Finland, for instance, tends to have a low cadmium content, sometimes below 10 mg/kg.<sup>15</sup> In contrast, phosphate rock sourced in North Africa, such as from Morocco, Algeria and Tunisia, has much higher cadmium levels, sometimes exceeding 60 mg/kg.<sup>16</sup> Together, Morocco and Algeria are responsible for nearly half of the EU's imports of phosphate rock.<sup>17</sup>

In June 2019, the Official Journal of the European Union published the full text of the fertiliser legislation, which was adopted as Regulation (EU) 2019/1009. The proposal, which was initially put forward three years earlier under the framework of the Commission's Raw Materials Initiative (RMI), “covers a wider range of fertilising products (including those manufactured from secondary raw materials) and sets limits for the presence of heavy metals and contaminants in fertilising products.”<sup>18</sup> As part of the RMI, in December 2015 the Commission presented its ‘EU Action Plan for the Circular Economy’ to promote “the transition to a more circular economy, where the value of products, materials and resources is maintained in the economy for as long as possible, and the generation of waste minimised.”<sup>19</sup> Under the plan, the Commission proposed a revision of the Fertiliser Regulation (EC) No 2003/2003 with a view to improving nutrient recycling, among other measures. The legislative proposal concluded a process formally initiated in 2010 with the publication of an independent evaluation of the 2003/2003 regulation that had explicitly called on the Commission to address the issue of heavy metals – i.e.

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14 EC (2014), “Report on Critical Raw Materials for the EU.”

15 EC (2013), “Consultative Communication on the Sustainable Use of Phosphorus.”

16 Ibid.

17 EC (2017), “Study on the review of the list of Critical Raw Materials. Critical Raw Materials Factsheets.”

18 EP (2019), “Briefing – EU Legislation in Progress; EU fertilising products.”

19 EC (2015), “Closing the loop – An EU action plan for the circular economy.”

cadmium – in any forthcoming fertiliser regulation.<sup>20</sup>

The 2019 legislation, therefore, can be said to have been the inevitable outcome of a decade-long intra-EU institutional conversation on the need to regulate cadmium levels in European food. However, there are fears that it will effectively disincentivise European industry from importing rock phosphate from sources the EU is currently dependent on – specifically in North Africa – while it will increase the economic viability of rock imports from Russia, a country that it is feared may instrumentalise European dependency on its natural resources for political purposes.<sup>21</sup>

## The Fertiliser Regulation and supply risk

Once fully implemented in 2022, the Fertiliser Regulation will cap cadmium levels in phosphate fertilisers at 60 mg/kg, subject to a four-year review process “in order to assess the feasibility of reducing it to a lower appropriate level.”<sup>22</sup> It is estimated that about two-thirds of the EU’s imports of phosphate products are from deposits with cadmium levels between 20 mg/kg and 100 mg/kg.<sup>23</sup> Like 95% of the world’s proven phosphate reserves and 85% of the world phosphate rock production, these deposits are of a sedimentary nature.<sup>24</sup>

It is assessed that 70% of EU rock phosphate imports come from these sources, with Morocco leading as the largest rock exporter to Europe.<sup>25</sup> The 60 mg/kg limit will therefore ensure that a significant portion of this phosphate, approximately 25%, will be excluded from

the European market.<sup>26</sup> Given the current supply chain arrangements, a further decrease of the cadmium level to 40 mg/kg would by default exclude 50% of all EU imports, a move that is ardently opposed by Fertilizers Europe, the continent’s largest professional grouping of fertiliser producers.<sup>27</sup> It is further contended that a limit of “60 mg would render some 40% of globally-traded phosphate in all its forms unavailable to the EU.”<sup>28</sup>

The Russian company PhosAgro assesses that the immediate exclusion of phosphate sources with cadmium exceeding 60 mg/kg would not be felt by European fertiliser manufacturers because “countries such as Jordan, South Africa, Canada and Russia are standing ready to respond to the market demands for low heavy-metal phosphate rock.”<sup>29</sup> Russia is already the first and second largest exporter of phosphate fertilisers and phosphate rock respectively to the EU and is expected to be an important beneficiary of the cadmium limit.<sup>30</sup> According to the Commission, the only reserves of non-sedimentary rocks in the immediate neighbourhood of the EU are limited to Russia.<sup>31</sup> It should therefore come as no surprise that much of the lobbying at the EU level in favour of the Fertiliser Regulation, including more drastic lowering of the cadmium limit, has been undertaken by Russian companies or entities linked to them.<sup>32</sup>

Despite PhosAgro’s assurances, the European Commission has expressed “doubts [about] whether Russia will be able to increase its capacity from existing deposits ... to levels necessary to make up for the no longer

20 CSES (2010), “Evaluation of Regulation (EC) 2003/2003 relating to Fertiliser.”

21 <https://www.ft.com/content/4cfd4b1e-43eb-11e9-b83b-0c525dad548f>

22 EP (2019), “Briefing, EU Legislation in Progress, EU fertilising products.”

23 EC (2016), “Commission Staff Working Document - Impact Assessment - Limits for cadmium in phosphate fertilisers”; OCP (2016), “Briefing paper by OCP S.A. COM (2016)157/F1 - 2016/0084(COD) - Making available on the market of CE marked fertilising products - Proposed limits on Cadmium.”

24 Ibid.

25 Lécuyer, B. (2014), “The world phosphates market: What risk for the European Union?”

26 Fertilizers Europe. (2016), “Concerning proposal for new fertilizer regulation”; OCP. (2016), “Proposed EU Limits on Cadmium in Phosphate Fertilisers.”

27 Fertilizers Europe. (2016), “Concerning proposal for new fertilizer regulation.”

28 OCP (2016), “Proposed EU Limits on Cadmium in Phosphate Fertilisers.”

29 PhosAgro (2017), “Review of the EU fertilizer regulation.”

30 Lécuyer, B. (2014), “The world phosphates market: What risk for the European Union?”

31 EC (2016), “Commission Staff Working Document - Impact Assessment - Limits for cadmium in phosphate fertilisers.”

32 <https://www.nytimes.com/2018/10/21/world/europe/russia-europe-fertilizer-regulation.html>

available sedimentary rocks.”<sup>33</sup> The Commission has also questioned the efficiency of current operations in Russia and noted that they “would require huge investments to maintain or even increase production.”<sup>34</sup> These investments would be made more complex by existing EU sanctions on Russia that “prohibit EU financial institutions and companies from providing funds for investment,” the Moroccan phosphate company OCP contends further in a European Commission briefing released under freedom of information laws.<sup>35</sup> Moreover, according to the Commission, there is currently only one European fertiliser producer that “can be supplied with igneous rocks from Finland and Russia at an affordable price as Russia prefers to export to the high added value feed supplements market.” Russian phosphate producers would therefore need to pivot more towards the fertiliser industry and away from the feeds market, with impacts (on the feeds market) that have yet to be assessed.<sup>36</sup>

## Concerns with increased dependency on Russia

Concerns of a default Russian monopoly over the European phosphate supply as a result of cadmium-capping fertiliser legislation predate the 2016 regulatory proposal and the debates that ensued. In a 2003 stakeholder consultation on a similar proposal to limit cadmium in phosphate fertilisers, “all but two companies (KEMIRA in Finland and PhosAgro in Russia) argued that the impact on EU industry and farmers as well as some high cadmium content sedimentary phosphate rock producing countries could be severe due to the creation of a quasi-monopolistic position of the Russian producer of low cadmium igneous rock.”<sup>37</sup> These anxieties echoed wider concerns related to the EU’s dependency on Russian

natural resources, particularly oil and gas. In fact, the impetus for the EU’s 2014 Energy Security Strategy was concerns about increased Member State dependency on Russian sources, which “leaves them vulnerable to supply disruptions, whether caused by political or commercial disputes or infrastructure failure.”<sup>38</sup>

In 2017, the Commission outlined the potential ramifications of a cadmium limit, particularly regarding the dynamics of increased dependency, noting:

“A potentially important development on the supply side could be regulation about the cadmium content in phosphate rock. If the EU adopts tight standards for phosphate fertilisers relating to a maximum amount of cadmium, the potential supply from many sedimentary sources (in particular Morocco) would pose problems, requiring either a process removing cadmium or a switch to igneous sources. Phosphate rock ores from Finland would not be affected by this ruling given their geological properties. If only Europe were to adopt tight standards, this would probably not significantly impact world supply (high cadmium rock and so fertiliser would be used elsewhere in the world) but could increase costs and could make Europe dependent on certain supplier countries (in particular Russia).”

As recently as March 2019, two months before the EU’s adoption of the Fertiliser Regulation, in a resolution on the state of EU-Russia relations the European Parliament stressed that “Russia can no longer be considered a ‘strategic partner’ of the EU,” and therefore called for reconsideration of the EU-Russia Partnership and Cooperation Agreement (PCA), which provides a framework for the promotion of “trade and investment and harmonious economic relations” between the two parties.<sup>39</sup>

Based on the above, it is apparent that consequential EU institutional stakeholders – including the Commission, the Council and the Parliament – agree that exposure to risks stemming from a potentially self-inflicted increased dependency on Russian phosphate

33 Ibid.

34 Ibid.

35 OCP (2016), “Briefing paper by OCP S.A. COM (2016)157/F1 - 2016/0084(COD) - Making available on the market of CE marked fertilising products - Proposed limits on Cadmium.”

36 EC (2016), “Commission Staff Working Document - Impact Assessment - Limits for cadmium in phosphate fertilisers.”

37 Ibid.

38 <http://www.newslettereuropean.eu/european-energy-security-package/>

39 <https://www.europarl.europa.eu/news/en/press-room/20190307IPR30737/russia-can-no-longer-be-considered-a-strategic-partner-say-meps>



is not desirable. This discomfort is expressed in explicit qualitative terms in various official EU reports. However, this position, while it may have contributed to dismissing earlier legislative proposals pushing for more stringent cadmium limits, was not consequential enough to eliminate the cadmium limit from the fertiliser legislation.

## The Fertiliser Legislation and North Africa

Equally puzzling to the apparent absence of EU institutional coherence in addressing the geopolitical and economic risks associated with the cadmium limit is the EU's seeming disinterest in assessing the impact of the Fertiliser Legislation on key North African countries.

The EU enjoys a strong relationship with phosphate-exporting North African countries, namely Morocco, Algeria and Tunisia. Together, these countries control over 80% of the world's proven reserves of phosphate.<sup>40</sup> Morocco and Algeria are responsible for nearly half of the EU's imports of phosphate rock.<sup>41</sup> Phosphate represents 19% of Morocco's overall annual exports and 4.6% of its annual GDP and the industry directly and indirectly employs over 20,000 people.<sup>42</sup> While the sector's contribution to the Algerian economy (approximately 0.6%) is dwarfed by the oversized role that hydrocarbons play, the Algerian authorities have made their intentions clear on the need to diversify their economy through ambitious development plans for the country's phosphate industry, among other sectors.<sup>43</sup>

### In Tunisia, the phosphate industry's pre-revolution

40 <https://theArabweekly.com/algeria-ramps-phosphate-production-giving-maghreb-dominant-role-industry>

41 EC (2017), "Study on the review of the list of Critical Raw Materials. Critical Raw Materials Factsheets."

42 Geissler, B., Hermann, L., Mew, M. C. & Steiner, G. (2018). "Striving Toward a Circular Economy for Phosphorus: The Role of Phosphate Rock Mining." *Minerals*, 8:9; [https://www.lanterne.com/Phosphates-baisse-du-chiffre-d-affaires-pour-le-marocain-OCP\\_a36296.html](https://www.lanterne.com/Phosphates-baisse-du-chiffre-d-affaires-pour-le-marocain-OCP_a36296.html)

43 <https://oxfordbusinessgroup.com/interview/unearting-potential-obg-talks-farid-benhadj-cto-manal>

shares of the country's annual GDP and exports were approximately 4% and 10% respectively, while it employs 23,000 staff.<sup>44</sup> However, political instability and ongoing disruptions linked to social unrest have brought the industry to its knees, threatening the national phosphate company with bankruptcy.<sup>45</sup> As a result, Tunisia's phosphate exports, including to its key EU markets, have seen a sharp decrease over recent years.

Like Tunisia, Morocco's overall phosphate exports to the EU saw an important decrease – by 50% or from \$1.2 billion to \$600 million – between 2007 and 2017.<sup>46</sup> However, this decrease is not congruent with an overall decrease in Morocco's market share of European imports and appears to be mainly due to a shift in European consumption towards domestically and sustainably produced products.<sup>47</sup>

Europe remains one of Morocco's most important phosphate markets, with 37% of its total annual exports.<sup>48</sup> Tunisia, a country with no meaningful domestic hydrocarbons industry and an economy that is over-reliant on the volatile tourism and services industries, will still look towards the EU – its largest trading partner – for future exports if and when its phosphate industry is operational again. Nevertheless, the Fertiliser Legislation with its strict cadmium limit will, at the very least, complicate future Tunisian attempts to reinvigorate phosphate exports to the EU.

In an interview with the author, a former Tunisian phosphate executive stressed that the legislation "could be a future death sentence" for the Tunisian phosphate industry.<sup>49</sup> "Why even fight to get the domestic

44 Boubaker, S., Hassen, M., 2015. *La Compagnie des Phosphates de Gafsa (CPG): État des lieux de la gouvernance et recommandations.*

45 <https://theArabweekly.com/tunisia-phosphates-company-risk-collapse>; <https://www.reuters.com/article/us-tunisia-protests/tunisia-phosphate-exports-halted-by-job-protests-idUSKCN1G01XP>

46 Berahab, R. & Dadush, U. (2020), "Has Morocco Benefited from the Free Trade Agreement with the European Union?"

47 Ibid.

48 OCP (2019), "2019 Sustainability Report."

49 Interview with former Tunisian phosphate executive (15 October 2019).

industry back on track when our default partner will be snubbing us?” the executive added, noting that “we were not officially consulted by the EU when they were drafting the legislation.”<sup>50</sup> When pressed on the apparent absence of an official Tunisian submission as part of the public voluntary consultative process launched by the Commission during the conceptualisation stage of the legislation, the executive conceded that “we were busy with our own domestic issues and were not focused enough on such a technical matter.”<sup>51</sup> He added, “this is going to have long-term implications on the stability of Tunisia as we would have to look away from the EU for new markets and for non-EU investors in our phosphate market.”<sup>52</sup>

Concerns with the disruptive potential of the legislation were echoed in a 2016 submission by the Spanish fertiliser company Tervalis. Arguing that the Commission should assess the impact of the legislation on North African exporters, Tervalis noted that “Given the challenges of finding alternative markets for their phosphate products, these countries risk substantial disruption to their economies, which could also have a politically destabilising effect, which we already see today in phosphate-producing parts of Tunisia affected by existing challenges in phosphate production.”<sup>53</sup> The Moroccan phosphate company OCP also raised similar concerns in its submission to the Commission, stating that “some” phosphate exporting countries in north and west Africa “would be severely impacted [by the cadmium limit], fomenting wider economic disruption and potential social instability.”<sup>54</sup>

An international phosphate industry expert familiar with European deliberations over the Fertiliser Legislation stressed that “the legislative process did not build into it a mechanism that is mainly focused on the stakeholders that were most likely to be negatively

affected by the legislation.”<sup>55</sup> While the Commission produced a detailed Impact Assessment related to the cadmium limiting legislation, “the assessment was mostly EU-centric and failed to account for the impact of the legislation on phosphate suppliers such as Tunisia and Morocco.”<sup>56</sup>

Both Morocco and Tunisia have been described by EU officials as “essential partner[s]” with a relationship built on “mutual interest.”<sup>57</sup> The EU has association agreements with both countries and is currently pursuing Deep and Comprehensive Free Trade Agreements (DCFTA) with both. Arguably, Tunisian and Moroccan statements may be tactically alarmist in their tones given that their industries will be comparatively more affected by the cadmium legislation. However, this does not reduce the disruptive potential of the legislation, especially when considering other variables in the wider global phosphate ecosystem, such as demand shifts and bold moves by industry actors in key competitive markets. “What good is there in having a partner if they do not take your best interests to heart and instead take strong measures to undermine the foundation of that partnership?” reflected the former Tunisian phosphate executive.

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50 Ibid.

51 Ibid.

52 Ibid.

53 Tervalis (2016), “Revision of the Fertiliser Regulation 2003/2003: Proposals for Limits on Cadmium in Phosphate Fertilisers.”

54 OCP (2016), “Briefing paper by OCP S.A. COM (2016)157/F1 - 2016/0084(COD) - Making available on the market of CE marked fertilising products - Proposed limits on Cadmium.”

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55 Interview with international phosphate industry expert (20 April 2020).

56 EC (2016), “Commission Staff Working Document - Impact Assessment - Limits for cadmium in phosphate fertilisers”; Interview with international phosphate industry expert (20 April 2020).

57 <https://ec.europa.eu/trade/policy/countries-and-regions/countries/morocco/> ; <https://ec.europa.eu/trade/policy/countries-and-regions/countries/tunisia/>; EC. (2008), “Communication from the Commission: Creation of a Common Aviation Area with Tunisia.”



## Conclusion & recommendations

This chapter has put the European legislation on cadmium levels in phosphate fertilisers in its institutional and geopolitical context. It has sought to analyse the anticipated impact of the Fertiliser Legislation on the EU's dependency on Russian phosphate sources and its disruptive potential for its existing phosphate trade arrangements with traditional North African exporters.

In so doing, the chapter has raised fundamental questions about the EU's legislative approach to the cadmium issue, particularly regarding the EU's consideration of the complexity of its relationship with both Russia and key North African countries. Although the EU's various institutions appear to be fully mindful of the risks attached to increasing the EU's dependency on Russian phosphate sources, the Fertiliser Legislation with the 60 mg/kg cadmium limit was nevertheless adopted. The regulation was embedded in a wider effort by the Commission to create a regulatory environment for the promotion of a circular economy – one centred around the sustainable management of resources – in view of reducing waste and dependency on imports of raw materials. This 'Circular Economy' approach to phosphorus policy may be sustainability-driven and may account for the impact of the cadmium cap on supply risk, but it did not take into consideration the legislation's full impact on the economies of phosphate export-dependent countries such as Tunisia and Morocco. The Fertiliser Legislation, in promoting phosphorus recycling and by limiting imports from North Africa, will by design alter phosphate supply-side dynamics and build in incentives for European industry to import more phosphate from countries such as Russia.

While the legislative process included opportunities for engagement with all stakeholders with interests in the legislation, those likely to be affected adversely by it were not offered a fitting framework to voice their concerns. With the exception of institutional lobbying and solicited submissions, little space was built in for countries such as Tunisia and Morocco to communicate their own assessments of the impact of the legislation on their economies. Nevertheless, there is ample evidence that other EU strategy and policy

conception processes have been more inclusive of a more diverse set of stakeholders, including non-EU member countries and international institutions. For instance, when drafting the 2016 EU Global Strategy, members of the team of then EU High Representative/Vice President Federica Mogherini not only held over 50 consultative events across the EU but also organised several other meetings with relevant non-EU stakeholders, including in the US, Japan, Brazil, Norway and Georgia.<sup>58</sup> While an EU security strategy is clearly fundamentally different to a legislative proposal on fertilisers in terms of scope and impact, the need to design more process inclusiveness should be self-evident. This is more imperative when the parties affected are "essential partners" with multi-dimensional relations with the EU and economies that are likely to be negatively impacted by the legislative outcome.

"Cadmium limits are not simply technical matters, they are political instruments that are promoted and used by industry as barriers to market entry against competition," said a seasoned European phosphate industry professional.<sup>59</sup> And in the case of the EU, they have the potential to be "used as tools for geopolitical competition by means of disrupting long-term trade relations with [North African] countries with which the EU has substantial political leverage, and increasing dependency on other countries [Russia] with whom the EU has a contentious history."<sup>60</sup> It is therefore important that in any forthcoming assessments of the application of the Fertiliser Legislation the EU expands its risk assessment to account for the legislation's disruptive potential for its southern neighbours. Furthermore, the EU should rigorously take account of the complexity of its relationship with key non-EU phosphate-exporting countries such as Russia, particularly with regard to their propensity to use their dominant EU fertiliser market position as geopolitical leverage.

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58 Tocci, N. (2017), "From the European Security Strategy to the EU Global Strategy: explaining the journey," *International Politics*, 54, pp. 487–502.

59 Interview with European phosphate industry professional (03 August 2019).

60 Ibid.



## **SECTION 2**

# NATURAL RESOURCES, CONFLICT, AND SECURITY

# Rebel Oil Companies and Wartime Economic Governance in the MENA

Ariel I. Ahram

## Executive summary

Oil smuggling has become a major feature of the war economies across the MENA region but the contest is not just for physical possession of oil through seizure and looting. Equally important is the political, legal and symbolic battle for ownership and authority to manage and dispose. Even as national economies splinter and collapse, the formal institutions of economic governance have unique capabilities and prerogatives and accordingly become focal points of contestation between rebel actors and governments. Rebels in Yemen, Iraq and Libya have launched alternative financial institutions, including national oil companies, central banks and other financial institutions, tied to petroleum sales. Such entities, unlike secretive smugglers, court publicity and tout their legitimacy and legality. This paper argues that these rebel oil companies and the attendant financial institutions are not merely facilitators of fraud but components of rebel governance and diplomatic strategies to enhance the durability of rebel rule. Rebel national oil companies (NOC)s and related institutions serve as points in conflict financing, facilitating the conversion and integration of illicit revenue into streams of normal or licit financial operations. They ease rebels' linkage into global markets for oil and other natural resources.

**Keywords:** Oil; smuggling; sovereignty; rebel governance; Libya; Yemen; Iraq

## Introduction

Oil smuggling has become a major feature of the war economies across the MENA region.<sup>1</sup> The media provide lurid details of missing tanker convoys, unregistered ships, shadowy brokers and armed assaults on remote gas plants, pipelines, refineries and depots. As important as physically controlling these facilities is, the need to exert legal authority is equally salient. Even as national economies splinter and collapse, national oil companies (NOCs), central banks and other formal state institutions that act as stewards or custodians of economic resources remain extremely powerful. Their unique capabilities and legal prerogatives make them focal points of contestation.<sup>2</sup> Rebel actors have often sought to circumvent the officially-sanctioned organs by creating their own alternative organisations and corporations. Such entities, unlike secretive smugglers, court publicity and announce themselves in press releases, websites and bank statements. They seek to legitimate themselves, both in the eyes of their own populations, in whose name they purportedly operate, and in the eyes of the international actors that serve as their customers and collaborators.

This paper argues that rebel oil companies and attendant financial institutions are not merely instruments of fraud, an extension of illicit smuggling by other means, but components in rebel governance and diplomatic strategies. Rebel NOCs and their related rebel central banks are points of interface in conflict financing, facilitating the conversion and integration of illicit revenue into streams of normal or licit financial operations.<sup>3</sup> The article proceeds in three sections. The first discusses the emergence of rebel oil as armed groups move from seizing physical control over oil to asserting the right to own and manage

- 1 Eaton, T. et al., (2019) Conflict Economies in the Middle East and North Africa, Chatham House Report, June 25, 2019, <https://reader.chathamhouse.org/conflict-economies-middle-east-and-north-africa#>
- 2 Heydemann, S. (2018). "Civil War, Economic Governance & State Reconstruction in the Arab Middle East." *Dædalus* 147(1): 48-63.
- 3 Mayntz, R. (2017). Illegal Markets: Boundaries and Interfaces between Legality and Illegality, in J. Beckert and M. Dewey, eds., *The Architecture of Illegal Markets*, Oxford University Press.

oil infrastructure. The second offers a case study of the conflict over the Libyan National Oil Company (LNOC), where rebels associated with the eastern government not only took control of oil wells but also set up an alternative NOC. The third section extends the discussion to other MENA cases and considers the long-term ramifications of rebel oil and its effects on post-war conciliation and state-building.

## Expropriation, Ownership and the Role of Rebel Oil Companies

Petroleum is the most valuable and widely traded commodity in the global economy. However, the wealth derived from oil exports contributes directly to economic underperformance, maladministration, authoritarianism and violence.<sup>4</sup> The reason oil so often seems cursed relates to the political and economic structures that surround its extraction and exchange. The most negative social and economic outcomes come in countries where oil is treated as state property and placed under NOC management.<sup>5</sup> NOCs have accumulated a growing and often contradictory list of responsibilities. The primary job of an NOC is to manage the oil sector and negotiate with foreign investors. In this sense, the NOC maintains a monopoly over the right to dispose of national oil wealth. Revenues from oil sales are used to fund NOC operations or passed on to the central bank and treasury. However, states also assign additional functions to NOCs, such as downstream refining, retail distribution and importing oil goods. With typically weak oversight and poorly-defined objectives, NOC operations tend toward

economic inefficiency and political opacity.<sup>6</sup>

As consequential as NOCs and state oil ownership are in setting the broad trajectories of economic and political development, their role in civil wars and conflict has been largely ignored.<sup>7</sup> Most studies instead focus on the ability of rebel groups to seize or expropriate physical control over oil, selling it off to help finance their military operations and governance.<sup>8</sup> Findings on this point have been equivocal.<sup>9</sup> Oil wealth can provide states with revenue to fund military build-ups that overawe rebels or to buy off would-be agitators.<sup>10</sup> Oil can also certainly be a fodder for grievances, especially

4 Ross, M. (2006). "A closer look at oil, diamonds, and civil war." *Annual Review of Political Science*. 9: 265-300; Ross, M. (2012). *The Oil Curse: How Petroleum Wealth Shapes the Development of Nations*. Princeton University Press.

5 Jones Luong, P. and E. Weinthal (2010). *Oil is not a curse: Ownership structure and institutions in Soviet successor states*, Cambridge University Press; Victor, D. G. (2013). "National oil companies and the future of the oil industry." *Annual Review of Resource Economics* 5(1): 445-462; Khanna, A. A. (2017). "Revisiting the Oil Curse: Does Ownership Matter?" *World Development* 99: 214-229; Closson, S. (2012). "Challenging the Consensus on the Oil Curse." *International Studies Review* 14(2): 346-348.

6 Marcel, V. (2006). *Oil Titans: National Oil Companies in the Middle East*, Brookings Institution Press; Cheon, A. et al. (2015). "Instruments of political control: National oil companies, oil prices, and petroleum subsidies." *Comparative Political Studies* 48(3): 370-402.

7 For a few exceptions, see Jones Luong, P. and E. Weinthal (2006). "Rethinking the resource curse: Ownership structure, institutional capacity, and domestic constraints." *Annual Review of Political Science* 9: 241-263; Wegenast, T. (2016). "Oil, Natural Gas, and Intrastate Conflict: Does Ownership Matter?" *International Interactions* 42(1): 31-55; Costello, M. (2018). "Oil and Gas Rents and Civilian Violence in the Middle East and North Africa, 1990-2004: A Resource Curse, or Rentier Peace?" *Social Sciences* 7(3): 39.

8 Lujala, P., et al. (2005). "A diamond curse? Civil war and a lootable resource." *Journal of Conflict Resolution* 49(4): 538-562; Snyder, R. (2006). "Does lootable wealth breed disorder? A political economy of extraction framework." *Comparative Political Studies* (8): 943; Sobek, D. and C. G. Thies (2015). "Civil wars and contemporary state building: Rebellion, conflict duration, and lootable resources." *Civil Wars* 17(1): 51-69.

9 Di John, J. (2007). "Oil abundance and violent political conflict: A critical assessment." *The Journal of Development Studies* 43(6): 961-986; Le Billon, P. (2010). "Oil and armed conflicts in Africa." *African Geographical Review* 29(1): 63-90; Basedau, M. and T. Richter (2014). "Why do some oil exporters experience civil war but others do not?: investigating the conditional effects of oil." *European Political Science Review* 6(4): 549-574.

10 Basedau, M. and J. Lay (2009). "Resource curse or rentier peace? The ambiguous effects of oil wealth and oil dependence on violent conflict." *Journal of Peace Research* 46(6): 757-776.

when citizens feel they are not getting their fair share.<sup>11</sup> Beyond physically looting and re-selling oil, rebels are involved in extorting oil facilities, demanding payments to allow them to continue their operations.<sup>12</sup>

But why do rebels go to the trouble of erecting parallel NOCs and the adjacent architecture? To understand NOCs, it is necessary to consider the interaction between oil's physio-chemical composition and its symbolic value. The value chain of oil encompasses physical and chemical processes that affect oil materially (i.e. exploration, transportation and refinement) and symbolic transformations (i.e. financing, marketing and distribution) that deal with legal ownership and assigning monetary value.<sup>13</sup> NOCs are critical in both the physical and symbolic transformations. As agents of sovereign states, NOCs convey ownership at purchase, often to international purchasers. The monetary proceeds received from international sources on behalf of the state are retained for NOC operations or passed to the treasury or central bank. NOCs' certitude of title and monopoly standing facilitates buying and selling and serves as the bedrock of the globalised petroleum market.

Periods of state weakness, civil war and revolution alter the physical disposition of resources and complicate the ownership claims surrounding oil.<sup>14</sup> Rebels contest the old regime's claim to act on behalf of the people, including its right to dispose of oil and other resources in the national patrimony. This situation of

'revolutionary sovereignty' confounds other states, which must decide whether and how to engage with rebel actors that proclaim themselves the rightful bearers of sovereignty.<sup>15</sup> International investors and purchasers face similar uncertainty and confusion about which party has authority to transact on behalf of the state. The result is a market for state-owned goods that is increasingly fragmented, opaque and inefficient. Illegal oil, like a stolen car, is physically indistinguishable from oil which is obtained legally. However, without the guarantee of ownership, buyers and sellers cannot rely on legal enforceability to conduct their transactions. Instead, they rely on reputation and interpersonal trust. Sophisticated international oil companies, accustomed to operating in a transparent market and relying on legal certainties of title and ownership, are often wary of these kinds of dealings. They risk fines, seizures of assets, embargos from the international community and boycotts from national governments as punishment for dealing in contraband. Lenders are hesitant to finance transactions that might involve contested property as collateral. When the larger more sophisticated buyers hold back, smaller buyers come forward. Their behaviour is comparable in many ways to a chop shop that fences stolen goods. They can demand a price discount to compensate for the assumed ownership risk. Contraband sellers consequently incur substantial opportunity cost in each transaction and never realise true market prices.<sup>16</sup> The scale of losses due to title risk are difficult to ascertain.<sup>17</sup> Indicative, but still anecdotal, evidence comes from Islamic State (IS), which dominated smuggling networks, refineries and a handful of oil wells along the Turkey-Syria-Iraq borders. IS famously used oil revenue to finance its army, subsidise food and basic services, and pay salaries to civil servants and administrators. However, while oil helped IS become

11 Lujala, P. (2010). "The spoils of nature: Armed civil conflict and rebel access to natural resources." *Journal of Peace Research* 47(1): 15-28; Watts, M. (2001). "Petro-violence: community, extraction, and political ecology of a mythic commodity" in N. Peluso and M. Watts, eds., *Violent environments* (Cornell University Press), 189-212; Le Billon, P. and A. Cervantes (2009). "Oil prices, scarcity, and geographies of war." *Annals of the Association of American Geographers* 99(5): 836-844.

12 Ocakli, F. and M. Scotch (2017). "Oil-Fueled Insurgencies: Lootable Wealth and Political Order in Syria, Iraq, and Nigeria." *Journal of Global Security Studies* 2(1): 74-88.

13 Tordo, S. (2011). *National Oil Companies and Value Creation*, The World Bank.

14 Engwicht, N. (2017). "We Are the Genuine People": Legality and Legitimacy in the Sierra Leonean Diamond Market, in J. Beckert and M. Dewey, eds., *The Architecture of Illegal Markets*. Oxford University Press.

15 Lawson, G. (2019). *Anatomies of Revolution*, Cambridge University Press.

16 Beckert, J. and F. Wehinger (2012). "In the shadow: Illegal markets and economic sociology." *Socio-Economic Review* 11(1): 5-30.

17 Bohn, H. and R. T. Deacon (2000). "Ownership risk, investment, and the use of natural resources." *American Economic Review* 90(3): 526-549; van der Ploeg, F. (2018). "Political economy of dynamic resource wars." *Journal of Environmental Economics and Management* 92: 765-782.



a wealthy militant group, it remained impecunious as a state-like entity. IS's oil operations were hampered by technical and commercial inefficiencies. The bulk of the oil revenue went to middle-men and brokers, not into IS coffers.<sup>18</sup> IS allegedly proffered smuggled Syrian oil at \$35 in 2014, a period when prices in New York and Dubai were closer to \$100. Similarly, IS-originated diesel reportedly sold at forty percent below the government-subsidised rate.<sup>19</sup>

Rebel NOCs seek to mitigate the effects of illegality. Through symbolic manoeuvring they provide a plausible legal imprimatur that confirms ownership and turns contraband into a legal commodity. This narrows the uncertainty premium and nudges the market back toward efficient dynamics. In Libya, for example, the rebel NOC based in the east reportedly offered oil at a \$5 per barrel discount compared to the Tripoli NOC—far more advantageous terms than what IS could command.<sup>20</sup> Rebel NOCs that cannot displace the incumbent ruler can still offer the promise of oil pending victory, so-called 'booty futures.'<sup>21</sup> "We are ready to act according to US policy if the US will protect us from the wolves," said Iraqi Kurdish Mulla Mustafa Barzani in the midst of the Iraqi civil war of 1973. "In the event of sufficient support we should be able to control the Kirkuk oilfields and confer exploitation rights on an American company."<sup>22</sup>

18 Hansen-Lewis, J. and J. N. Shapiro (2015). "Understanding the Daesh economy." *Perspectives on Terrorism* 9(4): 142-155; Do, Q.-T. et al. (2018). "Terrorism, geopolitics, and oil security: Using remote sensing to estimate oil production of the Islamic State." *Energy research & social science* 44: 411-418.

19 Giglio, M. (2014). "This is how ISIS smuggles oil," BuzzFeed, November 3, <https://www.buzzfeednews.com/article/mikegiglio/this-is-how-isis-smuggles-oil>; Pizzi, M. (2014), "Islamic State's bootleg petro-state may prove unsustainable" Al Jazeera, August 23, <http://america.aljazeera.com/articles/2014/8/23/islamic-state-oil.html>

20 UN Security Council Document S/2018/812, Panel of Experts on Libya, September 5, 2018, p. 36.

21 Ross, *The Oil Curse*, p. 174; Humphreys, M. (2005). "Natural resources, conflict, and conflict resolution: Uncovering the mechanisms." *Journal of Conflict Resolution* 49(4): 508-537; Walsh, J. I., et al. (2018). "Funding rebellion: The Rebel Contraband Dataset." *Journal of Peace Research* 55(5): 699-707.

22 Cited in McDowall, D. (2003). *Modern History of the Kurds*, IB Tauris, p. 333.

The contestation for physical control in civil wars interlinks with the struggle to supplant the state symbolically. Parliaments-in-exile and interim governments seek to substitute the incumbent regime in the domestic and international arena. Rebels also develop deeper institutions for governance, including courts, tax collection, subsidies and schools.<sup>23</sup> Rebel NOCs are part of this broad thrust of rebel governance and diplomacy. They employ workers and handle domestic fuel distribution, a key component of the national economy. However, they also seek to engage with international financial institutions, including private oil companies and banks, and international institutions such as the World Bank and the IMF. Gaining access to these overseas institutions, even provisionally, can be critical to the viability of rebellion. These parallel institutions warn foreign investors against continuing to do business with the 'official' state-affiliated NOC. If the incumbent regime falls, the new regime could nullify previous agreements because they were not conducted with the proper authorities and constituted theft from the people. In 1978, for example, Ayatollah Khomeini warned foreign governments that supported the Shah that once the Islamic government gained power it would abrogate bilateral treaties and deny them access to Iranian oil. Indeed, one of the first acts of Khomeini's revolutionary government was to nullify existing oil contracts, which it claimed were predatory and corrupt.<sup>24</sup> Unlike the anonymous smuggler, rebel NOCs operate through explicit declarations that set public expectations of behaviour. Their tools for legitimisation are symbolic and legal: legislative acts,

23 Mampilly, Z. C. (2012). *Rebel rulers: Insurgent governance and civilian life during war*, Cornell University Press; Arjona, A., et al. (2015). *Rebel Governance in Civil War*, Cambridge University Press; Coggins, B. L. (2015). "Rebel diplomacy: Theorizing violent non-state actors' strategic use of talk." In A. Arjona et al., eds. *Rebel Governance in Civil War*, 98-118; Huang, R. (2016). "Rebel diplomacy in civil war." *International Security* 40(4): 89-126. For application to the Middle East, see Rangwala, G. (2015). "The creation of governments-in-waiting: The Arab uprisings and legitimacy in the international system." *Geoforum* 66: 215-223; Ahram, A. I. (2017). "Territory, Sovereignty, and New Statehood in the Middle East and North Africa." *The Middle East Journal* 71(3): 345-362.

24 Nikazmerad, N. M. (1980). "A chronological survey of the Iranian Revolution." *Iranian Studies* 13(1-4): 327-368.



articles of incorporation, legal opinions, tenders, bank accounts and wire transfers.

## The Battle for the Libyan National Oil Company

Competition for control over oil has been a major theme in Libya's repeated rounds of civil war since the 2011 uprising. Libya has long been a kind of quintessential rentier state. It has some of the largest oil and gas reserves in Africa. Oil rents account for approximately a third of the country's GDP and nearly all of its export revenue. The government had long maintained subsidies on consumer oil products and used oil revenue to fund development projects.<sup>25</sup> Nevertheless, the 2011 uprising began in the oil-rich eastern region of Cyrenaica. Early on, there were efforts to block or deny adversaries access to oil. A sheikh of the Zuwayah tribe threatened to sabotage oil pipelines if security forces continued to attack protesters. Regime officials also warned of dire consequences if oil was disrupted.

The contest to gain physical control over oil was intertwined with an effort to assert legal title, the right to dispose of oil and receive the proceeds from sales. Qaddafi tried to use oil sales to cement diplomatic relationships and support abroad, particularly with Britain, France and Italy. As the crisis intensified in 2011, Qaddafi continued to try to solicit foreign investment in the oil sector in the hope of gaining or maintaining allies abroad. At the same time, the Transitional National Council (TNC), the leading opposition organ that had formed in rebel-held Benghazi, lobbied for a freeze on Libya's oil sales and other assets. Libya's wealth, it proclaimed, should benefit its people not bolster the Qaddafi regime. The UN placed embargos and freezes on Libyan oil and other assets. France was the first government to grant the rebel TNC recognition in March 2011. Other countries, including the US, Qatar, Australia, Great Britain, Spain and Russia eventually followed suit, although many refused to cut ties with the incumbent

regime that remained in Tripoli.<sup>26</sup> The legal status of Libyan oil became increasingly murky. Leonardo Bellodi observed that Libya's oil inhabited a strange grey zone between licit and illegal, where "the Tripoli regime, legal owner of the resources, was subject to an international embargo, [but] any company that bought oil from the [TNC] was open to the risk of a suit brought by the incumbent national oil operator. This left many potential customers unwilling to run the risk of making deals with Benghazi [i.e. the TNC]."<sup>27</sup>

The situation on the ground was even more complicated. Despite its international recognition, the TNC lacked control over most of the country. Qaddafi loyalists remained entrenched in Sirte and Tripoli. Moreover, the local revolutionary committees that had sprung up in so-called liberated zones operated independently and offered the TNC only nominal allegiance. Many had direct bilateral ties with foreign sponsors, including Qatar, Turkey, the UAE and various European powers. This condition of ruptured sovereignty endured even after Qaddafi's capture and killing in October 2011, effectively ending the first civil war.

The TNC and its successor government, the General National Congress (GNC), struggled to maintain physical control over oil fields, pipelines, refineries and export terminals. With the Libyan security services in tatters, the government assigned former revolutionary militias paramilitary duties, such as in the Petroleum Facilities Guard (PFG). These forces operated more or less as free agents without effective oversight by central authorities. In July 2013, PFG commander Ibrahim Jadhraan, a former revolutionary fighter and criminal, seized the export hubs around Sidra. Many observers dismissed Jadhraan as merely another opportunistic thug who could siphon off oil wealth. Jadhraan, however, raised a new kind of political claim not just to the physicality of oil but to its ownership. He announced his support for the separatist movement that had emerged

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25 Vandewalle, D. (2018). *Libya Since Independence: Oil and State-Building*. Cornell University Press.

26 On the international politics surrounding the TNC, see Talmon, S. (2011). "De-Recognition of Colonel Qaddafi as Head of State of Libya" *International & Comparative Law Quarterly* 60(3): 759-767; Chivvis, C. S. (2013). *Toppling Qaddafi: Libya and the Limits of Liberal Intervention*, Cambridge University Press.

27 Bellodi, L. (2012). "Libya's Assets and the Question of Sovereignty." *Survival* 54(2): 39-45.

in Cyrenaica after the revolution. Many of the major tribal and political forces in eastern Libya had become increasingly alienated from the Tripoli government. In 2012 a group unilaterally declared the formation of a Cyrenaica regional legislature and governing authority. The separatists demanded a reversion to Libya's original 1951 constitution, which had granted broad autonomy to Cyrenaica, Tripolitania and the Fezzan as the original provinces constituting the Unified Kingdom of Libya. One of the key issues was oil wealth. Libya's original constitution of 1951 had granted Cyrenaica exclusive purview over its own oil, which consisted of the bulk of the country's natural resource wealth. However, Cyrenaica had half the population of Tripolitania and was less economically developed. In 1963, King Idris unilaterally promulgated a new constitution and placed oil revenue in the hands of the central government in Tripoli. The process of centralisation further accelerated under Qaddhafi.<sup>28</sup> In taking over the export terminals in 2013, Jadhran insisted that his actions were part of reclaiming Cyrenaica's rightful autonomy.<sup>29</sup> He announced the formation of the Cyrenaica Political Bureau (CPB) and a 20,000-man army comprised of his PFG units and tribal fighters.<sup>30</sup> The CPB solicited foreign oil tenders through its own oil company. CPB officials emphasised that they intended only to retain Cyrenaica's share of the revenue and set aside Tripolitania's and Fezzan's, the other two original Libyan provinces. Jadhran hired lobbyists to try to gain favour with the U.S. and Russia, offering assurances of access to cheap oil. Rumours swirled about shady

foreign buyers. Both the Libyan government and the international community warned that oil sold by the CPB would be regarded as contraband. However, the Libyan government alone could do nothing to stop Jadhran. Prime Minister Ali Zeidan spoke about taking the ports back by force but lacked the means to do so. His efforts to enlist eastern tribal leaders as mediators similarly failed. Libya lost billions in export revenue. Ultimately, it was the international community that ended the standoff in March 2014, when the US navy intercepted a tanker carrying 230,000 barrels of crude from Sidra. The tanker bore a North Korean flag but was allegedly Emirati-owned and Saudi-operated.<sup>31</sup> The U.N. Security Council unanimously passed a resolution banning the sale of Libyan oil outside government channels and authorising outside powers to seize suspected smugglers.<sup>32</sup> In June, Jadhran agreed to reopen the ports on condition that the arrest warrants were set aside, that the LCB agreed to pay back salaries to PFG fighters and that the government began the process of relocating the LNOC headquarters to the east.<sup>33</sup>

The interlinked physical and symbolic contest over oil intensified in the 2014 civil war period and with the deepening of Libya's east-west fissure. The 2014 election spurred a new set of infighting amongst various Libyan factions, each backed by foreign powers. The newly elected House of Representatives (HoR) was relocated to the east, with the parliament based in Tobruk and the government in Bayda. The GNC holdover remained in Tripoli. Both claimed to be Libya's sole legitimate government and asserted authority over

28 Ahram, A. I. (2019). *Break All the Borders: Separatism and the Reshaping of the Middle East*, Oxford University Press, pp. 77-81.

29 Loyd, A. (2013). "Rebel choking Libya's oil exports steps up his bid for power; Libya," *The Times* (London), October 30, <http://www.thetimes.co.uk/article/rebel-choking-libyas-oil-exports-steps-up-his-bid-for-power-rl2g53db38z>; Crisp, W. (2013). "Tripoli has only one option—it must free us, says Jadhran," *Petroleum Economist*, October 8, <http://www.petroleum-economist.com/articles/politics-economics/africa/2013/tripoli-has-only-one-option-it-must-free-us-says-jadhran>

30 McGregor, A. (2013) "Autonomy Campaign in Cyrenaica Brings Libya's Oil Industry to a Halt," *Jamestown Foundation Terrorism Monitor*, 9:20, October, <https://jamestown.org/program/autonomy-campaign-in-cyrenaica-brings-libyas-oil-industry-to-a-halt/>

31 Ahram, *Break All the Borders*, pp. 83-88.

32 Mahmoud, K. (2014) Tarablus tu'talib rasmi al-mujtama' ad-dawli bimusa'adatiha fi tamin am al-bilad [Security council officially requests the international community to intervene to secure national security] *Ash-sharq al-Awsat*, March 22, 2014, <http://aawsat.com/home/article/61051>; Mahmoud, K. (2014) "Majlis al-Amn yufardh 'aqubat ala muharbi an-naft al-libi [Security Council imposes sanctions on Libyan oil smugglers]," *Ash-sharq al-Awsat*, March 21, 2014, <http://aawsat.com/home/article/60186>

33 International Crisis Group (2015) "The Prize: Fighting for Libya's Energy Wealth," *International Crisis Group Report No. 163*, December 3, 10-11, <https://www.crisisgroup.org/middle-east-north-africa/north-africa/libya/prize-fighting-libya-s-energy-wealth> (Accessed March 10, 2017);

the national oil company and central bank. Turkey and Qatar continued to support the holdover group, which included many figures associated with the Libyan Muslim Brotherhood groups and figures from the western mercantile city of Misrata. The situation became even more complicated with the rise of General Khalifa Haftar and his alliance with the HoR. Haftar denounced the Tripoli government for harbouring Islamist radicals and fostering lawlessness. Haftar sought to march on Tripoli and establish a strong centralised unitary Libyan state. Haftar's self-styled Libyan National Army (LNA) and allied militias took control over much of eastern Libya, including the largest oil installations. Russia, Saudi Arabia, the UAE and Egypt supported Haftar, mostly to counter Qatar and Turkey. The GNA, meanwhile, remained in power in Tripoli, Misrata and the west.

The US and most European powers, together with the UN, initially recognised the Tobruk-based HoR as Libya's legitimate government, but the LNOC and LCB headquarters remained in Tripoli under Mustapha Sanallah and Sadeq el-Kabir respectively. Both were experienced technocrats and were well-regarded in international circles. The World Bank, the IMF and other international institutions refused to treat with the HoR's nominated replacement. The result was a fissure in both institutions and the creation of parallel institutions in the east and west. The HoR government insisted that its appointees, both based in Benghazi, were the legitimate administrators of Libya's national oil company and central bank. In late 2015 the UN negotiated the installation of the Government of National Accord (GNA) in Tripoli in the hope of reconciling the eastern and western factions. Some of the HoR parliamentarians joined the GNA or stood down. However, Haftar continued to back the HoR, posing a direct challenge to the competency and the legitimacy of the now internationally-recognised government in Tripoli. The UN maintained that the GNA in Tripoli was Libya's official government. Few outside actors would openly break with this consensus. Some, however, came to regard Haftar's 'strongman' style as preferable to the ineptitude of the GNA. The Macron administration in France backed Haftar's efforts to extend control over southern Libya, including oil fields in the Fezzan, and France blocked British and

Italian efforts to censure him in the European Union.<sup>34</sup> The Trump administration in the US also signalled favourably to Haftar, despite continuing its formal diplomatic ties with Tripoli.

The eastern government pushed a more forthright claim of title over all of Libya's assets and authority over its key financial institutions. The eastern LNOC branch controlled some of the most important oil fields and terminals and repeatedly tried to sell oil to foreign customers. The eastern LCB set up foreign accounts to accept oil payments. In 2016, the eastern LNOC branch issued a directive on official stationary instructing oil sale payments to be submitted to a separate bank based in Amman through a unique SWIFT code. For the most part, however, international interventions stymied these efforts by insisting that the proceeds of all sales had to be routed to the Tripoli LCB accounts. Small-scale smuggling continued, but larger sales of Libyan oil through the eastern LNOC and eastern LCB were suppressed. The Tripoli LCB, tapping into funds accrued from oil sales, continued to provide liquidity, albeit on a limited scale, to banks operating in the east, and even paid the salaries of the LNA in the hope of holding Libya together. The IMF, the World Bank and the UN backed these efforts in the hope that this would create incentives for political reconciliation by assuring all the parties they would have access to accumulated oil wealth. The LNOC and the LCB working in concert were Libya's golden goose—too valuable for any faction to risk destroying.<sup>35</sup> However, Haftar and the eastern rebels continued to vie to gain legal authority to match their physical control on the ground. Since 2015, the eastern LCB has issued over 35 billion dinars in debt (\$25 billion USD) to finance public service operations and support commercial banks in the east. The sources of most of this money are likely to be Russia, the UAE, Saudi Arabia and Egypt, since most foreign countries refuse to treat with the eastern LCB. The eastern LCB has also

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34 Valori, G. (2020) "Khalifa Haftar's latest declarations," *Modern Diplomacy*, May 6, 2020, <https://moderndiplomacy.eu/2020/05/06/khalifa-haftars-latest-declarations/>

35 "Libyan oil chief warns renewed fighting threatens production," *Financial Times*, April 11, 2019 <https://www.ft.com/content/17e9ba82-5b94-11e9-9dde-7aed-ca0a081a;>

contracted with a Russian printing company to issue around 9.7 billion dinars worth of banknotes. The Tripoli government, and much of the international community, regards this as illegal and the Russian-manufactured dinars as counterfeit.<sup>36</sup> The Tripoli LCB further refused to honour the eastern LCB's debts. Without assured access to oil revenue, the eastern LCB began to draw down its reserves.<sup>37</sup>

In June 2018, LNA forces seized oil facilities around the Gulf of Sirtre from Jadhra's PFG, which had reconstituted in alliance with the GNA. The LNA immediately announced the transfer of control over the oil facilities to the Benghazi branch of the LNOC. This Benghazi LNOC issued a general memorandum on LNOC letterhead announcing that it was now the headquarters and sole representative of the Libyan national oil company. The letter dutifully cited Libyan law, including the 2013 law relocating the LNOC headquarters to Benghazi and a more recent HoR law confirming the relocation. It also cited UN resolutions calling for sanctions against criminals and others involved in "illicit" exploitation of Libyan crude. The Benghazi LNOC designated itself as "the sole owner of the titles related to all hydrocarbonates ... entitled to sell all crude oil, petroleum products and petrochemicals under Libyan Law 10 issued in 1979."<sup>38</sup> Again, the Tripoli government could only resort to legal, not military, means to defend itself. The Tripoli-based LNOC declared force majeure in affected fields, effectively annulling any property claims on the oil. Haftar backed down after a fortnight, but the incident underscored the impotence of the Libyan state in defending its most valuable assets.

The legal contests extended from the upstream domain of wholesale and exports to downstream

domestic consumables. The Libyan government had long provided Libyan citizens with deeply subsidised refined products. Retail petroleum consumption across Libya has been wracked by theft, fraud, extortion and smuggling. Many of the hundreds of filling stations that had been licensed by the LNOC to sell fuel since 2011 served as fronts to acquire subsidised gasoline for smuggling to neighbouring countries where the fuel retail prices were higher. Armed gangs seized control over LNOC-owned retail centres in the south and west. In 2019, the eastern HoR government announced the appointment of an alternative board of directors of the Brega Marketing Company, the LNOC's downstream affiliate. The alternative board accused the Tripoli LNOC of failing to provide adequate supplies of jet fuel and kerosene to residents of the east and insisted on its right to take over consumer distribution itself. The creation of a separate retail division answerable to the eastern government provided an additional legal and political foothold from which to dispose of Libyan assets with the imprimatur of legality.<sup>39</sup> This would not only garner greater revenue than outright smuggling but also help further substantiate the eastern government as the real Libyan state.

Haftar's offensive in late 2019 and early 2020 marked a dramatic turn in the competition for oil—a switch from efforts to own oil to much simpler extortion and denial. Many expected that some GNA-aligned militias would defect as Haftar inevitably moved on Tripoli. Haftar seemed confident of support not only from his traditional backers, Russia and the UAE, but of new-found support from France and the US. In fact, the Haftar offensive met unexpectedly stiff resistance. Turkey dispatched an expeditionary force to help bolster Tripoli's defences and GNA-aligned forces even managed a counterattack. With momentum stalled, Haftar switched strategy from trying to sell off Libyan oil to one of cutting off the flow, in effect extorting the

36 Wintour, P. (2016) "Battle of the banknotes as rival currencies are set to be issued in Libya," *Guardian*, May 20, <https://www.theguardian.com/world/2016/may/20/battle-of-the-banknotes-rival-currencies-libya>

37 On the banking sector, see Harchaoui, J. (2018) "Libya's Monetary Crisis," *Brookings Institution Lawfare*, January 10, <https://www.lawfareblog.com/libyas-monetary-crisis>.

38 UN Security Council Document S/2018/812, Panel of Experts on Libya, September 5, 2018, p. 37, Annex 41, <https://www.securitycouncilreport.org/un-documents/document/s2018812.php>

39 "Five Western countries, Turkey and UAE back Libyan state oil firm," *Reuters*, September 22, 2019, <https://www.reuters.com/article/us-libya-oil/five-western-countries-turkey-and-uae-back-libyan-state-oil-firm-idUSKBN1W70VP>; Sertin, C. (2019) "Partitioning oil sector will put Libya's integrity "at grave risk": NOC chairman," *Oil & Gas*, September 22, <https://www.oilandgasmiddleeast.com/drilling-production/35097-partitioning-oil-sector-will-put-libyas-integrity-at-grave-risk-noc-chairman>



government. Haftar's forces closed major pipelines and shut down export terminals in an attempt to starve the Tripoli government of funds. The results, coming amidst a dramatic downturn in global oil prices and the global coronavirus pandemic, were economically catastrophic. Even the US, which had tilted toward Haftar, demanded that the LNOC remain intact and urged Haftar to cease attacks on oil facilities.<sup>40</sup> The golden goose, it seemed, had become more vulnerable.

## Conclusion: Rebel Oil in Libya and Beyond

Most of the discussion about oil in MENA's civil wars focuses on its physical possession. The handling of oil by rebels is likened to looting, pillaging, ransom and other kinds of violent expropriation. However, these extraordinary modes of conflict are only a part of larger financial flows in wartime.<sup>41</sup> Rebel governance, just like that of states, requires more regular, even banal, fiscal modes—tax collection, revenue outlays, issuing and collecting debts. These cannot rely simply on seizure and coercion; they require assertions of authority and legality. Rebel NOCs serve as an interface converting intermittent and often meagre smuggling revenues into something more substantial, persistent and legal.

Rebels across MENA have moved from physical seizure to legal claims to oil, given its economic and political valence, but the manner of this assertion has varied. Instead of trying to take over the mantle of the NOCs and state ownership, as in Libya, some rebel forces have claimed the authority to break up NOC functions, effectively privatising what was once sacrosanct state ownership. The autonomous Kurdistan Regional Government (KRG) in Iraq has sparred for decades with the central government over the right to sell oil from the northern fields. The KRG repeatedly tried to solicit foreign investors in the

northern fields without consulting the Iraqi National Oil Company (INOC) or the Iraqi central bank. This led to a series of constitutional, political and even military crises. In 2014, in the midst of the IS onslaught in Iraq and Syria, KRG forces unilaterally seized the oil-rich city of Kirkuk, which Kurds had long claimed as their historical capital. The KRG renewed its push for secession, signalling that it would offer favourable terms on oil sales in return for diplomatic support. As in Libya, however, the international community rebuffed the KRG's attempt to sell oil independently. Iraqi security forces, with support from Iran and Turkey, retook Kirkuk and its oil fields in autumn 2017. However, the KRG's efforts differed from those of the eastern government in some very important ways. It sought to attract international investors by offering them more advantageous terms, not just on price but also ownership. In contrast to the INOC's production-sharing agreements, the KRG offered foreign investors outright ownership stakes in the fields—a move which federal officials in Baghdad decried as illegal. Moreover, the KRG did not set up its own national oil company to parallel or challenge the INOC. Instead, oil sales were handled directly within the KRG ministry of finance and the proceeds were funnelled into an opaque set of accounts. This kind of 'insider' privatisation allowed senior Kurdish political figures to access oil revenue without working through state channels.<sup>42</sup>

Yemen, a much more meagre oil producer, provides another example of rebels using privatisation to undermine the NOC monopoly over ownership. Importing and distributing subsidised consumables have long been among the key functions of the state-owned Yemen Petroleum Company (YPC). In June 2015, the Houthi-dominated government in the besieged northern areas of Yemen abolished the YPC's import monopoly and began auctioning off import licenses for refined consumer products. As with the KRG, the effect was a kind of insider privatisation of core NOC functions. The licensees chosen were closely tied to the Houthi leadership. Iran supplied these

40 "The NOC and its subsidiaries must remain apolitical, US Embassy says," *Libya Observer*, May 7, 2020, <https://www.libya-observer.ly/inbrief/noc-and-its-subsidiaries-must-remain-apolitical-us-embassy-says>

41 Wennmann, A. (2005). "Resourcing the recurrence of intra-state conflict: Parallel economies and their implications for peacebuilding." *Security Dialogue* 36(4): 479-494.

42 Voller, Y. (2013). Kurdish oil politics in Iraq: Contested sovereignty and unilateralism. *Middle East Policy*, 20(1), 68-82; Tinti, A. (2019). Contested geographies of Kurdistan. Oil and Kurdish self-determination in Iraq, Ph.D. Diss., Sant'Anna School of Advanced Studies, Pisa.



Houthi-linked licensees with refined products, skirting the Saudi-led blockade of the north. The licensees could then divert Iranian-imported fuel back into the black market.<sup>43</sup>

How will rebel NOCs and their adjacent legal infrastructure affect MENA's postwar economic governance? Incumbent states and their backers in the international community treat rebel ownership claims as thin contrivances, dressed up fraud and theft of state property. Accordingly, whatever rebels do with oil is illegitimate, inadmissible and ultimately criminal. This does not mean, however, that their impact will be ephemeral. Actors that states deem criminal one day are often inducted as partners and collaborators the next. States make criminals, but criminals also make states.<sup>44</sup> Conflict resolution initiatives across MENA have struggled to find negotiated solutions that grant one-time belligerents access to political power and material resources. As ever, the oil sector remains hotly contested, with rebels continuing to hold significant fields, pipelines, export terminals, refineries and other physical installations. Incumbent states in Iraq, Libya and Yemen are unlikely to roll back these gains without massive international intervention. This makes the rebels' demands for legal accommodation all the more important. Even in Syria, where state military supremacy appears nearest at hand, the Assad regime has struggled to regain the oil fields in the PYD-held northeast. It has also offered ownership stakes to Russian and Iranian forces that have been instrumental

in reconquering and defending oil infrastructure.<sup>45</sup> Wars often serve as critical junctures and catalysts for innovations in modes of production, ownership and redistribution. MENA's decade of war, then, is not just an occasion for political change but also for economic restructuring.<sup>46</sup> Illicit wartime arrangements may well prefigure the legal and political innovations that are crucial for future peace.

The international community, which is interested in promoting stability and peace in the region, has more leverage over belligerents' economic choices than directly over the course of fighting. Decisions about whether to recognise ownership can determine the ease or difficulty with which belligerent actors access the global financial system and how they convert war booty into normal licit financial tools. These incentives can have significant impacts on the way belligerents behave in war and peace. Now is the time for the international community to consider the shape of post-conflict political economies in MENA.<sup>47</sup> None of the countries affected by the wars of the 2010s—Syria, Iraq, Libya or Yemen—were paragons of economic dynamism or inclusion. Indeed, poor economic performance, in terms of both growth and equity, were among the underlying causes of conflict in the first place. NOCs are deeply implicated in this record of underachievement. Shifting the terms of ownership and use of oil and other natural resources could provide a basis for economic reform that might make peace more sustainable and stable.

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43 Letter dated 26 January 2018 from the Panel of Experts on Yemen mandated by Security Council resolution 2342 (2017) addressed to the President of the Security Council, Section V.A, <https://reliefweb.int/sites/reliefweb.int/files/resources/N1800513.pdf>; Letter dated 25 January 2019 from the Panel of Experts on Yemen addressed to the President of the Security Council, Section V.5, <https://digitallibrary.un.org/record/I664359>

44 Koivu, K. L. (2018). "Illicit Partners and Political Development: How Organized Crime Made the State." *Studies in Comparative International Development* 53(1): 47-66; Andreas, P. (2013). *Smuggler nation: how illicit trade made America*, Oxford University Press.

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45 "Looming Oil Crisis in Syria Catalyzed by International Sanctions," *Enab Baladi*, July 26, 2019,

<https://english.enabbaladi.net/archives/2019/07/looming-oil-crisis-in-syria-catalyzed-by-international-sanctions/>; Katona, V. (2018) "Russia Is Taking Over Syria's Oil And Gas" *OilPrice*, February 14, <https://oilprice.com/Energy/Energy-General/Russia-Is-Taking-Over-Syrias-Oil-And-Gas.html>

46 Heydemann, S. (2000). *War, institutions, and social change in the Middle East*, University of California Press; Lynch, M. (2018), *The Politics of Post Conflict Reconstruction*, September, [https://pomeps.org/wp-content/uploads/2019/07/POMEPS\\_Studies\\_30.pdf](https://pomeps.org/wp-content/uploads/2019/07/POMEPS_Studies_30.pdf)

47 Wennmann, A. (2010). *The Political Economy of Peacemaking*, Routledge.

# Conflicts in the MENA Region – What Role Do National and Imported Water Shortages Play?

Karen Meijer, Susanne Schmeier, and Ruben Dahm

## Executive summary

This chapter explores the link between water-related risks and instability in the MENA region. It identifies the different pathways through which the agricultural sector mediates the impact of water scarcity on social tensions, through national developments as well as external trade relations. While recognizing that water-related conflicts don't occur in a political vacuum, the chapter presents empirical evidence showing that water depletion aggravates the risks of decline of the rural economy, which increases the risk of conflict. The chapter contributes to a more nuanced understanding of the complex links between climate, water and conflict.

**Keywords:** water shortage, virtual water, agricultural income, food security, violent conflict

## Introduction

Water is a reason for both conflict and cooperation. While water is important for human wellbeing, livelihoods and economies, climate change, growing populations and changing lifestyles can reduce access to and increase competition over water. The impact of this on societal instability and eventually on the risk of violent conflict will depend on numerous interdependent social, economic and political factors that jointly determine the extent to which water-related threats might turn into competition, instability, violence or conflict.

In the MENA region, the link between water-related

risks and instability is particularly prominent. Social unrest and conflict have been connected with water in the Syrian civil war, the 2011 Egyptian uprising, and the internal displacement over the past decade in Iraq. A drought hit Syria from 2008 onwards leading to failed harvests, related losses in livelihoods and migration to urban areas, where the unrest started that ultimately led to the civil war.<sup>1</sup> In the same period, Iraq experienced drought, water scarcity and poor water quality leading to internal displacement.<sup>2</sup> In 2018–2019, several thousands of families in southern Iraq were displaced due to water-related issues.<sup>3</sup> The 2011 Egyptian uprising was partly triggered by high bread prices in Egypt,<sup>4</sup> which were related to the impacts of failed yields due to droughts in Central Asia, China and parts of Russia that Egypt highly depends on for food imports.<sup>5</sup>

In each of these three cases – as well as in many others around the world – reduced agricultural production plays a key role as a threat-multiplying factor. This is what this paper aims to investigate. Agriculture – be it for subsistence or as a source of income – together with related food security is an important factor in the complex pathway between water-related threat and instability and conflict.

Agriculture is the largest user of freshwater worldwide.

- 1 Gleick, P. H., 'The Syrian Conflict and the Role of Water,' in *The World's Water*, (Springer, 2014), pp. 147-51; Kelley, C. P. and others, (2015) 'Climate Change in the Fertile Crescent and Implications of the Recent Syrian Drought,' *Proceedings of the national Academy of sciences*, 112; Werrell, C. E., Femia, F. and Sternberg, T., (2015) 'Did We See It Coming?: State Fragility, Climate Vulnerability, and the Uprisings in Syria and Egypt,' *SAIS review of international affairs*, 35.; Jägerskog, A., (2016) 'Don't Blame the Drought! - the Dangers of Oversimplifying the Case of Syria,' in *Stockholm Waterfront*, Stockholm: Stockholm International Water Institute, pp. 12-13.
- 2 Sadoff, C. W., Borgomeo, E. and De Waal, D., (2017) *Turbulent Waters: Pursuing Water Security in Fragile Contexts*, (The World Bank).
- 3 IOM (International Organisation for Migration), (2019) 'Assessing Water Shortage-Induced Displacement in Missan, Muthanna, Thi-Qar and Basra.'
- 4 Sternberg, T., (2012) 'Chinese Drought, Bread and the Arab Spring,' *Applied Geography*, 34.
- 5 Ibid.

Withdrawals for agriculture account for 70% of global freshwater use on average, with some countries especially in the MENA region ranking significantly higher.<sup>6</sup> Agriculture also accounts for 25% of global employment, and for 60% of employment in low income countries.<sup>7</sup> Because of agriculture's importance in providing food, income and jobs, drought and water scarcity that affect the agricultural sector may have socio-economic implications that under specific social, institutional or political circumstances can lead to social unrest, migration, instability or conflict.

This has also been acknowledged by some of the research that investigates possible links between drought and conflict – although conclusive findings on whether and why water-related risks turn into conflict and violence in some places but not in others are still largely lacking.<sup>8</sup> These studies hypothesise that drought results in water shortage, failed harvests and resulting loss of livelihoods, high food prices and famine,<sup>9</sup> possibly leading to competition over (perceived) scarce water resources, conflict and violence. Most studies, however, have solely investigated drought and conflict in the same, or a nearby, spatial unit. These spatial units are dominantly clustered at the

country-level<sup>10</sup> or the first-order administrative level.<sup>11</sup> These studies implement these spatial units either in large-N statistical regressions and lack understanding of the pathways from drought to conflict and the different intervening factors along them. Other studies investigate impacts of droughts as single case studies<sup>12</sup> lacking generalisability and comparability.

In most of these studies, the role of the agricultural sector and the importance of food security remain underrepresented, missing their role as intervening factors in the link between water-related risks and instability, conflict and violence. However, by considering the different pathways through which the impacts of drought and water scarcity on the agricultural sector can affect societies, an intermediate approach can be found that offers two benefits. First, it provides additional insights into a key intervening factor that links water-related threats to conflict. And second, it includes pathway factors while still being easily applied to large sets of countries, thus addressing some of the methodological challenges the aforementioned studies face.

In this chapter, we do this by identifying three main factors that vary across countries and that could determine pathways from drought to conflict. First, there is variation in the extent to which a country's vulnerability to water insecurity impacts specific

6 WWAP (World Water Assessment Programme), (2003) *Water for People, Water for Life: The United Nations World Water Development Report: Executive Summary*, (Unesco Pub.).

7 Data.worldbank.org.

8 Peluso, N. L. and Watts, M., 'Violent Environments,' in *Violent Environments*, ed. by Nancy Lee; Watts Peluso, Michael (Ithaca/London: Cornell University Press, 2001), pp. 3-38.

9 Burke, M. B. and others, (2009) 'Warming Increases the Risk of Civil War in Africa,' *Proceedings of the national Academy of sciences*, 106; Hendrix, C. S. and Glaser, S. M., (2007) 'Trends and Triggers: Climate, Climate Change and Civil Conflict in Sub-Saharan Africa,' *Political geography*, 26; Theisen, O. M., Holtermann, H. and Buhaug, H., (2012) 'Climate Wars? Assessing the Claim That Drought Breeds Conflict,' *International Security*, 36.

10 Koubi, V. and others, (2012) 'Climate Variability, Economic Growth, and Civil Conflict,' *Journal of Peace Research*, 49; Landis, S. T., (2014) 'Temperature Seasonality and Violent Conflict: The Inconsistencies of a Warming Planet,' *Journal of Peace Research*, 51; Jun, T., (2017) 'Temperature, Maize Yield, and Civil Conflicts in Sub-Saharan Africa,' *Climatic Change*, 142.

11 Nordkvelle, J., Rustad, S. A. and Salmivalli, M. J. C. C., (2017) 'Identifying the Effect of Climate Variability on Communal Conflict through Randomization,' 141; Fjelde, H. and von Uexkull, N., (2012) 'Climate Triggers: Rainfall Anomalies, Vulnerability and Communal Conflict in Sub-Saharan Africa,' *Political Geography*, 31; Detges, A., (2016) 'Local Conditions of Drought-Related Violence in Sub-Saharan Africa: The Role of Road and Water Infrastructures,' *Journal of Peace Research*, 53.

12 Schilling, J. and others, (2012) 'Raiding Pastoral Livelihoods: Motives and Effects of Violent Conflict in North-Western Kenya,' 2; Selby, J. and Hoffmann, C., (2014) 'Beyond Scarcity: Rethinking Water, Climate Change and Conflict in the Sudans,' *Global Environmental Change*, 29.

economic sectors and water uses, including for food production. National (staple) food security depends on national production – directly dependent on water availability – or on food imports or the combination of the two. For the latter, local drought may be less important in the causal pathway where a drought causes food insecurity and livelihood decline resulting in increased risk of conflict than a drought in the sourcing areas. This water used for crop production, which is ‘virtually’ imported with the crops, has been termed ‘virtual water’<sup>13</sup> and further developed into the water footprints of various commodities<sup>14</sup> and needs to be taken into consideration when investigating the causal pathway between water insecurity and conflict that transverses food security as a key determining factor.

Second, the importance of agricultural production for a country’s economy varies. In some countries, agriculture forms an important share of the Gross Domestic Product (GDP), which is a commonly used measure of the size of the economy. In others, it is mainly important as a source of livelihood and income generation for the rural population. In others again, it is particularly relevant for job creation and employment, even if the share in the GDP overall remains low. And yet in others, the agricultural sector may be large or small in all these dimensions.<sup>15</sup> Depending on these specific features, societies and countries will be more or less vulnerable to negative impacts of droughts on the agricultural sector, potentially leading to different consequences in terms of instability, conflict and violence.

Third, there are variations in the extent to which

countries can temporarily deal with water shortage through, for example, large water storage, food stocks or institutional and financial means. These are aspects pertaining to a country’s governance effectiveness. Governance effectiveness is therefore not only a key factor determining the overall link between water and conflict<sup>16</sup> but also a crucial element on the specific pathway between water insecurity, agriculture and conflict.

Our chapter brings these factors together in the commonly used risk model<sup>17</sup> as represented in Figure 1. We assume that a risk results from the combination of a *hazard* (drought), *exposure* to this hazard (depending on import dependence and the importance of agriculture for employment and the economy) and *vulnerability* (the lack of capacity to cope with exposure to the hazard). Exposure to drought, either at home or abroad, can result in loss of jobs, lower food availability or higher food prices and therefore reduced food security. The distribution of these impacts and the perception that this distribution is unequal can intensify existing grievances and mobilise violence.<sup>18</sup> These grievances and violence can focus on other societal groups or be directed towards the state. The latter can be the case when state policies are considered to have contributed to low resource availability or when the state demonstrates little capacity to act and meet public demands. An effective government may be able to prevent exposure to drought resulting in societal instability, for example by developing food stocks, providing emergency food supplies, increasing

13 Allan, J., (1998) ‘Virtual Water: A Strategic Resource Global Solutions to Regional Deficits. *Groundwater* 36 (4): 545-546.’

14 Chapagain, A. K. and Hoekstra, A. Y., (2004) ‘Water Footprints of Nations,’ in *Value of Water Research Report Series No. 16*, Delft: UNESCO-IHE Institute for Water Education, p. 80; Mekonnen, M. and Hoekstra, A. Y., (2011) ‘National Water Footprint Accounts: The Green, Blue and Grey Water Footprint of Production and Consumption,’ in *Value of Water Research Report Series No. 50*, Delft: UNESCO-IHE Institute for Water Education.

15 WWAP (United Nations World Water Assessment Programme), (2016) ‘The United Nations World Water Development Report 2016: Water and Jobs,’ Paris: UNESCO.

16 Wolf, A., Yoffe, S. & Giordano M. (2003), *International Waters: Identifying Basins at Risk*, Water Policy, 5, 1, 29-60; Böhmelt, T., Bernauer, T., Buhaug, H., Gleditsch, N.I., Tribaldos, T. & Wischnath, G. (2013), Demand, supply, and restraint: Determinants of domestic water conflict and cooperation, *Global Environmental Change*, 29, 337-348.

17 IPCC (Intergovernmental Panel on Climate Change), (2012) *Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation: Special Report of the Intergovernmental Panel on Climate Change*, (Cambridge, UK and New York, NY, USA: Cambridge University Press).

18 United Nations and World Bank, (2018) *Pathways for Peace: Inclusive Approaches to Preventing Violent Conflict*, (World Bank); Nel, P. and Righarts, M., (2008) ‘Natural Disasters and the Risk of Violent Civil Conflict,’ *International Studies Quarterly*, 52.

job opportunities or through other forms of social security.

We suggest that, to understand the links between water, agriculture and conflict, a differentiation between nationally produced and imported staple foods is critical. This leads to a key distinction between internal and external water demand for staple food production. This paper therefore analyses the role of water in agricultural production and its relationship with conflict in 19 MENA countries based on the information available in global datasets. We demonstrate how variations in droughts, the role of water in agriculture and the capacity to deal with a lack of water and staple food vary among MENA countries in the period 1989-2014 and can help explain social unrest and conflict in these years.

## Methods

To explore whether conflicts coincide with periods of low water availability and whether the pathways from that water-related risk to conflict are determined by the agricultural sector and related food insecurity, we analysed variations over time for the four types of factors in our conceptual model: 1) drought hazard, 2) exposure through agricultural dependency, 3) vulnerability through lack of coping capacity, and 4) occurrence of violent conflict. As shown in Figure 2, these time series and country characteristics were generated or collected for 19 MENA countries: Algeria, Bahrain, Egypt, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Libya, Morocco, Oman, Palestine, Qatar, Saudi Arabia, Syria, Tunisia, the United Arab Emirates and Yemen. Data are not available for all indicators for all countries.

**Figure 1. Conceptual model of societal instability risks resulting from the combination of drought hazard, exposure through importance of the agricultural sector and vulnerability through lack of coping capacity**

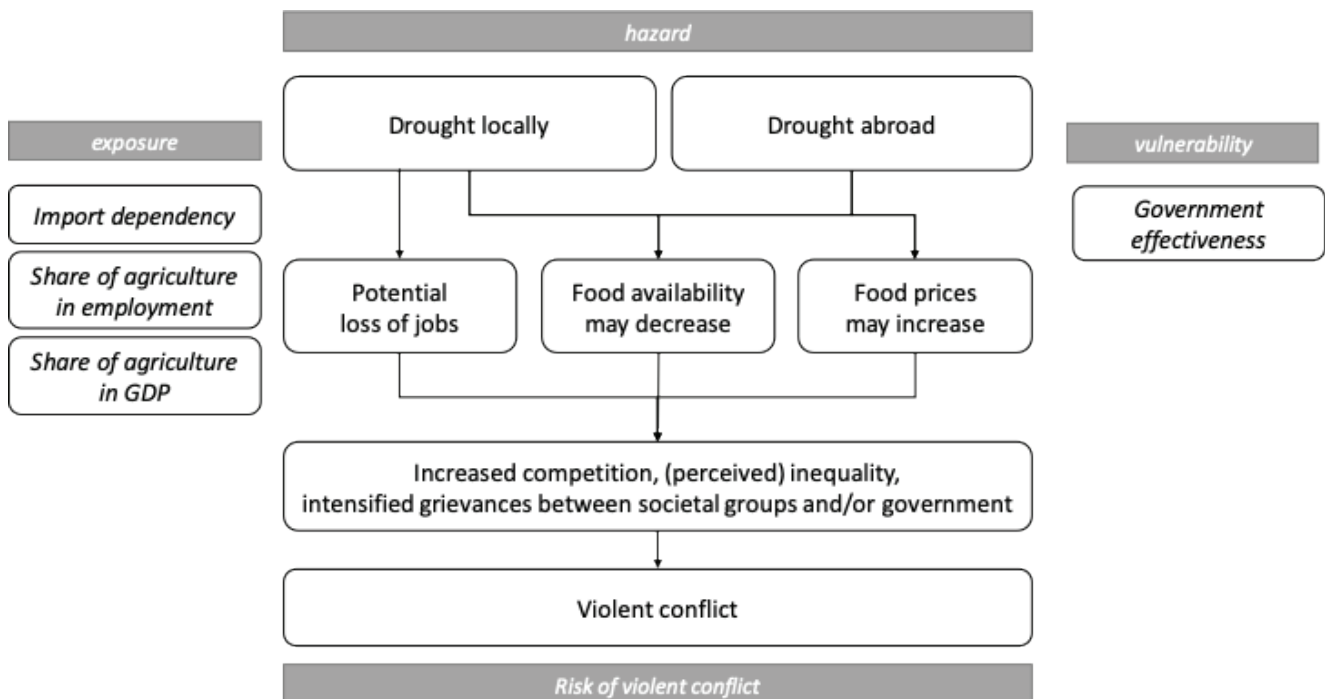
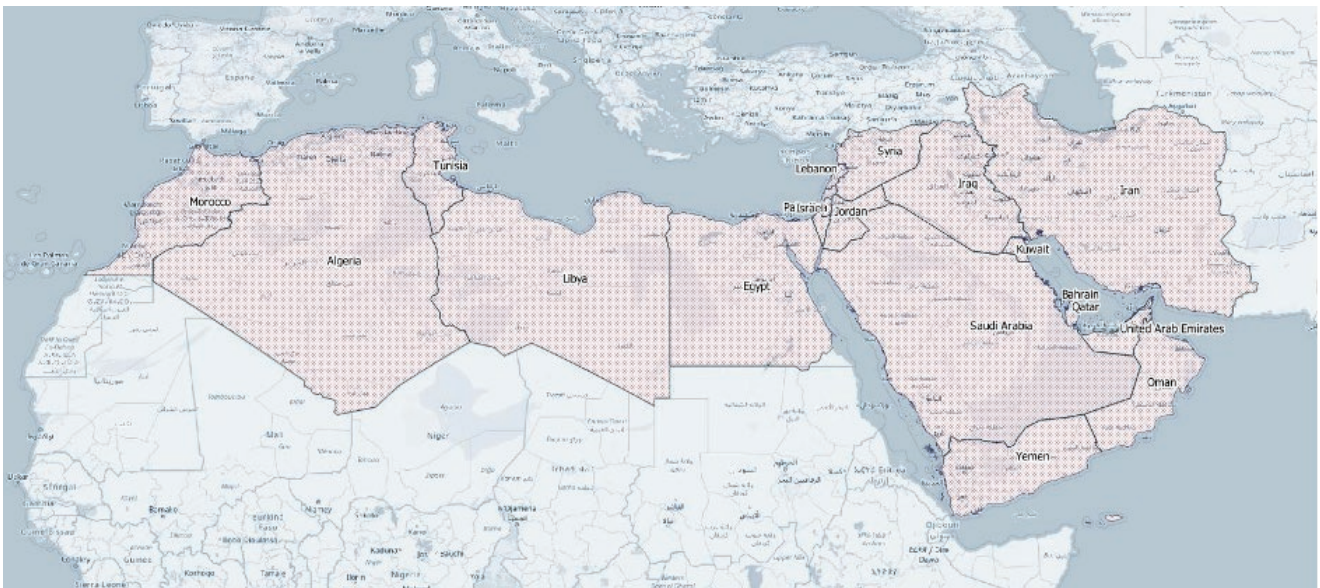




Figure 2. Map showing the MENA countries included in this study using [www.openstreetmap.org](http://www.openstreetmap.org) and [www.gadm.org](http://www.gadm.org)



## Definitions and data

### Drought

As a measure of drought, we use water shortage for crop evaporation. We assessed whether sufficient water was available for crops to evaporate as an indicator of water shortage for crop production as a fraction of actual evaporation over potential evaporation. The fraction of actual evaporation over potential evaporation is a measure of this crop water shortage: if sufficient water is available, crops will evaporate more water and actual evaporation will be close to potential evaporation. With low water availability, only little water can be evaporated and the fraction will be low. This is a measure that is valid for both rainfed and irrigated crops, unlike many other measures of water shortage, such as the withdrawal-to-availability ratio<sup>19</sup> or the

water exploitation index,<sup>20</sup> which only account for water abstractions and therefore ignore crop failure of rainfed crops. Because in many MENA countries these fractions are generally very low, we used the deviation from the average fraction of actual evaporation over potential evaporation as the indicator to get a better indication of wetter and drier years and to account for the specific characteristics of the region.

Whether crops will fail depends, however, also on the means countries have to supply water through water infrastructure like irrigation systems. Storage of water and irrigation are therefore taken into account in the computation of actual evaporation. The values were calculated using output from the global water balance model PCRGLOB-WB.<sup>21</sup>

<sup>19</sup> Alcamo, J., Döll, P., Henrichs, T., Kaspar, F., Lehner, B., Rösch, T. and Siebert, S., 2003. Global estimates of water withdrawals and availability under current and future “business-as-usual” conditions. *Hydrological Sciences Journal*, 48(3), pp.339-348.

<sup>20</sup> EEA (European Environment Agency), (2020) 'Use of Freshwater Resources in Europe,' [online] Available at: <https://www.eea.europa.eu/data-and-maps/indicators/use-of-freshwater-resources-3/assessment-4>. EEA.

<sup>21</sup> Sutanudjaja, E.H., Van Beek, R., Wanders, N., Wada, Y., Bosmans, J.H., Drost, N., Van Der Ent, R.J., De Graaf, I.E., Hoch, J.M., De Jong, K. and Karssenbergh, D., 2018. PCR-GLOBWB 2: a 5 arcmin global hydrological and water resources model. *Geoscientific Model Development*, 11(6), pp.2429-2453.

## Exposure

### Staple food import dependency

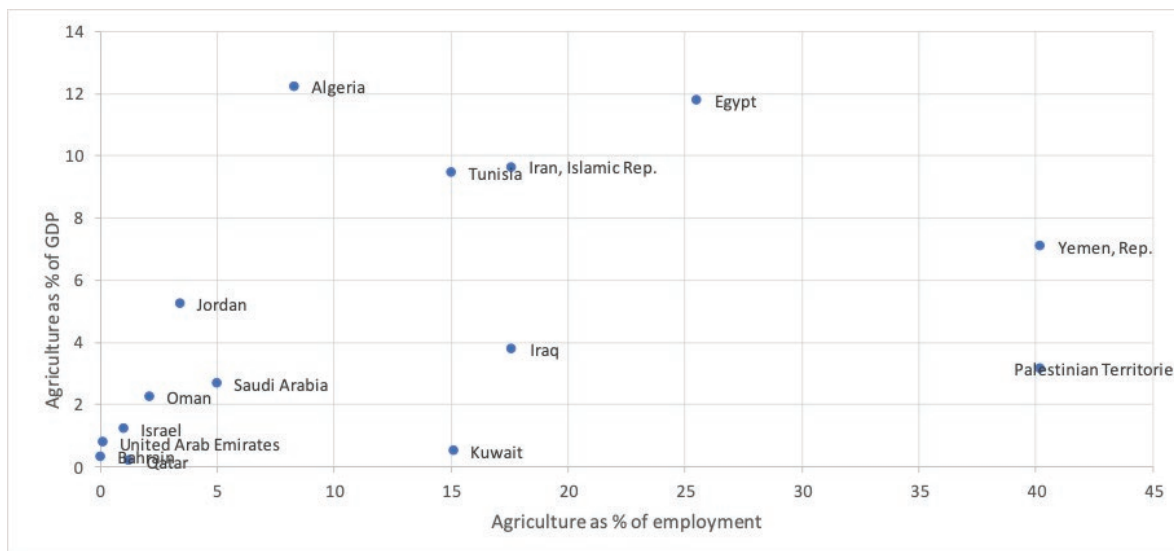
We assess import dependency by considering the ratio between imported and nationally produced staple foods, and also by considering the drought risks related to these imported and national products. This was done through the following steps: 1) identifying staple foods per country, 2) identifying the percentage production of each of these food crops (in calories) per country (national or imported), 3) calculating the import dependency ratio by dividing imported staple food calories by total consumed staple food calories as an indicator of exposure. These percentages range from 0, indicating no imports of staple foods, to above 100, meaning that imported staple food exceeds national consumption. In addition, we assessed the water shortage that was associated with this food production over time separately for imported and national production. This was done by weighting the actual over the potential evaporation fraction for a source country by the average fraction of total imported calories that is imported from that country.

Staple foods were derived from the Food Balance Sheet.<sup>22</sup> Information on trade volumes of crops and food products was taken from the Detailed Trade Matrix.<sup>23</sup> These numbers were derived for average values for the period 1989-2014. Information on calories per food product was derived from the National Nutrient Database of the USDA.<sup>24</sup>

### Share of agriculture in the economy and employment

National agricultural production can be important for a country's economy in several ways: to contribute to food security (included as part of import dependency); to provide jobs and income for rural households; and to support the wider economy, especially production chains and exports. Understanding the impact of agricultural drought therefore requires insights into the role of agriculture in the economy. We display data on the share of employment in agriculture (% of total employment, 2016 data) and the share of agriculture in the gross domestic product (GDP). Figure 3 shows both indicators combined. Countries that rank high on both the x- and the y-axis are particularly dependent on the agricultural sector for both economic production and for the employment of their population. The figure also shows that in countries where agriculture may not seem important for the overall economy it is important for the livelihoods of a large part of society.

**Figure 3. Agriculture as percentage of employment (x-axis) and of GDP (y-axis)**



22 FAO, (2017) 'Food Balance Sheet', Rome.

23 FAO, (2019) 'Detailed Trade Matrix', Rome.

24 USDA (United States Department of Agriculture, (2016) 'National Nutrient Database for Standard Reference Release 28, Online Database.'

## Vulnerability

### Government effectiveness

We assume that governments can effectively cope with water-related threats and prevent or mitigate potential related security risks when they are willing and able to prevent or adapt to impacts that harm certain water user groups or groups in society. Factors relating to this help to understand why in certain countries exposure to hazards results in disasters, whereas this does not happen in other countries.

We therefore also consider government effectiveness factors in our analysis as we aim to capture governments' ability to provide high quality public and civil services in a manner that is independent of political pressure.<sup>25</sup> We focus on government effectiveness as a dimension of governance effectiveness in public and civil services and their ability to cope with water-related threats, leaving aside for now other governance factors (such as the role of civil society or issues around voice and accountability)<sup>26</sup> without contesting their potential relevance to the capacity of societies to deal with water-related risks. We therefore include data on Government Effectiveness from the Worldwide Governance Indicators<sup>27</sup> (2018 data). Values for all the countries are included in Annex 1.

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25 Kraay, A., Kaufmann, D. and Mastruzzi, M., (2010) *The Worldwide Governance Indicators: Methodology and Analytical Issues*, (The World Bank).

26 Government effectiveness is defined as "the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies" (Kaufmann, Daniel, Aart Kraay and Massimo Mastruzzi (2010). "The Worldwide Governance Indicators: Methodology and Analytical Issues." World Bank Policy Research Working Paper No. 5430). The indicator gives the country's score on the aggregate indicator in units of a standard normal distribution, i.e. ranging from approximately -2.5 to 2.5.

27 Kraay, A., Kaufmann, D. and Mastruzzi, M., (2010) *The Worldwide Governance Indicators: Methodology and Analytical Issues*, (The World Bank).

## Conflicts

Conflict data was taken from the UCDP Georeferenced Event Dataset (UCDP GED).<sup>28</sup> The UCDP GED database, version 19.1, includes a violent event if the event results in at least one recorded death and when the dyad – a set of two armed and opposing actors – to which it belongs exceeds the threshold of 25 direct conflict-related deaths in at least a single calendar year in the time the conflict spans. Violent events in earlier and later years (than the year with the threshold exceedance) are assigned to that specific dyad. The UCDP GED database applies a spatial resolution at the town or village level with a temporal resolution of a day. The database includes events from 1989 onwards. We assessed whether a conflict took place for the years 1989-2014, which are the years for which conflict and drought information was available. We included state conflicts, non-state conflicts and communal conflicts in our analysis.

## Results

Our analysis reveals great variations over time and across countries in water shortage for staple food production, the importance of imported staple foods and the importance of the national agricultural sector. In addition, the coping capacity of countries to deal with these impacts varies across countries. A direct link with conflict cannot be directly derived, but the variations in the indicators suggest that different pathways through which water shortage for the agricultural sector impacts would be important to consider in the analysis of water-conflict relationships.

Figure 4 shows variations in water shortage for both national and imported staple food production for Egypt, Iraq and Syria. Graphs for all the MENA countries, exhibiting great variations, are found in Annex 2. A number of countries saw lower than average actual evaporation fractions, indicating high water shortage, from around 2008 until 2014, especially Egypt, Iran, Israel, Jordan, Libya, Morocco, Saudi Arabia, Syria, the United Arab Emirates and Yemen. In some countries, for example Algeria, Lebanon and

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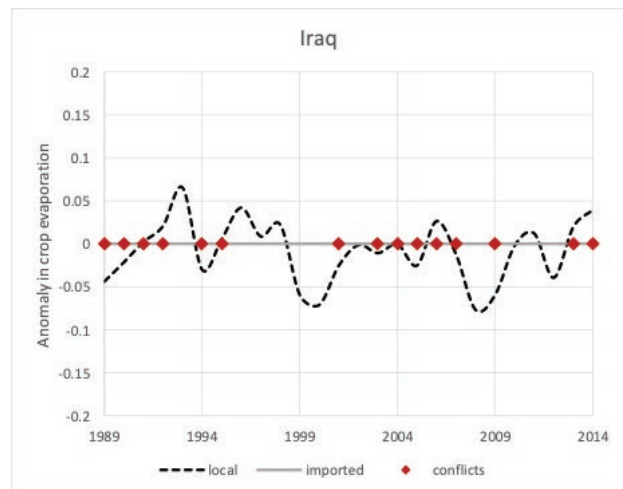
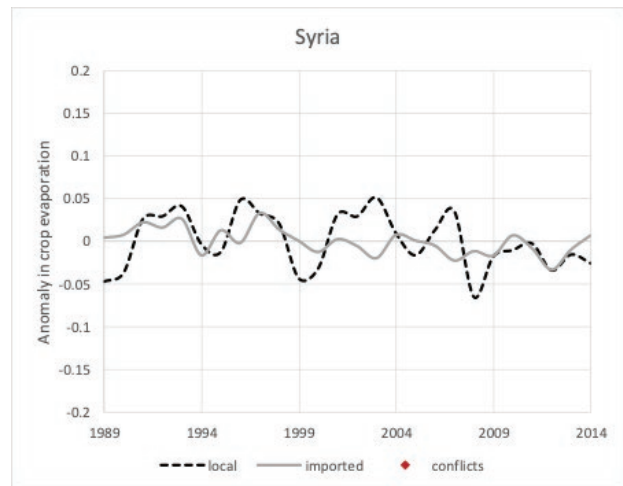
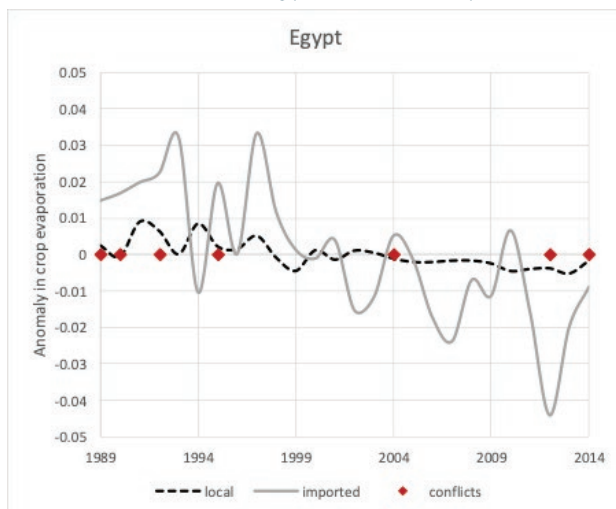
28 Sundberg, R. and Melander, E., (2013) 'Introducing the UCDP Georeferenced Event Dataset,' *Journal of Peace Research*, 50.



Morocco, water shortages of imported foods were particularly high, while in other countries, for example Egypt, Israel, Jordan, Syria, Libya and Yemen, local and imported water shortage coincided. Whether the local or imported water shortage has more impact depends on the staple food import dependency ratio (imported food as a percentage of total food).

On average, MENA countries depend on imported food for over 50% of their staple food consumption (Figure 6, Annex 1), but this import dependency greatly varies among them. The staple food import dependency ratio for the MENA countries ranges from 27% for Iran to 100% for Kuwait. Special cases are Oman and the United Arab Emirates, with staple food imports exceeding their total national staple food consumption: 139% and 144% respectively. This shows their dependency on imported 'virtual' water and the water management in the countries from which they import. For example, Egypt is dependent on imports for 36% of its staple food supply, a relatively low percentage compared to other MENA countries, and may therefore be less vulnerable to water shortage in exporting countries. Kuwait, Oman and the United Arab Emirates all show high shortages for local production, but because of their high staple food import dependency ratio combined with low water shortages for imported crops, they are little exposed to water shortage. Iran and Morocco have the lowest staple food import dependency ratios, making their food supply vulnerable to water shortage. Both countries have frequently experienced this.

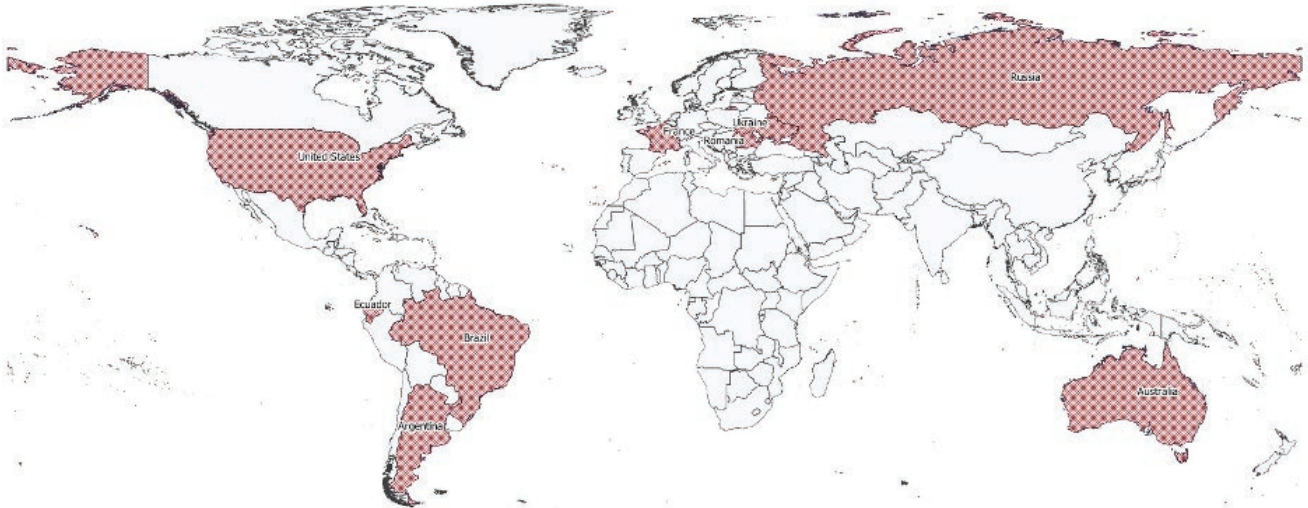
**Figure 4. Variations over time in crop evaporation deficit and conflict in Egypt, Iraq and Syria**



By importing from various countries, the risks of imported water shortage can be spread. For example, Egypt imported staple foods from 97 different countries in the period 1989-2014, but the majority of imports (59%) originate from only three countries: the United States of America (34%), the Russian Federation (13%) and Ukraine (11%). Together, the top nine countries are responsible for 82% of Egypt's total imports of stable food. See Figure 5. All the MENA countries import on average from 75 individual countries. In such cases, the impact of droughts on staple food consumption then not only depends on their national water management practices but also on the climate conditions and water management practices in those 75 countries.

A national water shortage can also be problematic if it is important for local jobs. This is particularly the case in Egypt, Palestine and Yemen. Especially in

**Figure 5. Egypt's top 10 countries from which it imports stable foods**

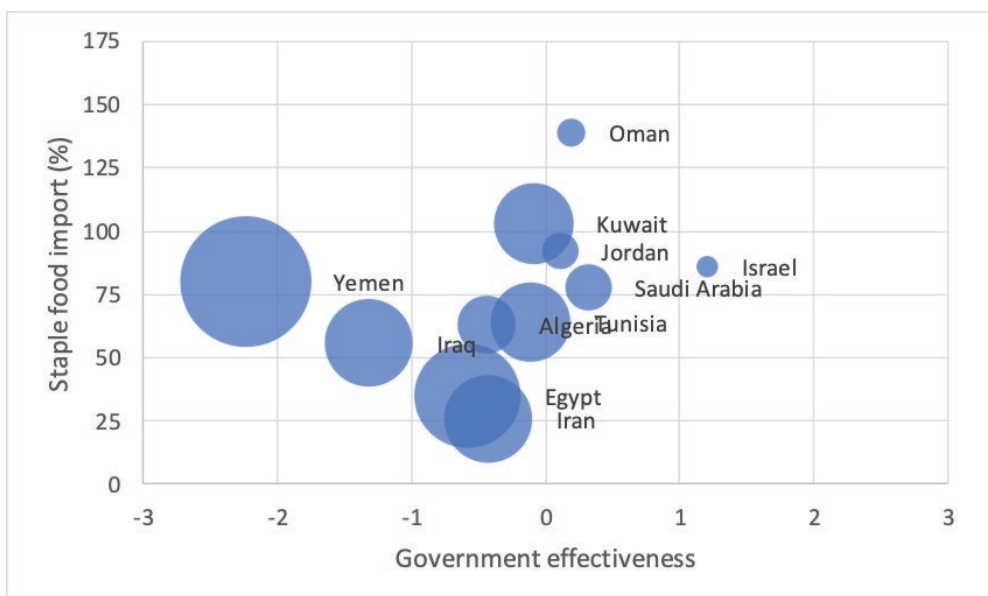


Palestine and Yemen, the high share of agriculture in employment combined with local water shortage in recent years may have caused problems for local livelihoods in these years. Other MENA countries have lower shares of agriculture in employment, making them less vulnerable to this pathway.

The impacts of water shortage on societal problems will eventually depend on a country's governance capacity. Therefore, we combined the derived staple food import dependency ratios with the composite measure of governance, which is available for 18 of the 19 MENA countries. Government effectiveness is low in the MENA region, with the exceptions of Bahrain,

Israel, Jordan, Oman, Saudi Arabia and the United Arab Emirates (see Figure 6). It should be noted that governance capacity may vary greatly across sectors, and that the indicator used is a rough indication. We consider countries to be most at risk of destabilising impacts of water shortage when their food security and employment sectors are frequently exposed to water shortage and their government effectiveness scores low. Combining these data shows high risk for Iran, Lebanon, Morocco and Yemen, and medium risks for Algeria, Egypt and Jordan (Table 1). Other countries are either assessed as low risk or cannot be assessed due to missing data.

**Figure 6. Country characteristics as indications of exposure and coping capacity in relation to drought. Exposure is indicated with staple food imports as a percentage of total staple food consumption on the y-axis. The share of agriculture in employment (%) is shown through linear scaled circle size. Coping capacity is indicated as government effectiveness on the x-axis and GDP (USD per capita) is used for linear scaled circle size. The data for this assessment were available for 13 of the 19 countries.**





**Table 1. Assessing hazard, exposure and vulnerability of water-related social unrest and violent conflict**

Country	Linking hazard and exposure	Exposure assessment	Vulnerability assessment
Algeria	Food imports at some water shortage risk and import dependency relatively high	Medium	Medium
Bahrain	Some water shortage locally and imported, but no data on exposure	Unknown	Unknown
Egypt	Imported water shortage, but low import dependency	Medium	Medium
Iran, Islamic Rep.	Local water shortage, important for both food security and jobs	High	High
Iraq	Medium dependency on imports, but drought risks unknown, some risk of local drought for food and jobs	Unknown	Unknown
Israel	Local water shortage, but high food imports	Low	Low
Jordan	High local and imported water shortage, high dependency on food imports	High	Medium
Kuwait	Local water shortage, but high food imports	Low	Low
Lebanon	High local and imported water shortage, high dependency on food imports	High	High
Libya	Some water shortage locally and imported, but no data on exposure	Unknown	Unknown
Morocco	Local water shortage, and high dependency on local production	High	High
Oman	Local water shortage, but high food imports	Low	Low
Palestinian territories	Local water shortage, and high share of agriculture in employment, no data on food imports	High	Unknown
Qatar	Some water shortage locally and imported, but no data on exposure	Unknown	Unknown
Saudi Arabia	Some water shortage locally and imported, and high dependency on imported food	Medium	Low
Syrian Arab Republic	Some water shortage locally and imported, but no data on exposure	Unknown	Unknown
Tunisia	Water shortage locally and some dependency for jobs and food, no information on water shortage of imported food	Unknown	Unknown
United Arab Emirates	Local water shortage, but high food imports	Low	Low
Yemen, Rep.	Local water shortage, and high share of agriculture in employment, and some dependence on national food production	High	High

Comparing these variations with the occurrence of conflicts over time does not directly reveal clear patterns – indicating that the link between water scarcity, agricultural production, food insecurity and conflict is highly complex. For example, while the recent droughts in Egypt coincided with conflicts, earlier wetter periods have seen conflict as well. Conflicts that only occur during water-shortage years could be found only for Yemen. Conflict data for Syria are found in neither the UCDP nor the ACLED<sup>29</sup> dataset. Inquiries taught us that this data was still being processed. Several articles connect the civil war that started in 2011 in Syria to the multi-year drought in the region, which clearly shows in the graphs in Figure 4 from 2008 onwards.<sup>30</sup>

## Discussion and directions for future research

### Societal impacts of water shortage

The societal impact of water shortage will depend on a combination of water shortage with various societal factors. Local water availability is particularly important if a large share of the labour force is employed in agriculture as a higher share of the population depending on the agricultural sector for employment could imply that changes to this sector due to water shortages affect a larger share of the country's overall population, which in turn increases the number of people potentially competing for scarce water resources or turning against their government to contest weak government services in the water sector. This can lead to direct or indirect conflicts over water that are translated through the agricultural sector.

29 Raleigh, C. and others, (2010) 'Introducing ACLED: An Armed Conflict Location and Event Dataset: Special Data Feature,' *Journal of Peace Research*, 47.

30 Werrell, C. E. and Femia, F., (2013) *The Arab Spring and Climate Change: A Climate and Security Correlations Series*, (Center for American Progress); Gleick, P. H. J. W., *Climate and Society*, (2014) 'Water, Drought, Climate Change, and Conflict in Syria,' 6; Kelley and others; Selby, J. and others, (2017) 'Climate Change and the Syrian Civil War Revisited,' 60; Selby, J., Dahi, O. S., Fröhlich, C. & Hulme, M. (2017).

Water availability in the countries from which food is imported is important to maintain food prices, although the global food market will often balance the impacts of individual droughts or result in a price rise of a commodity independently of where it is produced. Food prices may be of particular importance for the urban poor. Future research can distinguish between different types of violence and whether these take place in rural or urban areas and how they link to food prices and agricultural employment.

### Water and food-related policy actions

Since the societal impacts are always the result of a combination of factors, effective water management alone will not suffice. However, where water contributed to severe societal impacts and unrest it is important that water managers take measures to reduce the social impacts of water shortage and do not inadvertently contribute to the escalation of conflicts. Dependence on rainfall can be reduced through measures such as water storage, water-efficient irrigation, wastewater reuse, and less water-consuming or more drought-resistant crop choices. Alternatively, maintaining food stocks can overcome periods of low production and high prices, thereby guaranteeing a country's food self-sufficiency level. Many countries provide subsidies on basic commodities such as fuel and bread. The lowering of groundwater tables in Syria due to the drought in 2008/2009, which resulted in increased pumping costs, reportedly took place at the same time when fuel subsidies were cut. According to De Châtel (2014),<sup>31</sup> the Syrian government cancelled a number of state subsidies in 2008/2009 following a need to halt an increasing budget deficit. These cancellations affected both diesel and fertiliser, and prices multiplied abruptly. Together, this made it no longer cost-effective to pump groundwater, and farmers stopped irrigating their crops. With limited other social safety systems in place, the agricultural sector lacked the capacity to cope with these compounded effects of drought and subsidy cuts. Affected agricultural households needed to ensure their livelihoods and as a consequence many abandoned their lands and moved to neighbouring

31 De Châtel, F., (2014) 'The Role of Drought and Climate Change in the Syrian Uprising: Untangling the Triggers of the Revolution,' *Middle Eastern Studies*, 50.

urban areas in search of employment. Similarly, the high bread prices that may have been a cause of the 2011 Egyptian uprisings may have been the combined impact of increased wheat prices in the international market and reductions in subsidies on bread. Subsidy policies might be aligned with information on drought in the main areas from which staple foods are sourced. The timing of increased or decreased subsidies on either agricultural production and inputs or on their derivative products in shops, like bread, might be aligned with global drought information.

## Geopolitics and international dependencies

Some of these choices will make countries more dependent on international relations if they depend for either their water or their food on other countries. In periods of droughts or structurally reduced water availability due to climate change, countries at the downstream end of transboundary basins may see their inflows reduced. Nevertheless, it could be a good choice to store water in mountainous areas in upstream countries where less water would be lost to evaporation. International dependencies can be a good reason to seek cooperation and maintain peaceful relations between countries, however they also pose a risk when a country cannot fully control the resources it depends on. A low self-sufficiency for main food crops means global dependencies that need to be mitigated effectively. In view of water shortage and a changing climate, a sound approach would be to reconsider where imported food crops are produced and subsequently spread the risks. When developing national food policies, policymakers should consider drought-risk scenarios not only for their own country but also for the countries from which they import their staple foods.

## Conclusion

Links between climate, water and conflict are easily assumed. The reality is, however, more complex. Many physical, social, economic and institutional factors influence whether climate leads to water shortage and whether water shortage leads to conflict. The agricultural sector and with it concerns about food

security are one of these determining factors. This paper has shown how these relationships vary across countries in the MENA region and how water-related risks translate via the agricultural sector into instability and conflict.

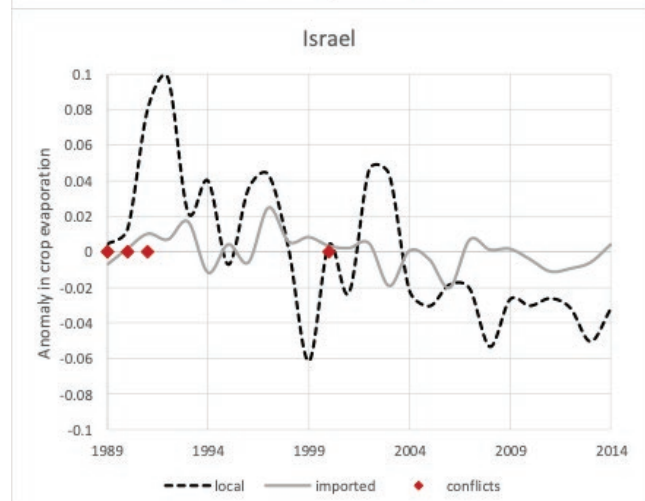
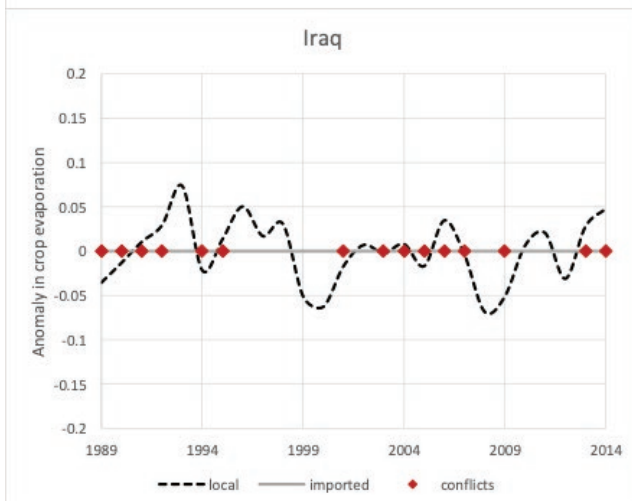
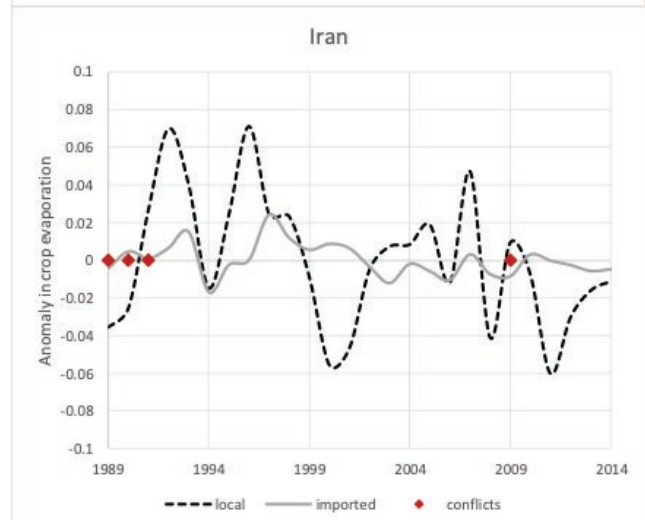
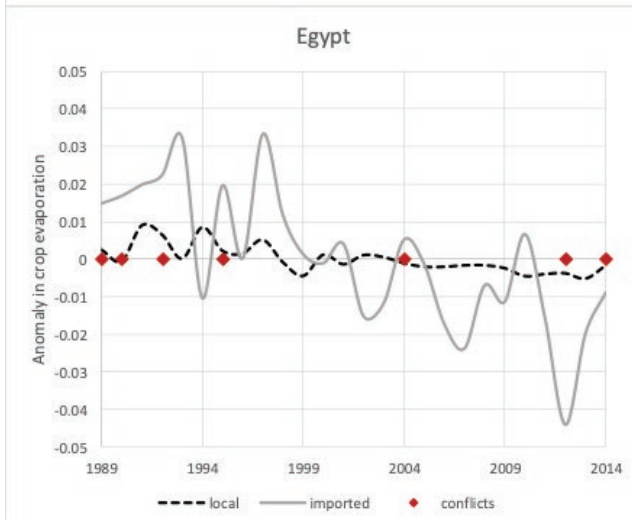
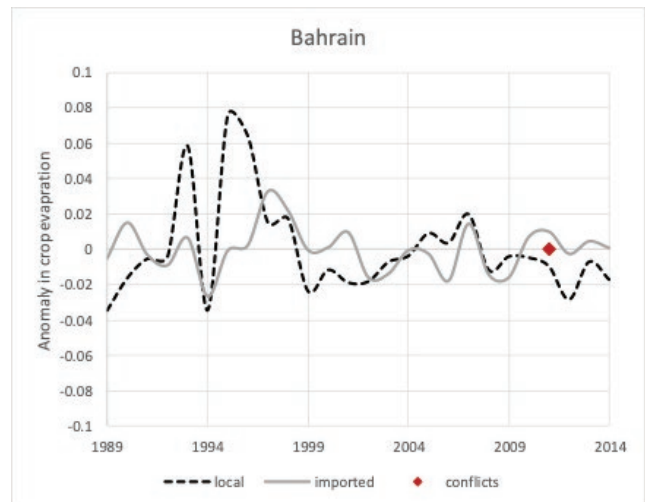
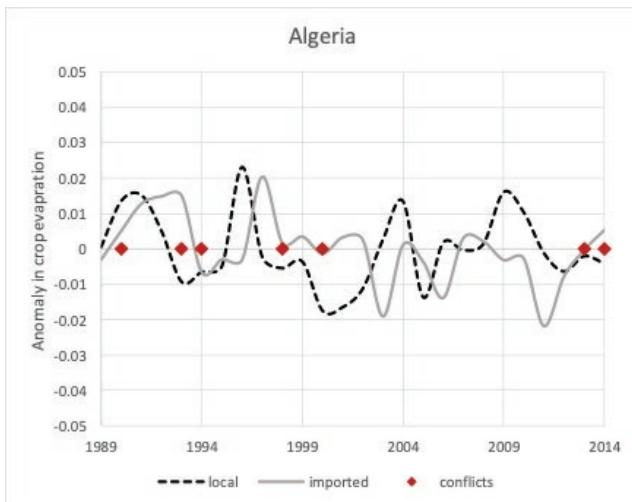
This chapter has shed light on how different dimensions of agriculture and food security – from the dependence of a country on imported food to the share of the population employed in the agricultural sector – determine the direction and the intensity of the link between water-related risks and insecurity and conflict in different ways. This confirms our initial starting point that the role of the agricultural sector in the water-conflict link must not be neglected as it can provide important explanations as to whether and why water-related risks lead to conflict in one place but not in another. In this context, we also argue that to understand a country's vulnerability to drought we should consider not only local water availability but also drought in areas from which countries source their staple food supply. A better understanding of global dependencies on water and food will help identify which interventions, whether water management-related or not, could be the most effective.

## Annex 1. Country characteristics as indications of exposure and coping capacity in relation to drought

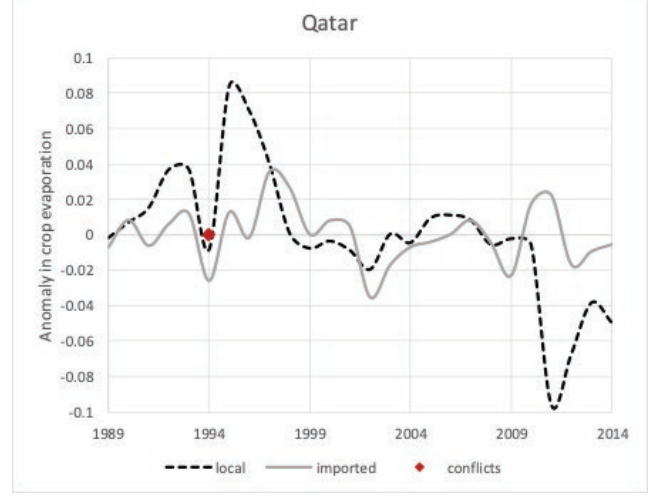
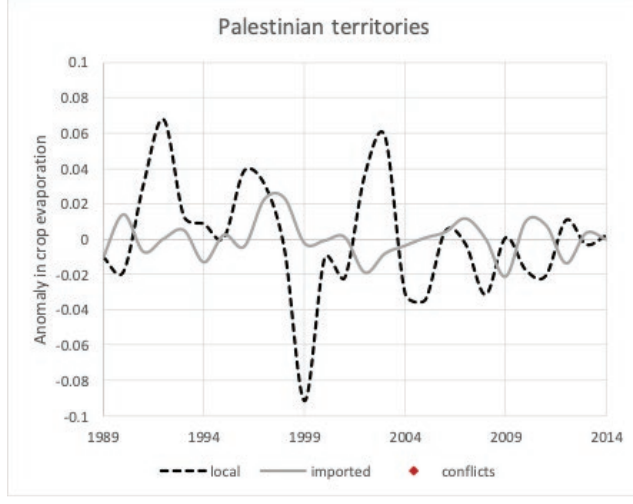
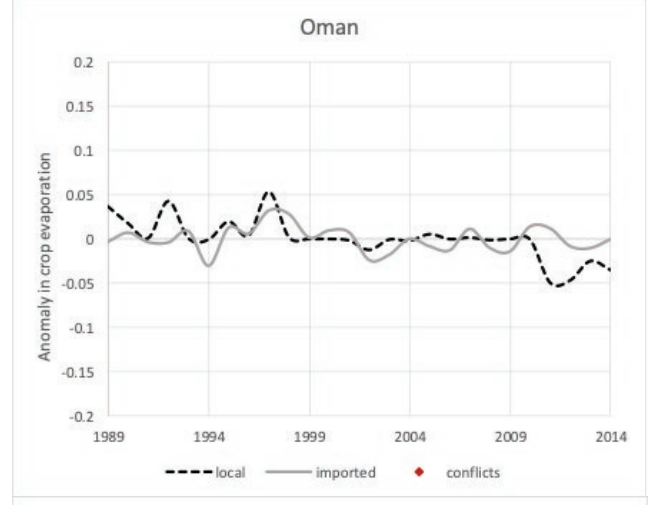
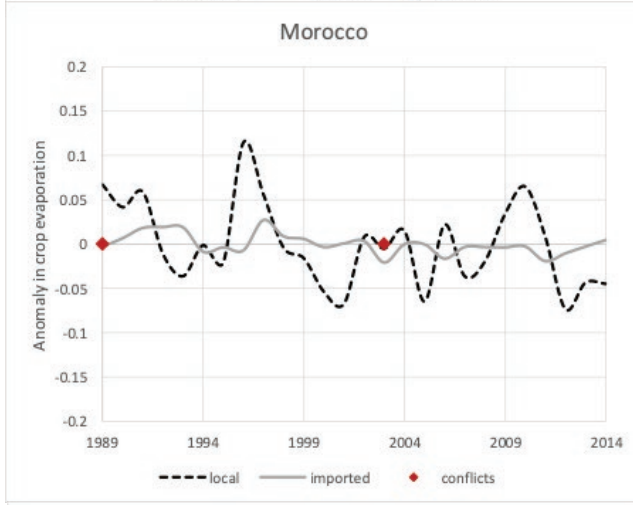
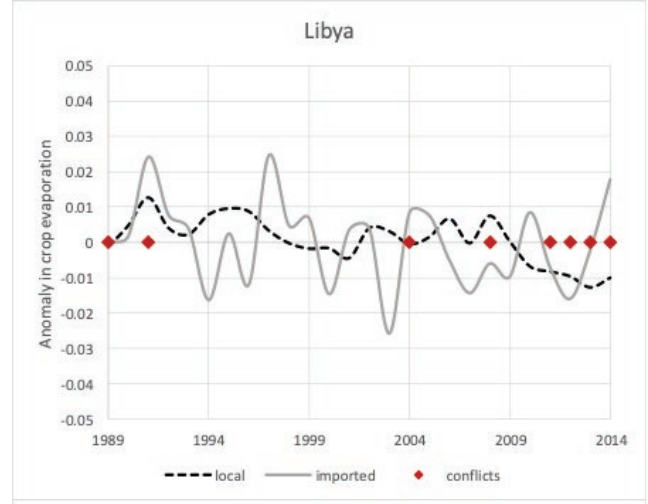
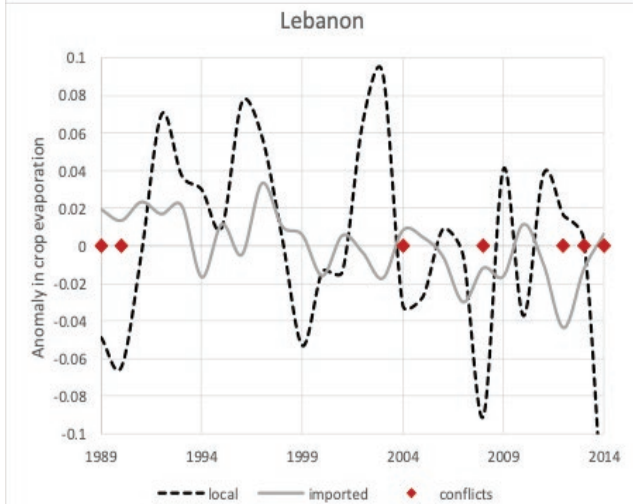
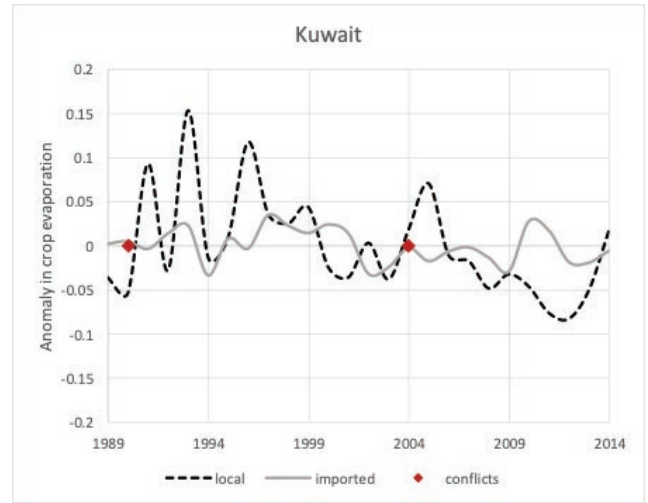
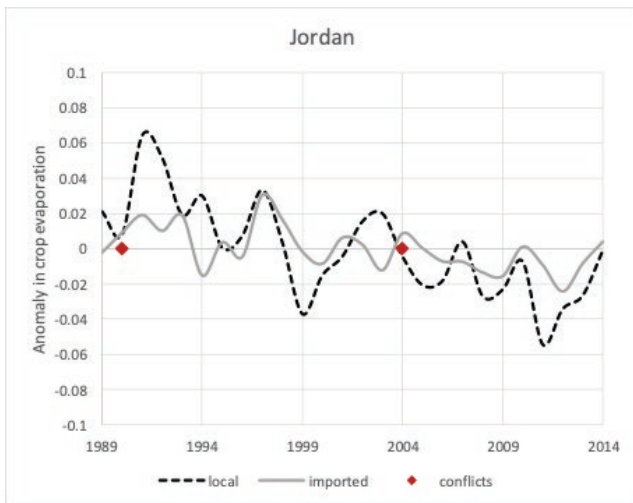
	Exposure	Coping capacity	
	Labour population employed in agriculture (%)	Staple food imports as a percentage of total staple food consumption (%)	Government effectiveness
Algeria	8	63	-0.44
Bahrain	missing	missing	0.18
Egypt	26	36	-0.58
Iran, Islamic Rep.	18	27	-0.43
Iraq	18	50	-1.32
Israel	1	88	1.21
Jordan	3	91	0.11
Kuwait	15	100	-0.09
Lebanon	missing	76	-0.64
Libya	missing	missing	-1.85
Morocco	missing	37	-0.21
Oman	2	129	0.19
Palestine/West Bank and Gaza	40	missing	Missing
Qatar	1	missing	0.63
Saudi Arabia	5	72	0.32
Syrian Arab Republic	3	missing	-1.67
Tunisia	15	57	-0.11
United Arab Emirates	missing	144	1.43
Yemen, Rep.	40	76	-2.24

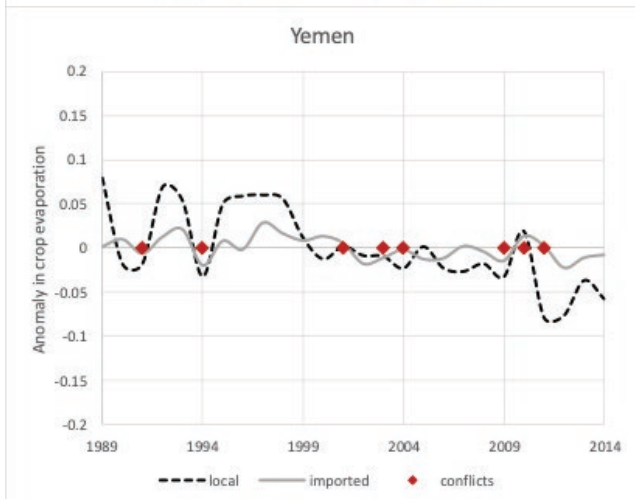
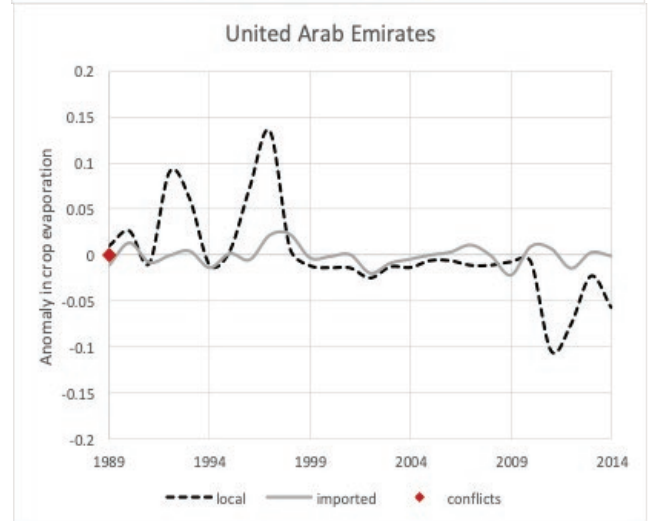
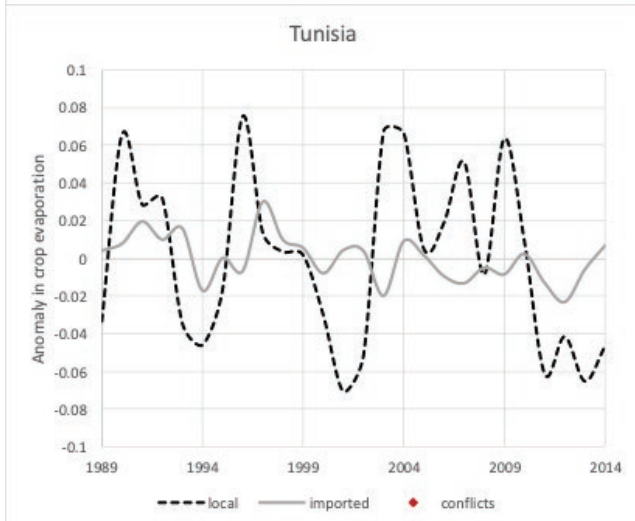
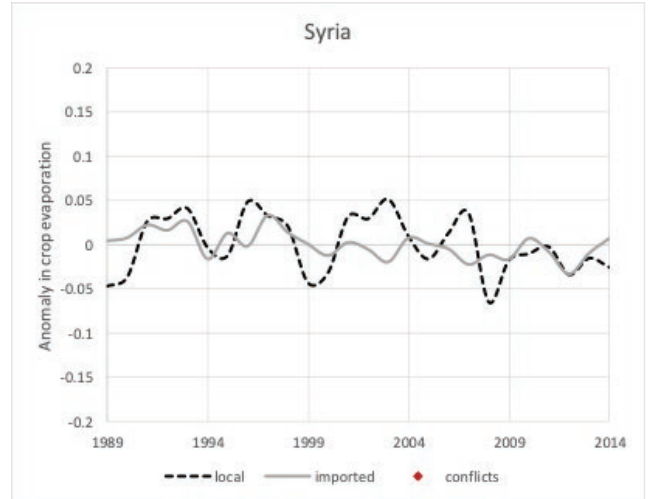
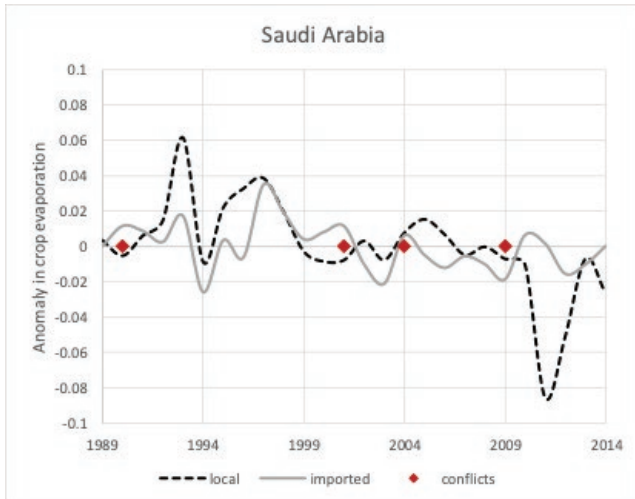
## Annex 2. Variations over time in crop evaporation deficit and conflicts in MENA countries

Note: the y-axis scale varies across charts for clarity









# Desalination in Saudi Arabia: Assessing Critical Infrastructure Vulnerabilities

Robert Mogielnicki

## Executive Summary

Desalination is one of the few long-term sustainable sources of fresh water for many Arab states. However, the recent attacks on Saudi Aramco facilities have exposed the vulnerabilities of the energy infrastructure in the Gulf. This chapter analyses the region's desalination system and the potential shock and disruptions that threaten it. Focusing on the case of Saudi Arabia, it illustrates these multifaceted and complex threats while also examining their effects. It concludes by offering policy recommendations on mitigating threats to desalination infrastructure in the Gulf.

**Keywords:** Desalination, Saudi Arabia, Water Resource Management, Critical Infrastructure

## Introduction

Attacks on Saudi Aramco facilities in Abqaiq and Khurais and the targeting of tankers in the Gulf of Oman in mid-2019 drastically escalated tensions across the Gulf region. The glaring vulnerabilities of onshore and offshore energy infrastructure in the Gulf became clearer following the attacks – the most serious of which appeared to take regional officials by surprise. That these attacks occurred during the intolerably hot summer months highlights additional risks to other forms of critical infrastructure, such as water and electricity plants and grids. A major disruption of fresh water supplies and electricity access in Gulf Cooperation Council (GCC) states could have drastic consequences for the region's residents and its agricultural activities. Some regional cooperation initiatives aim to prevent disruption of the functioning of this critical infrastructure. GCC states have created an interconnector – or coordination mechanism – to help

prevent power outages. However, electrical integration in the region has not reached its full potential.<sup>1</sup> There is even less regional cooperation over water resource management and desalination processes.

Desalination is one of the few long-term sustainable sources of fresh water for many Arab states. Consequently, the Arab region accounts for approximately 55 percent of the world's total desalination capacity, with the vast majority of desalinated water production taking place in the six member states of the GCC.<sup>2</sup> Saudi Arabia possesses the largest economy and population among the GCC states, and it accounts for the bulk of desalinated water production in the region. This chapter identifies critical infrastructure weaknesses related to desalination systems in Saudi Arabia and provides policy recommendations to mitigate related threats.

Most studies on water resources in the Middle East examine the sustainability of long-term use and management rather than the short-term effects of disruptions caused by conflicts, technical malfunctions or cyber-attacks.<sup>3</sup> In contrast, this chapter presents an updated view of the region's desalination system and the potential threats of acute shocks and disruptions. The chapter begins by contextualising desalination concepts and processes pertaining to the Gulf Arab region, and thus shapes the boundaries of the system. The work then comprehensively maps desalination processes in Saudi Arabia and assesses the likely impacts of external shocks and disruptions. The conclusion offers broad policy recommendations on mitigating threats to desalination infrastructure in the

- 1 Wogan, D. (2019), "The costs and gains of policy options for coordinating electricity generation in the Gulf Cooperation Council," *Energy Policy* 127, pp. 452-463.
- 2 Al-Zubari, W. (2019), "Regional Water Governance and Cooperation in the Arab Region," *EDA Insight*, Emirates Diplomatic Academy, p. 1.
- 3 Paleologos, E. (2018), "Water Resource Management towards a Sustainable Water Budget in the United Arab Emirates," Conference on Water Resource and Environment Paper; Dawoud, M.A. (2005), "The role of desalination in augmentation of water supply in GCC countries," *Desalination* 186, pp. 187-198.

Gulf.<sup>4</sup>

The process of mapping, assessing and formulating policy recommendations connected to Gulf desalination infrastructure has revealed the existence of complex systems. The findings of this research suggest that this complexity is both a blessing and a curse for the Gulf Arab states. While the complexity of desalination processes in Saudi Arabia increases individual points of vulnerability across the system, it simultaneously reduces the likelihood of a single or limited number of shocks to the system inflicting catastrophic harm on the region’s residents or other end users. Before delving into the specifics of the desalination system in Saudi Arabia, it is important to provide some general remarks on global desalination technology and how it is applied in the Gulf region.

## Contextualising Desalination Systems in the Gulf

Careful consideration of the primary technologies involved in desalination and the costs associated with various desalination methods helps widen the conceptual framework of desalination systems. There are two primary types of water desalination processes: ones that are thermally driven and ones employing membranes. In the Gulf region, most of the desalination plants use either multi-stage flash (MSF) or multi-effect distillation (MED) – both thermal processes – or reverse osmosis (RO), which relies on membrane-based technology. MSF and MED are energy-intensive processes that heat water to generate steam, which is then used to heat the next batch of incoming water. In some cases, steam can be drawn

4 This research adopts an institutional research and design model (Thomson 1992, Ostrom 1990) in order to determine the underlying institutional incentives shaping the ability to implement acute changes to infrastructure systems in a fraught geopolitical environment. To propose solutions to mitigate threats to critical infrastructure, stakeholder analysis will be employed. This is an important method to identify conflicts of interest and trade-offs associated with a better management of resources at the regional level. The work forms part of a wider research series entitled ‘Next Gen Gulf’ that the author launched at the Arab Gulf States Institute in Washington in May 2019. The series examines how advanced technologies shape Gulf Arab governments and economies.

from neighbouring plants, often an independent water and power plant (IWPP) or an independent water steam power producer (IWSPP). RO desalination facilities leverage a membrane, or series of membranes, to filter out salts and other impurities. While less energy intensive, this membrane-based process is capital intensive and does not handle high salinity water – such as that found in the Persian Gulf<sup>5</sup> – as efficiently as the thermal processes.

**Figure 1. List of Key Desalination Terms**

Energy costs play a central role in the development

<b>MSF</b>	Multi-Stage Flash (distillation)
<b>MED</b>	Multi-Effect Distillation
<b>RO</b>	Reverse Osmosis
<b>IPP</b>	Independent Power Producer
<b>IWP</b>	Independent Water Project
<b>IWPP</b>	Independent Water and Power Plant
<b>IWSPP</b>	Independent Water Steam Power Producer
<b>SWCC</b>	Saline Water Conversion Corporation
<b>SEC</b>	Saudi Electricity Company
<b>MIGD</b>	Million Imperial Gallons per Day

trajectories of desalination systems. In thermal desalination processes, energy can constitute more than half of the total cost.<sup>6</sup> These processes are often favoured by hydrocarbon-abundant states such as those in the Arab Gulf region. For example, around 80 percent of Saudi Arabia’s desalinated water comes from MSF (64%) and MED (16%) processes. The cost-effectiveness of thermal desalination depends heavily on the global price of crude oil and the opportunity costs associated with using a barrel of oil for desalination rather than exporting it. The development of desalination infrastructure therefore tends to be concentrated in large industrial complexes so that the various energy, water and power inputs and outputs can be used cost-effectively and efficiently. Combined water and power plants produce the largest proportion of power in the GCC region through a process known as cogeneration.

5 Leahy, Stephen & Purvis, Katherine. (2016), “Peak salt: is the desalination dream over for the Gulf states?”, *The Guardian*, [www.theguardian.com/global-development-professionals-network/2016/sep/29/peak-salt-is-the-desalination-dream-over-for-the-gulf-states](http://www.theguardian.com/global-development-professionals-network/2016/sep/29/peak-salt-is-the-desalination-dream-over-for-the-gulf-states)

6 Napoli, C. and Bertrand Rioux. (2015), “A Framework for Comparing the Viability of Different Desalination Approaches,” *KAPSARC*, p. 8.



In addition to its energy costs and carbon footprint, desalination also produces brine – a high-salinity by-product that is often dumped back into the original water source. This process reduces the long-term viability of seawater desalination and threatens maritime ecosystems. Saudi Arabia is responsible for 22.2 percent of the total production of brine worldwide, while the UAE contributes another 20.2 percent of the world’s brine.<sup>7</sup> In November 2019, the Saline Water Conversion Corporation (SWCC), the state-run Saudi company overseeing much of the country’s desalination, signed a memorandum of understanding with Japan’s Toyobo Co. on a joint pilot test to accelerate the use of technology that efficiently uses concentrated brine from saltwater desalination plants.<sup>8</sup>

A comprehensive view of desalination systems must take into account both the original source of the water and the end use.<sup>9</sup> Saudi Arabia’s capital city Riyadh relies on desalinated water from the Persian Gulf, whereas the main cities on the country’s western shore rely on desalinated water from the Red Sea. In this respect, desalination systems resemble distinct networks composed of various process stages. The water required for industrial activities – which often use recycled wastewater – is not treated and processed in the same plants as drinking water and that used in agricultural processes. Agricultural activities, which include animal husbandry, consume an inordinate amount of water resources in the Gulf, as will be explained later in the chapter. Each point in these networks is important when identifying potential vulnerabilities of the broader desalination system.

With minimal ground water and precipitation, the Gulf region has to rely on desalination, depleting aquifers and imports of the water required by the booming populations and economic activities in these states.

7 Jones, E. et al., (2019), “The State of desalination and brine production: A global outlook,” *Science of The Total Environment* 657, pp. 1343-1356.

8 <https://www.prnewswire.com/news-releases/toyobo-and-saline-water-conversion-corporation-sign-mou-on-joint-pilot-test-aimed-at-accelerating-use-of-new-membrane-technology-for-reusing-concentrated-brine-300949770.html>

9 Napoli, C. and Bertrand Rioux. (2015), “A Framework for Comparing the Viability of Different Desalination Approaches,” *KAPSARC*, p. 6.

Qatar and Kuwait previously considered importing substantial amounts of water from Iran but ultimately abandoned the plans. The countries feared that the “hydrohegemonic influence of Iran” might create a risky external dependency.<sup>10</sup> In 2013, the GCC states agreed to jointly develop a \$7 billion desalination plant on the Indian Ocean side of the Arabian Sea to protect against potential contamination from a radioactive spill at an Iranian nuclear facility or an oil spill in the Persian Gulf.<sup>11</sup>

The initiative, which would produce a shared water line from the Gulf of Oman to Kuwait, has not made any tangible progress over the past several years.<sup>12</sup>

Desalination plants and other forms of critical infrastructure in the Gulf represent targets for hostile actors in the region.<sup>13</sup> In June 2019 the Houthis launched a projectile targeting the desalination plant in Shuqaiq, Saudi Arabia, which is located near Jizan. However, a spokesperson for the Saudi-led coalition operating in Yemen confirmed that the projectile did not harm any individuals or result in any infrastructure damage.<sup>14</sup> Drones launched by Houthi rebels in August 2019 also caused a fire at a liquid natural gas facility near the Shaybah oil field along Saudi Arabia’s border with the UAE.<sup>15</sup> Although the attack occurred on Saudi soil, it demonstrated that hostile actors in the region would be capable of launching a similar attack on Emirati territory. Claims that attacks on desalination plants could wipe out water for the residents in Gulf

10 Amery, H. (2017), “Water-Demand Management in the Arab Gulf States: Implications for Political Stability,” in Jean C. *Water Security in the Middle East: Essays in Scientific and Social Cooperation*, Anthem Press, p. 70.

11 Ibid., 68.

12 Reuters. (2013), “Gulf Arab states eye Arabian Sea for safer water supplies,” [www.reuters.com/article/us-water-gcc-link/gulf-arab-states-eye-arabian-sea-for-safer-water-supplies-idUSBRE96H0BZ20130718](http://www.reuters.com/article/us-water-gcc-link/gulf-arab-states-eye-arabian-sea-for-safer-water-supplies-idUSBRE96H0BZ20130718)

13 Meshkati, Najmedin. (2019), “Gulf Escalation Threatens Drinking Water,” *Belfer Center*, <https://www.belfercenter.org/publication/gulf-escalation-threatens-drinking-water>

14 Saudi Press Agency. (2019), “An enemy projectile launched by the Iranian-backed terrorist Houthi militia falls near the al-Shaiq desalination plant” (Arabic), [www.spa.gov.sa/1936330](http://www.spa.gov.sa/1936330).

15 Gambrell, Jon. (2019), “Yemen rebel drone attack targets remote Saudi oil field,” *AP News*, [apnews.com/9edbf1f71010847f2b321d1951997e797](https://apnews.com/9edbf1f71010847f2b321d1951997e797)



countries are usually not supported by a comprehensive understanding of these complex systems. Therefore, this chapter now turns to the desalination system in Saudi Arabia.

## Mapping Saudi Arabia's Desalination System

The prominent role of water resource management in Saudi Arabia's strategies and transformation plans highlights the strategic importance of desalination processes. The Saudi National Water Strategy 2030, which exists as a broad outline on the ministry's website, lists "a sustainable water sector, safeguarding the natural resources and environment of the Kingdom and providing cost-effective supply and high-quality services" as its key objectives.<sup>16</sup> The water strategy notes that 60 percent of the country's urban water supply comes from desalination. The production of desalinated water involves not only a high production unit cost but also substantial costs associated with pumping water from coastal plants to inland urban centres. The burgeoning water demand requires Saudi Arabia to produce 6.6 million cubic meters of water a day, which accounts for approximately 54 percent of the desalinated water produced in the Gulf region. With the total water demand in Saudi Arabia growing at a rate of 7 percent annually,<sup>17</sup> desalinated water will not only remain a central component of the country's water mix but also a strategic resource for the foreseeable future.

Saudi Arabia has no permanent running surface water and experiences only around 100 millimetres of rainfall annually. As a "severely water scarce country," it withdraws more than 1,000 percent of its renewable water resources and also depends heavily on non-renewable fossil aquifers.<sup>18</sup> Approximately 87 percent of the extracted water – or that from aquifers

and desalination – is used for agricultural activity.<sup>19</sup> According to National Geographic, Saudi Arabia used to sit atop 500 billion cubic meters of fossil water, but an estimated 21 billion cubic meters per year supported modern intensive farming.<sup>20</sup> Consequently, desalination is linked to food security issues in the kingdom.

Given the crucial need to enhance the country's water security, desalination plants emerged in Saudi Arabia as early as the mid-1950s. By early 2020, Saudi Arabia accounted for between 18 and 22 percent of the world's total desalinated water output. The country has around 35 operational desalination plants<sup>21</sup> and additional desalination facilities are under construction. Most Saudi desalination involves thermal processes – MSF and MED constitute 64 percent and 16 percent of desalination – whereas RO technologies are used for the remaining 20 percent of desalination activities.

Between the late 1990s and the early 2000s, the Ministry of Water and Electricity launched a privatisation and investment directive. The directive culminated in a strategic transformation plan released in 2005 to increase the role of the private sector in desalination. The more recent National Transformation Program (NTP), a subset of Saudi Vision 2030, aimed to increase private-sector-led desalination from 16 percent to 52 percent by 2020.<sup>22</sup> The NTP includes plans to privatise specific facilities, such as the Ras Al-Khair desalination plant, in order to achieve capital and operating savings for the government.<sup>23</sup> The privatisation of major Saudi desalination facilities has proceeded slowly, but private-sector actors are nevertheless engaged in the country's

19 Ibid.

20 Smart Water Magazine. (2019), "Saudi Arabia's groundwater to run dry", <https://smartwatermagazine.com/blogs/cristina-novo/saudi-arabias-groundwater-run-dry>

21 Oxford Business Group. "Saudi Arabia works to meet rising water and energy demand", <https://oxfordbusinessgroup.com/overview/path-privatisation-kingdom-works-meet-rising-demand-energy-and-water>

22 Oxford Business Group. "Saudi Arabia works to meet rising water and energy demand", <https://oxfordbusinessgroup.com/overview/path-privatisation-kingdom-works-meet-rising-demand-energy-and-water>

23 "Privatization Program: Delivery Plan 2020." vision2030.gov.sa.

16 "National Water Strategy." Ministry of Environment, Water, and Agriculture. <https://mewa.gov.sa/en/Ministry/Deputy%20Ministries/TheWaterAgency/Topics/Pages/Strategy.aspx>

17 Ibid.

18 Napoli, C., Ben Wise, David Wogan and Lama Yaseen. (2016), "Policy Options for Reducing Water for Agriculture in Saudi Arabia," KAPSARC, p. 3.

water resource management. In June 2020, the Saudi Water Partnership Company and a consortium of other companies announced the successful financial closing of a \$245 million independent sewage treatment plant – the country’s first such plant to be awarded to the private sector as part of the public-private partnership project model.<sup>24</sup>

Saudi Arabia also plans to slash daily per capita consumption of water from 263 litres to 150 litres in 2030 – thus tackling both the supply and demand issues associated with desalinated water.<sup>25</sup>

Saudi Vision 2030 aims to achieve optimal use of the country’s water resources by combining a reduction in water consumption with a greater use of treated and renewable water resources. Phasing out water subsidies can incentivise consumers to cut back on water consumption. However, monitoring and accountability systems are needed to adequately measure progress. The Saudi government plans to install a million high-precision electronic water meters that are linked to an automated reading system.<sup>26</sup> Updating irrigation methods, implementing hydroponic technologies on farms and reusing wastewater can also reduce demand for desalinated water.

Despite these aims and given its expanding population, Saudi Arabia’s total desalination output over the past five years has grown substantially. The annual desalinated water output grew by 58 percent from 2014 to 2018 according to the Ministry of Environment, Water and Agriculture. The expanding population helps to explain the growing need for desalinated water. Over the decade ending in 2018, Saudi Arabia’s population increased from 25.9 million to 33.7 million people<sup>27</sup>.

The majority of the country’s desalination activity takes place in a dense cluster of plants and complexes in the Eastern Province, namely in Al-Jubail, Al-Khobar and Ras Al-Khair. These three locations produced about 56 percent of the country’s desalinated water output in 2018, with much of the water being directed to the capital, Riyadh, and other cities in the country’s eastern region. On the country’s western coast, plants in Yanbu, Jeddah and Al-Shuaibah account for another 39 percent of desalinated water output. Desalination plants in Yanbu provide water for the holy city of Medina, while plants in Al-Shuaibah service Mecca and nearby holy sites, in addition to Jeddah and Taif.

**Figure 2. Saudi Desalinated Water Output 2014-2018.** Source: Ministry of Environment, Water and Agriculture

Water Produced by Desalination Plants for Years 2014 to 2018 A.D. (In thousands of cubic meters)					المياه المنتجة حسب محطات التحلية من عام 2014 الى عام 2018 م (الف متر مكعب)					
المجموع	Plant				المحطة					السنة
Total	المحطات الاخرى	الشفيق	الشعبية	الخليجي	جدة	ينبع	رأس الخير	الخير	الجبيل	year
1139964	25102	30746	182870	8120	189200	140629	55169	119514	388614	2014
1292165	25699	31489	193423	8050	196830	132686	197463	128260	378257	2015
1377064	25390	31967	172162	7916	199710	143429	306151	131998	358341	2016
1552915	26379	32471	204221	7012	196786	175946	344653	166863	396784	2017
1803100	30345	35579	250189	21713	201578	383962	383962	181502	440885	2018

Source: Saudi Arabia's Ministry of Environment, Water and Agriculture. المصدر: وزارة البيئة والمياه والزراعة.

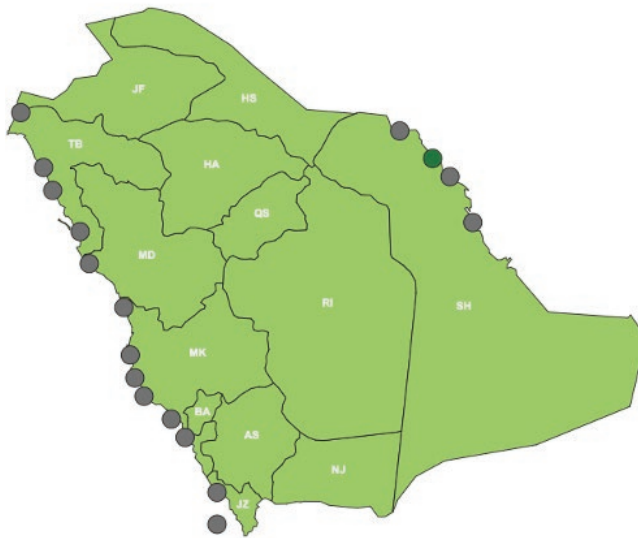
24 Utilities Middle East staff. (2020), “Saudi Arabia’s First-Of-Its-Kind Independent Sewage Treatment Plant Reaches Financial Closing”, <https://www.utilities-me.com/news/15528-saudi-arabias-first-of-its-kind-independent-sewage-treatment-plant-reaches-financial-closing>

25 Water World. (2019), “Saudi Arabia launches program for a drastic reduction in water use”, [www.waterworld.com/international/potable-water/article/16202937/saudi-arabia-launches-program-for-a-drastic-reduction-in-water-use](http://www.waterworld.com/international/potable-water/article/16202937/saudi-arabia-launches-program-for-a-drastic-reduction-in-water-use)

26 Vision 2030. “Vision Progress”, <https://vision2030.gov.sa/en/vision-progress>

27 The population figures cited are from the World Bank.

**Figure 3. SWCC Desalination Plants | Source: swcc.gov.sa**



The SWCC, an independent government corporation created by royal decree in 1974, is responsible for 69 percent of the production of desalinated water in the country.<sup>28</sup> The company operates 28 plants in 17 coastal locations which produce around 4.6 million cubic meters of water a day. The remaining desalination activity is undertaken by the private sector. The SWCC transports drinking water from desalination plants to interior locations through 5,600 kilometres of pipes, 47 pumping stations and 224 water storage tanks able to hold 11.6 million cubic metres of water – equivalent to 2.5 days’ worth of the SWCC’s production capacity.

The Saudi desalination system exhibits some unique characteristics. The Bowarege IWP rests on two barges moored off the coast of Yanbu. The Bowarege project is the world’s only operational self-contained desalination solution on barges, and its goal is to help meet drinking water demand anywhere in Saudi Arabia during the summer months. The desalination barges, which are a joint venture between ACWA Power International (65%) and Rakaa Saudi Water and Power Ltd. (35%), can produce 25,000 cubic meters of water a day and can be rapidly deployed to different regions of the country.<sup>29</sup> In December 2019, the SWCC signed a 20-year agreement with Bahri, Saudi Arabia’s state-backed tanker company, to transport desalinated

water from new floating desalination stations to storage tanks.<sup>30</sup> According to Saudi Vision 2030, the potential for solar and wind power generation is “largely untapped” and can attract future investments in the country’s renewable energy market.<sup>31</sup> The King Salman Renewable Energy Initiative launched in 2017 aims to generate 10 percent of Saudi Arabia’s power from renewable energy sources. Solar power is therefore likely to play an increasingly important role in future desalination initiatives. Limited examples of solar energy being used to power desalination plants, such as the RO plant in Khafji, already exist. Moreover, research conducted by Masdar, a renewable energy developer and investor in Abu Dhabi, found that solar-powered reverse osmosis desalination is up to 75 percent more energy efficient than the thermal desalination processes employed in the UAE.<sup>32</sup> However, additional development of energy storage technology is required before major desalination plants can become fully solar powered. At the moment, solar desalination plants must rely on traditional energy sources during non-daylight hours.<sup>33</sup> In January 2020, Saudi officials announced plans to construct a “solar dome” desalination plant at Neom, a tech-focused megaproject being constructed on the country’s north-western coast. The solar dome technology aims to reduce brine and cut carbon emissions to zero.<sup>34</sup>

28 Saline Water Conversion Corporation. “About SWCC”, <https://www.swcc.gov.sa/english/AboutSWCC/Pages/about.aspx>

29 Rasooldeen, MD. (2010), “Floating desalination plant launched in Yanbu”, *Arab News*, [www.arabnews.com/node/349724](http://www.arabnews.com/node/349724)

30 Bahri. (2019), “Bahri signs SAR 760 million agreement with Saline Water Conversion Corporation for transport of desalinated water”, <https://www.bahri.sa/Media/News/2456.aspx?lang=en-US>.

31 Vision 2030. “Thriving Economy”, <https://vision2030.gov.sa/en/node/384>

32 “Ghantoot Desalination Pilot Plant,” Masdar Website. Updated 2020. <https://masdar.ae/en/masdar-clean-energy/projects/ghantoot-desalination-pilot-plant>

33 Napoli, C. and Bertrand Rioux. (2015), “A Framework for Comparing the Viability of Different Desalination Approaches,” *KAPSARC*.

34 Nereim, Vivian & Di Paola, Anthony. (2020), “Saudis Plan ‘Solar Dome’ Desalination Plants at Neom Mega-City”, *Bloomberg*, <https://www.bloomberg.com/news/articles/2020-01-29/saudis-plan-solar-dome-desalination-plants-at-neom-mega-city>

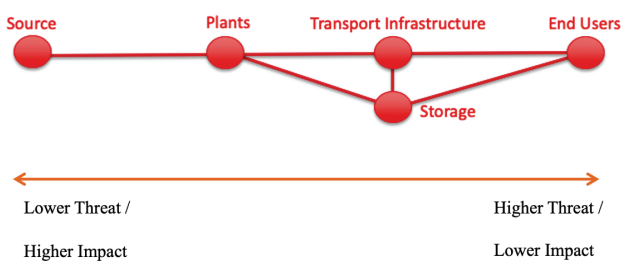
## Potential Shocks and Disruptions to Gulf Desalination Systems

Acute external shocks and disruptions to desalination systems begin with the source of desalinated water, include desalination plants and extend to the distribution networks and storage facilities that deliver water to end users. John Bullock and Adel Darwish portray desalination infrastructure as particularly vulnerable: “Every desalination plant built is a hostage to fortune; they are easily sabotaged; they can be attacked from the air or by shelling from off-shore; and their intake ports have to be kept clear, giving another simple way of preventing their operation.”<sup>35</sup>

History provides a pertinent example of the risks surrounding the water sources for desalination systems. When Iraq invaded Kuwait, the Iraqi military destroyed desalination plants and dumped millions of gallons of oil into Persian Gulf waters. The ensuing environmental epidemic so endangered Saudi Arabia’s desalination processes that that U.S. had to bomb Kuwaiti oil stations to stem the flow of oil into Gulf waters.<sup>36</sup>

U.S. officials accused Iraqis of opening valves at the Kuwaiti Sea Island Terminal on the country’s southern coast – a move that created a 35-mile oil slick encroaching on the Saudi Arabian coastline.

**Figure 4. Simplified Risk Assessment Framework, Gulf Desalination Systems**



35 Bulloch, J. and Adil Darwish. (1993), *Water wars: Coming conflicts in the Middle East*, Victor Gollancz.

36 Shenon, Philip. “WAR...” The New York Times. Published January 28, 1991. [www.nytimes.com/1991/01/28/world/war-gulf-overview-us-bombs-kuwait-oil-stations-seeking-cut-flow-into-gulf-more.html](http://www.nytimes.com/1991/01/28/world/war-gulf-overview-us-bombs-kuwait-oil-stations-seeking-cut-flow-into-gulf-more.html)

An intentional incident that renders Persian Gulf waters unsuitable for desalination remains unlikely because it would indiscriminately affect all countries using Persian Gulf water resources. Moreover, Iran – the country with the greatest incentive and capacity for intentionally threatening desalination systems in Saudi Arabia and the UAE – also has an interest in protecting Persian Gulf waters. Targeted attacks on desalination plants and transport networks represent a greater threat but would result in a lower absolute impact, given the dispersed and segmented nature of the desalination systems in this stage of water transmission. Attacks on long-term storage facilities, such as major tanks and aquifer complexes, might erode trust in the targeted government but would not necessarily cause immediate harm to residents. Unintentional incidents that threaten water sources in the Gulf also exist. For example, diesel spillage from a grounded barge near Sharjah entered the intake of a desalination plant and left Sharjah without water for a day in 1997.<sup>37</sup> Additionally, oil spills, algae blooms and nuclear incidents have the potential to negatively impact public health and safety.

Beyond the sources of desalinated water, desalination plants present identifiable targets for hostile actors. Attacks on physical infrastructure, blocks of intake ports and cyber-attacks all represent potential avenues for disrupting desalination operations. The region’s flagship companies and government entities confront genuine cyber security threats. In 2012 and 2017, Saudi Aramco suffered cyberattacks aimed at disrupting oil and gas flows. The earlier attack managed to damage 30,000 computers, but it did not result in a major disruption to oil production.<sup>38</sup> On 25 July 2019, hackers penetrated Bahrain’s Electricity and Water Authority, took control of several systems

37 Elshorbagy, W. and Elhakeem, A. (2008), “Risk Assessment Maps of Oil Spill for Major Desalination Plants in the United Arab Emirates,” *Desalination*, Volume 228, 200-16.

38 Reuters. (2012), “Saudi Arabia says cyber attack aimed to disrupt oil, gas flow”, [www.reuters.com/article/saudi-attack/saudi-arabia-says-cyber-attack-aimed-to-disrupt-oil-gas-flow-idUSL5E8N91UE20121209](http://www.reuters.com/article/saudi-attack/saudi-arabia-says-cyber-attack-aimed-to-disrupt-oil-gas-flow-idUSL5E8N91UE20121209)



and managed to shut down some of these systems.<sup>39</sup> There are global companies, such as CyberX, that offer services to protect desalination plants from cyber-attacks. Desalination plants may also be sabotaged through direct contamination intended to negatively impact public health and the safety of residents receiving desalinated water.

The network of pumps, pipes and smaller-scale storage tanks used to transport water from the coastal desalination plants to end users presents additional areas where infrastructure is vulnerable. The delivery of desalinated water in Saudi Arabia relies on thousands of kilometres of pipes, dozens of pumping stations and hundreds of short-term storage tanks. The government-run desalination infrastructure alone depends on 5,600 kilometres of pipes, 47 pumping stations and 224 water storage tanks. Similar targets include the longer-term water storage facilities and the back-up reservoirs and aquifers in Gulf Arab states. An incident at Abu Dhabi's Liwa Water Reservoir, for example, would threaten the emirate's long-term water security without necessarily inflicting direct harm on the civilian population.

## Conclusion & Policy Recommendations

The threats confronting critical infrastructure in Arab Gulf states are multifaceted and complex. This is especially true of desalination systems. Desalination plants, while often the focus of discussions on critical infrastructure vulnerabilities in the Gulf, nevertheless represent one link in a chain of processes that deliver desalinated water to end users or destinations. To fully comprehend the threats confronting the regional desalination systems, due consideration must be given to the sources, desalination plants, transport networks (pipes, pumping stations and short-term storage tanks) and longer-term water storage facilities (tanks, aquifers and reservoirs).

Moving from the source of water input toward the

delivery of desalinated water to its final destination, the opportunities to disrupt the successful delivery of that output increase exponentially. However, as water moves away from the original source, the overall impact on end users from an intentional shock or disruption is reduced. Within this context, any acute event that negatively affects the suitability of water sources for desalination would have the largest potential impact on the recipients of desalinated water, given that a large number of geographically concentrated desalination plants use just a handful of common water sources.

Any weakness in the chain of interrelated processes that deliver desalinated water from seawater sources to end users or destinations provides hostile actors with an opportunity to disrupt the process. Coordinated attacks could disrupt several different links along the process chain of a given desalination system. Likewise, a cyber-attack might cripple key commercial and government entities, such as the SWCC, which is responsible for 69 percent of desalinated water production in Saudi Arabia. The following policy recommendations can help Saudi Arabia mitigate threats to desalination systems and, in many instances, also apply to the other GCC member countries.

- 1. Enhance the regional interconnectivity of desalination systems in the Gulf.** Although all GCC member states face similar water scarcity issues, there is limited regional coordination over desalination specifically and water resource management in general. Shared desalination plants and interconnected water grids among GCC countries would permit countries to jointly manage risk and create an additional deterrence against attacks. Given the fractured nature of the GCC, this objective will be difficult to realise. However, increasing the number of multinational joint ventures involved in desalination systems, such as the large-scale RO desalination plant being developed by Emirates Water and Electricity Company and Saudi-based ACAW Power, could be an initial step in this direction.
- 2. Increase the manoeuvrability and agility of desalination plants.** The nimbler that desalination systems can be by using, for example, floating desalination barges and other technologies, the

39 Hope, Bradley, Strobel, Warren P. & Volz, Dustin. (2019), "High-Level Cyber Intrusions Hit Bahrain Amid Tensions With Iran", *The Wall Street Journal*, [www.wsj.com/articles/high-level-cyber-intrusions-hit-bahrain-amid-tensions-with-iran-11565202488](https://www.wsj.com/articles/high-level-cyber-intrusions-hit-bahrain-amid-tensions-with-iran-11565202488)



better equipped these systems will be to manage the effects of exogenous shocks and disruptions.

3. **Hedge against highly-centralised desalination operations and diversify energy inputs.** While centralising desalination operations, both at the firm level and geographically, may be cost-effective and efficient, it increases the vulnerability of end users in the case of an attack or incident that disrupts desalination systems. Stand-alone desalination facilities and small-scale plants can help ensure that critical desalination operations continue in the case of a widespread disruption of larger complexes. Incorporating new energy inputs, such as solar power, in the desalination process will help diversify the power mix that ensures continued operations.
4. **Reduce dependency on desalinated water for consumption.** While ultimately a longer-term goal, some elements of this policy can be implemented relatively quickly. According to a study by the King Abdullah Petroleum Studies and Research Centre, a 47 percent reduction in Saudi Arabia's agricultural water consumption could be realised without compromising food security or industrial revenue.<sup>40</sup> This would entail substituting water-intensive crops with water-productive crops with a high value-added component. Agricultural water consumption could be cut by as much as 70 percent in an extreme case, but this scenario would require the removal of dairy, fodder and grain from the country's agricultural portfolio.
5. **Expand storage capacity in a fortified manner.** Storage capacity – pertaining to both desalinated water and the energy required to power desalination plants – remains a barrier to more efficient operations. Fortified and plentiful water storage facilities will be the best protection against threats to desalination systems in the coming years. Constructing and safeguarding new storage facilities, however, is a costly undertaking. The coronavirus outbreak and oil price rout of early 2020 have imposed significant constraints

on Saudi Arabia's fiscal resources and ability to allocate capital expenditure. However, postponing decisions to better manage the country's scarce water resources may prove costly.

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40 Napoli, C., Ben Wise, David Wogan and Lama Yaseen. (2016), "Policy Options for Reducing Water for Agriculture in Saudi Arabia," KAPSARC.



## **SECTION 3**

# THE POLITICAL ECONOMY OF NATURAL RESOURCES

# The Impact of Mining on Local Communities: The Case of Jordan

Rami Alrawashdeh

## Executive summary

Despite its economic significance, Jordan's mining industry has had serious, if often overlooked, impacts on Jordan's mining regions. This chapter analyses the relationship between mining and local community wellbeing by comparing a range of socioeconomic and health characteristics across the governorates of Jordan. It shows how mining has failed to benefit local communities while producing adverse social, health and environmental impacts. The chapter explores possibilities for how mining companies can promote development in local community. It concludes by discussing potential mining policies that can be adopted to reform the industry.

## Introduction

The mining sector has been a major source of revenue for the Jordanian government since the establishment of the Jordanian Phosphate Mines Company (JPMC) and the Arab Potash Company (APC) in 1953 and 1956 respectively. During this period, the Jordanian industrial sector has been composed mainly of mining and quarrying and related manufacturing sub-sectors. The most important phosphate-finished fertiliser products are diammonium phosphate (DAP), mono-ammonium phosphate and triple superphosphate. The principal activity of the APC is producing potash, which is also one of the main constituents of NPK fertilisers. In 2018, mining contributed 2.1% of the Gross Domestic Product (GDP)<sup>1</sup>, but the combination of mining and related manufactured products (e.g.

fertilisers) reached 10%.<sup>2</sup>

Although Jordan has some metallic and non-metallic minerals distributed in the northern and central regions of the country, most mining revenue is generated in the southern region, where the main potash and phosphate mines are located. These mines contribute more than 95% of the country's total mining revenue. The Kingdom's greatest sources of phosphate are located near Ma'an, the largest city in the south. The majority of potash reserves are found near the southern city of Karak.

Various academic studies have examined the impacts of mining operations on local communities.<sup>3 4 5 6</sup> Beyond the jobs and income generated by mining operations, one of the concerns identified in the academic literature focused on the impact of mining is the overall wellbeing of the local community. The opening of a large mine has economic, environmental and social consequences at the national, state and provincial/local levels. Large mines can generate foreign exchange earnings and tax revenue and create employment directly and indirectly that benefits the country as a whole. However, local communities have become increasingly concerned that they shoulder most of the negative impacts of mining but do not receive enough of the benefits. This is a particular problem in the case of large capital-intensive mining operations because they may generate relatively few local jobs compared to more labour-intensive industries.

Many corporations, especially international ones, are

- 2 Natural Resources Authority (2019). Mining sector performance. <http://www.nra.gov.jo/index.php>
- 3 Badera, J and Kocan, P (2015). Moral panic related to mineral development projects –Examples from Poland. *Resources Policy*. 45, pp. 29-36.
- 4 Bin, P, Li, B and Bu, D, (2015). The relationship between corporate governance and community engagement: Evidence from the Australian mining companies. *Resources Policy*. 43, pp. 28-39.
- 5 Moffat, K and Zhang, A (2014). The paths to social license to operate: An integrative model explaining community acceptance of mining. *Resources Policy*. 39 (2014), pp. 61-70.
- 6 Campbell, G and Roberts, M. (2010). Permitting a new mine: Insights from the community debate. *Resources Policy*. 35 (3), pp. 210-217.

1 Central Bank of Jordan, (2019). Publications and statistics. <http://www.cbj.com>

embracing corporate social responsibility (CSR)<sup>7</sup> as a fundamental aspect of resource extraction operations, including mining. Exercising social responsibility in small remote centres often means that international and transnational corporations must interact with rural or indigenous people who have strong emotional and historical links to the land. Meanwhile, these corporations are increasingly drawn to such remote areas due to their growing technological capacity, the liberalisation of international markets and new resource discoveries in previously ‘unknown’ places.<sup>8</sup>

<sup>9</sup> <sup>10</sup> As a result, while the mining sector can sometimes strengthen the economy at the national level, it may present a new set of problems at the local level.

An alternative perspective on the socioeconomic impacts on small rural communities is that they usually result in significant negative demographic changes due to large influxes of labourers seeking employment.<sup>11</sup> This causes major negative impacts such as disruption of the social balance in communities, the introduction of diseases, increased demand for local resources, higher prices, an increased cost of living, stress on the local water supply, disturbance to traditional hunting and fishing, and increases in socially undesirable activities such as prostitution.<sup>12</sup> Poorly managed mines may even worsen existing levels of poverty.<sup>13</sup> Furthermore, the positive impacts arising from employment tend to diminish over time as mining becomes more technical and automated, which can reduce support for mining

activity among local stakeholders.<sup>14</sup>

In many cases, promises made to people before mineral exploration in their communities have not been kept.<sup>15</sup> Similarly, the effect of mining on forest and game reserves has been studied and mining activities have contributed to the depletion of forest reserves, which can have an adverse effect on the environment.<sup>16</sup>

While the local community bears most of the environmental and other social costs of mining, much of the profit or rents realised may flow elsewhere, given the national and international nature of mining. Has mining benefited the local communities in southern Jordan? What needs to be done to improve the benefits to local communities from mining?

This chapter explores the relationship between mining and local community wellbeing by comparing a range of socioeconomic and health characteristics. The chapter compares socioeconomic indicators (e.g. unemployment, human development, poverty, education, health and environment indices) in mining regions with those in non-mining regions to study the impacts of mining on local communities. The following section discusses the significance of the mining sector in the Jordanian economy. This is followed by a detailed comparison of socio-economics factors between mining and non-mining regions and an investigation into how mining activity may correlate with the results. The next section focuses on the role of mining companies in the development of local communities and the last section discusses the need for a mining policy. The chapter concludes with a discussion of the results and what has been learned.

7 Garriga, E and Mele, D (2004). Corporate social responsibility theories: mapping the territory. *Journal of Business Ethics*. 53 (1-2), pp. 51-71.

8 Brohman, J. (1996). *Popular Development: rethinking the theory and practice of development*. Oxford: Blackwell.

9 Madeley, J (1999). *Big Business, Poor People: The Impact of Transnational Corporations on the World's Poor*. Zed Books Ltd, London.

10 Veiga, M, Scoble, M. and McAllister, M., 2001. Mining with communities. *Natural Resources Forum*. 25 (3), pp. 191-202.

11 Hilson, G (2002). An overview of land use conflicts in mining communities. *Land Use Policy*. 19 (1), pp. 65-73.

12 Vanclay, F (2002). Conceptualising social impacts. *Environmental Impact Assessment Review*. 22 (3), pp. 183-211.

13 Pegg, S (2006). Mining and poverty reduction: transforming rhetoric into reality. *Journal of Cleaner Production*. 4 (3-4), pp. 376-387.

14 Warhurst, A and Mitchell, P (2000). Corporate social responsibility and the case of Summitville mine. *Resources Policy*. 26 (2), pp. 91-102.

15 Ofori, J and Ofori, D (2018). Earning a social license to operate: Perspectives of mining communities in Ghana. *Extr. Ind. Soc.* <https://doi.org/10.1016/j.exis.2018.11.005>

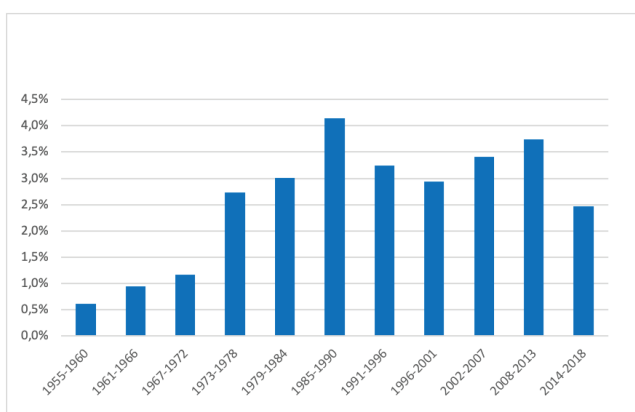
16 Owusu, E, Ofori, B and Attuquayefio, D (2018). The secondary impact of mining on primates and other medium to large mammals in forest reserves in south-western Ghana. *Extractive industries and society* 5 (1), pp. 114-121.

## The significance of the mining sector in the Jordanian economy

The mining sector in Jordan can be divided into the mineral extraction industry and the mineral manufacturing industry. Phosphate, potash, salt, calcium carbonate, treated zeolite, treated silica, travertine and other products from quarries and mines are part of the extraction industry while the mineral manufacturing industry is composed of two branches: the chemical industry (fertilisers, chemical acids, aluminium fluoride, quick and quenched lime) and the construction materials industry (white cement, rock wool and building materials).

The direct contribution of the mining sector to Jordanian GDP has typically been small. For example, between 1955 and 1960 it was only 0.6%, it rose to a maximum of 4.1% between 1985 and 1990 and then declined during the 1990s back to about 3%. More broadly-based economic growth in the 1990s enabled Jordan to become less dependent on the mining sector and so there was a steady contraction of the mining sector's contribution to GDP in this decade, but since 2002 and because of high demand for biofuel, which led to high prices of potash and phosphate fertiliser, there was a gradual rise in mining's contribution to GDP, reaching 3.7% from 2008 to 2013. This was followed by a gradual decline of 2.5 % from 2014 to 2018, as is shown in Figure 1.

**Figure 1. The contribution of the mining sector to Jordanian GDP<sup>17</sup> from 1955 to 2018**

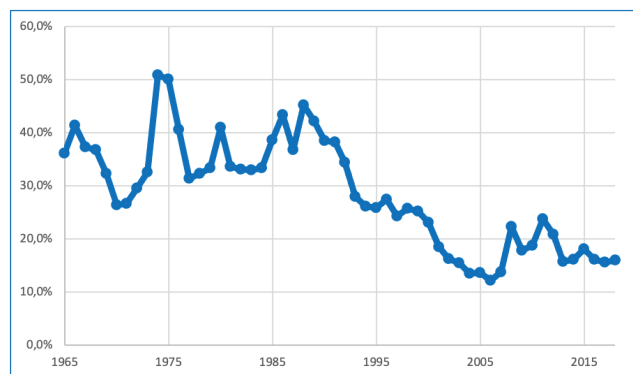


17 Central Bank of Jordan, (2019). Publications and statistics. <http://www.cbj.com>

Jordan has large reserves of phosphate and potash, its phosphate and potash reserve bases are 1.2 billion and 270 million tonnes respectively<sup>18</sup>. Economic exploitation of these minerals helped lay the foundation for Jordanian private and public investment, modernisation of its infrastructure and an expansion of the public service sector such as in education and health. In 2018, the service sector made the highest contribution to GDP, approximately 70%.

As Figure 2 shows, the contribution of mining to total export revenue<sup>19</sup> reached its maximum, about 51% of total exports, in 1974, fell to 45% in 1988 and to 16% in 2018. This indicates that there has been considerable success in diversifying the Jordanian export economy away from its traditional reliance on exports of phosphates and potash.

**Figure 2. Contribution of the mining sector to total exports<sup>20</sup> from 1965 to 2018**



The minerals industry has been expected to play a role in alleviating the major unemployment problem that has beset Jordan in recent years. However, the share of mining in industrial sector employment decreased from 10% in 1992 to 2.5% in 2013, while its contribution to total employment fell from 2.5% in 1992 to around 0.7% in 2018. Nevertheless, mining may have been responsible for many new jobs in the economy. The Jordanian government has suffered from a high budget deficit for long periods of time, and taxes

18 United States Geological Survey (2019). Commodity statistics and information. <http://minerals.usgs.gov/minerals/pubs/commodity/>

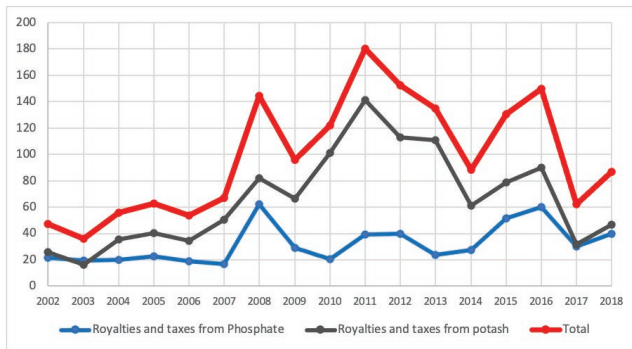
19 Central Bank of Jordan, (2019). Publications and statistics. <http://www.cbj.com>

20 Ibid



and royalties generated from mining have assisted in covering some of its current and capital expenditure needs. Corporate taxes and mining fees<sup>21</sup> (particularly from the JPMC and the APC) contributed to around 3% of total government revenue in 2018.

**Figure 3. Government revenue (in million USD) from mining royalties and corporate taxes from the APC and the JPM from 2002 to 2018**



Total mining taxes and royalties increased from US\$ 47 million in 2002 to US\$ 86.5 million in 2018 (see Figure 3). In 2008, when both Jordan's major mining companies achieved high profitability due to high phosphate and potash prices, the Jordanian government generated a total of tax revenue and royalty payments of US\$ 141 million. Due to a high demand for fertilisers in 2011 and 2012, the total government revenue from mining rose to its highest amounts of US\$ 180.4 million and US\$ 152.3 million respectively. As Figure 3 shows, the majority of government revenue received from mining came from potash, especially in the period from 2008 to 2013. The detailed distribution of minerals in the northern, central and southern parts of Jordan is shown in Appendix 1 (Table 1.1). The minerals in these regions are valued at US\$ 12.2 million, US\$ 18.5 million and US\$ 1691 million respectively, reaching a total wealth of around US\$ 1721 million, of which 98% is concentrated in the southern region.

## Methodology and Results

This chapter investigates how key socioeconomic indicators (unemployment, the human development index, poverty, health, education and environmental

<sup>21</sup> Ibid

indicators) vary across the governorates of Jordan and how they correlate with the amount of mining activity in the individual governorates. The chapter also compares selected socioeconomic indicators in the mining regions (specifically, the southern region of Jordan) with those in the non-mining regions (the northern and central parts) to explore the impact of mining on local communities. ANOVA is used to test the differences in the means of various socio-economic development indicators between mining and non-mining districts. The chapter also analyses the role of mining companies in developing local communities. Has there been any policy that obliges mining companies to contribute part of their profits to local community development, especially during price booms? In order to help local communities generate positive impacts from large mines, has the Jordanian government redistributed some of the tax revenue from mining to local governments and encouraged the mining companies to contribute more to the welfare of local communities?

## The unemployment rate, HDI and poverty

Arguments for mining development focus on it enhancing the wellbeing of the local community by providing employment to residents and other economic benefits. In the first years of mining operations, local community members tend to occupy the more lowly skilled jobs and provide unsophisticated services to the mine, especially if it is in a remote location. However, as the community matures it is common for local residents to provide services such as vehicle repairs, machine shop services, welding, sheet metal work, plumbing and electrical work.

Jordan struggles with a disproportionately young population with limited job opportunities. The World Bank estimates that in 2018 unemployment rates in Jordan reached over 16% among young men and over 27% among young women. Since 1995, many Jordanian state companies have been privatised due to neoliberal economic reforms, and in many cases this has resulted in a net loss of jobs. State-owned enterprises tend to over-staff, pay high wages and provide generous benefits, so when mining companies were privatised in the 2000s workers, especially in the

south, lost their jobs. Consequently, living standards have declined causing inequality and poverty to rise. In Tafilah, for example, many people previously employed by phosphate and potash companies lost their jobs following privatisation. Before privatisation, 40 buses used to depart from Tafilah every morning to bring workers to the phosphate factory. However, following privatisation, only one bus transports workers to the factory. In addition, staff that were involved in transport and logistics were laid off, affecting many people and their families.

**Figure 4. Cross sectional chart of the value of mining per capita and the unemployment rate from 2010 to 2018**

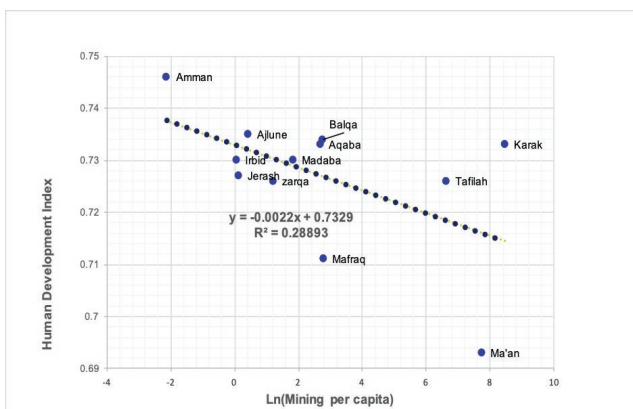


Figure 4 shows a cross sectional chart of the natural logarithm of the value of mining per capita on the x-axis and the unemployment rate in Jordanian cities on the y-axis. As the value of mining per capita increases, the unemployment rate tends to increase. Mining activity is concentrated in the south and it is estimated that southern areas like Karak, Tafilah and Ma'an have the highest rates of unemployment (20%, 22% and 28% respectively compared to the current 19.5% nationwide).

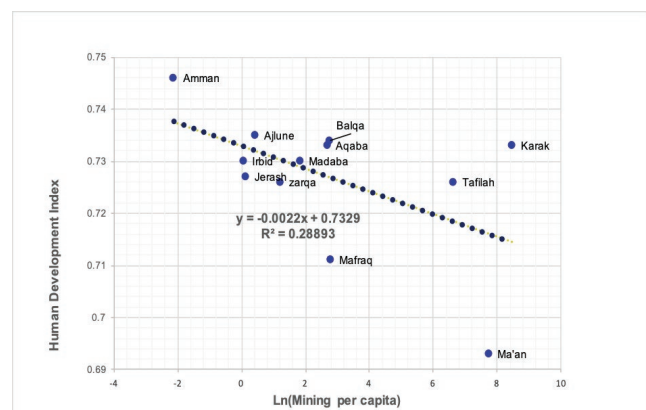
Jordan has made human development a national priority. The country continues to invest significant resources to ensure that all its citizens benefit from access to health and education services and enjoy a reasonable standard of living. One of the main drags on development is deep and chronic inequality, which restricts choices and erodes the social fabric.

The mining regions host fewer economic development projects than the rest of Jordan and their local

communities have been hard hit by stagnating wages and a lifting of fuel subsidies since 2008. While the country's basic industrial sector is a significant contributor to its total output, services still make up approximately 70% of GDP, leading to low wages and unstable work.<sup>22</sup> Two-thirds of all industry is in the capital city Amman and the southern mining areas have only a small proportion of industry, less than one percent of the domestic total, which consists mainly of raw material mining.

Regional human development disparity remains a challenge to the promotion of social equity. As Figure 5 shows, as the value of mining per capita increases, the human development index tends to decrease. The development status of Ma'an, Karak and Tafilah remains relatively weak with HDI values of 0.69, 0.73 and 0.72 respectively.

**Figure 5. Cross sectional chart of the value of mining per capita and the human development index from 2010 to 2018**



Unofficial estimates put the poverty rate in Jordan at 20%. In line with the distribution of poverty in the kingdom, over 55% of households in Ma'an and Karak in the southern mining regions spend the highest proportion of their income on food and drink. In contrast, families in all income groups in the non-mining regions, e.g. Amman, spend the lowest proportion of their income on these necessities. Results show that the highest proportion of family expenditure is on water, electricity and gas, with an average of US\$ 4089, followed by transport with an average of US\$ 3009 and education with US\$ 511. Residents in the

<sup>22</sup> Ibid

centre (e.g. Amman) spend an average of US\$ 20,184, followed by the north (e.g. Zarqa) with expenses amounting to US\$ 16,740. The least spending has been recorded in the mining regions (e.g. Tafilah), at US\$ 12,165.

**Figure 6. Cross sectional chart of the value of mining per capita and the poverty rate from 2010 to 2018**

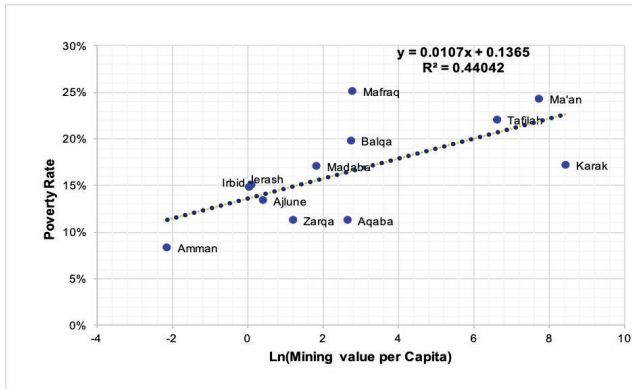


Figure 6 shows that as the value of mining per capita increases along the  $x$ -axis the percentage of the population living below the poverty line tends to increase, especially in the mining regions (Karak, Ma'an and Tafila). The inequality that exists between the affluent and the poor in a community can induce violence, and there are higher violence and rates per capita in the southern mining regions compared to the northern and central parts.<sup>23</sup>

In summary, the percentage of people living below the poverty line in the mining regions is 21.1%, compared to 15% in the non-mining regions. The average human development index in the mining regions reaches 0.71, compared to 0.73 in the non-mining regions, and the unemployment rate is higher in the mining regions ~ 23%, compared to 18.4% in the non-mining regions (see Appendix 2, Table 2.1).

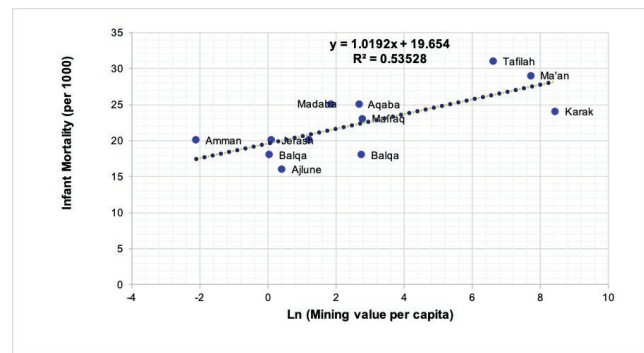
## Health indicators

Jordanian people benefit from a relatively modern health system that is accessible by everyone. Different sources estimate total health expenditure in Jordan

<sup>23</sup> Jordan Department of Statistics (2019). Statistical reports. [http://www.dos.gov.jo/dos\\_home\\_a/main/index.htm](http://www.dos.gov.jo/dos_home_a/main/index.htm)

at around 5.5% of GDP.<sup>24</sup> The southern mining communities have relatively low health indicators compared with the rest of the country. Figure 7 shows a cross sectional chart of the value of mining per capita on the  $x$ -axis and the infant mortality rate in Jordanian cities on the  $y$ -axis. As the value of mining per capita increases along the  $x$ -axis, the infant mortality rate tends to rise.

**Figure 7. Cross sectional chart of the value of mining per capita and the infant mortality rate from 2010 to 2018**



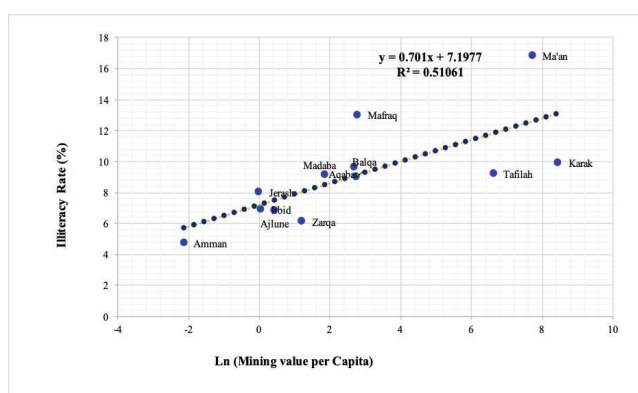
Comparing the health indicators of the mining communities in the country with those of the non-mining communities, when taken as a group children born in the mining communities with a greater dependency on minerals are more likely to die at birth, have poorer health care and nutrition than their resource-poor counterparts and die sooner if they survive at birth. In general, mining regions in Jordan tend to have lower life expectancy for males and females, higher rates of child malnutrition, higher infant mortality rates and higher rates of unvaccinated children. In addition, they are afflicted by higher percentages of people suffering from chronic and heart diseases, and less healthcare is available in the mining regions since most highly qualified doctors do not work there because of the low quality of life (see Appendix 2, Table 2.2).

<sup>24</sup> World Bank, 2019. Data: By country. <http://data.worldbank.org/>

## Education indicators

Given the available resources, education also performs worse than expected in the mining regions, affecting future prospects for growth. Jordan, inadvertently or deliberately, has neglected the development of southern mining communities by allocating inadequate resources to education. As Figure 8 shows, there is a positive correlation between the value of mining per capita and the illiteracy rate, which means that as we move along the *x*-axis the illiteracy rate tends to rise as the value of mining per capita rises.

**Figure 8. Cross sectional chart of the value of mining per capita and the illiteracy rate from 2010 to 2018**



The illiteracy rate in the mining regions reaches 11.9%, compared to 8.1% in the non-mining regions. The adult literacy rate for males and females and the percentage of students with bachelor, master and PhD degrees in the mining regions tend to be less than those in non-mining communities (see Appendix 2, Table 2.3). Flooded with easy money from mining, the government has underestimated the need for strong educational policies in the mining regions, specifically in the southern regions. These could have achieved long-term development benefits and social equity across the country.

In 2018, the Department of General Statistics conducted a statistical survey and found that about 60,000 children were truant and working in Jordan, and that 6,000 of them were aged 5-12 years with most of them in the southern mining regions. The main reason is poverty, which leads these children to work in order

to assist their families. Another reason, which is no less important than the first, is an insufficiency of the educational system in facing the education essentials of students with learning difficulties.

## Environmental indicators

Air emissions, discharges of liquid effluents and large volumes of solid waste are responsible for the most important negative environmental impacts of the mining and minerals industry. There are several examples of these impacts in Jordan from the activities of the phosphate industry. After collecting dust samples from southern and northern Jordan, higher concentrations of arsenic, cadmium, sulphur and phosphates (PO<sub>4</sub>) have been found in the mining regions of Jordan than in the non-mining regions<sup>25</sup>. This might be due to phosphate-handling activities at the port at Aqaba (see Table 1).

**Table 1. Arsenic, Cadmium and Sulphur concentrations (in parts per million) in dust samples in mining and non-mining regions of Jordan<sup>26</sup> in 2002**

Element	Mining regions	Non-mining regions
Arsenic	98	53
Cadmium	13	1.7
Sulphur	12,800	6331.1

## The role of mining companies

Mining companies can support local communities by addressing their needs in ways that raise local living standards and contribute to improving the services provided in different sectors with the aim of achieving social balance and sustainable development. In the areas of social responsibility, investment in the development of local communities and protecting the environment, in 2018 the APC donated more than US\$ 13.7 million, which was spent according to priorities

<sup>25</sup> El-Hassan, T, Jiries, A and Manasrah, W (2002). Qualitative evaluation of the mineralogical and chemical composition of dry deposition in the central and southern highlands of Jordan. *Chemosphere* 48 (9), pp. 933-938.

<sup>26</sup> Ibid



defined in consultation with local authorities and civil society organisations. The donations and grants from the APC were spent on official organisations (32%), health (21.8%), social development (21.1%), education (19.2%), sport (3.3%), trade (1.5%) and the rest on houses of worships and cultural activities (see Figure 9).

**Figure 9. Donations and Grants from the Arab Potash Company<sup>27</sup> in 2018**

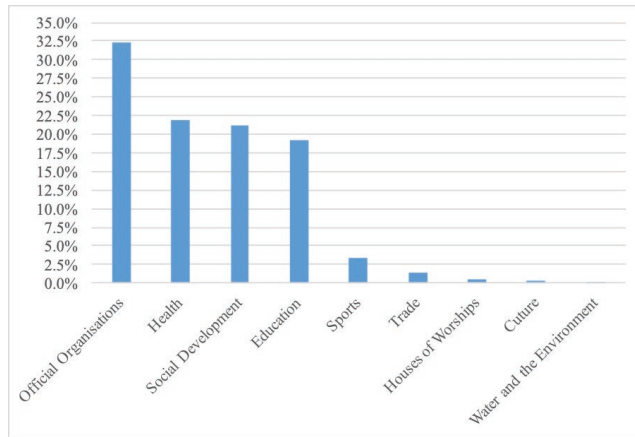


Table 2 shows the total expenditure by mining companies on local community development. The data show that this expenditure ranged from US\$ 1.26 million in 2005 to around US\$ 20.29 million in 2013 and US\$ 14.2 million in 2018, which respectively represented 1.7%, 5.4% and 5.8% of total mining profits. The percentage of local community expenditure covered by mining companies reached its highest point in 2016 (~14.8%) at around US\$ 13.9 million. As can be seen from Table 2, major rises in oil prices generated high demand for bio-fuel, which in turn caused a dramatic upturn in phosphate and potash prices in 2007 and 2008. This development suddenly made mining the fastest growing sector in the Jordanian economy and the net profits of the JPMC and the APC at that time were around US\$ 276.8 million and US\$ 775.5 million respectively.

27 Arab Potash Company (2019). Annual report 2018. <http://www.arabpotash.com/>

**Table 2. Mining company expenditure on local communities all over the country<sup>28 29</sup> from 2005 to 2018**

Year	Total expenditure on local communities in USD (000)	Total mining profits in USD (000)	Percentage of local community expenditure (%)
2005	1,263	75,326	1.7
2006	4,542	77,846	5.8
2007	3,104	276,797	1.1
2008	11,920	775,516	1.5
2009	4,086	316,787	1.3
2010	7,105	342,534	2.0
2011	10,083	627,386	1.6
2012	17,093	466,051	3.7
2013	20,288	369,933	5.4
2014	14,400	169,000	8.5
2015	16,000	233,000	6.8
2016	13,900	94,000	14.8
2017	11,350	127,000	8.9
2018	14,200	243,000	5.8

## The need for a mining policy

There has not been a policy to raise expenditure on local communities when prices for mined resources rise. In 2006, for example, the average price for a tonne of phosphate ore was around US\$ 60 and the percentage of mining company expenditure in the total net revenue of local communities reached 5.8%, but from 2007 to 2009 and after the oil boom the prices suddenly rose to US\$ 350 per tonne but the percentage of mining company expenditure in the total net revenue of local communities did not change. The amount remained at around one to one and a half percent of the mining companies' profits, i.e. less than they distributed in 2006.

28 Jordan Phosphate Mines Company, various years. Annual Reports, Amman, Jordan. <https://www.jpmmc.com.jo/>

29 Arab Potash Company, various years. Annual Reports. <http://www.arabpotash.com/>

Although they have been supportive, there is no specific mining policy that obliges Jordanian mining companies to spend a share of their profits on local community development. The amount of support provided is determined solely by their senior management and boards of directors. In 2005, the JPMC's profits reached US\$ 14.7 million but it only distributed US\$ 2,600 to local communities (Jordan Phosphate Mines Company, 2009), a very trivial amount compared to the amount of profit the company made.

Mineral activities in Jordan at present largely fail to benefit local communities. Policies and rules need to be developed so that part of Jordanian mining companies' wealth (e.g. part of the mining fees, taxes and profits) is better redistributed to local communities in order to offset the local costs of mining. Mining companies in Jordan should negotiate agreements with impacted communities so that the latter receive a share of the benefits that are created by mining activity. These benefits can take the form of employment opportunities, a share in mine profits and investment in local development and infrastructure projects such as roads, schools and clinics.

Practical experience has demonstrated that extensive community consultation should be involved in the drafting of a minerals policy for the country. An absence of community decision-making is likely to result in ineffective or inappropriate arrangements for the distribution of benefits. Decision-making needs to recognise the rights of communities to representation and engagement in processes that affect them, and the interaction between mining projects and communities should be based on the values, goals and aspirations of the communities affected. Mining companies need to be willing to have genuine two-way dialogues with communities. They need to be transparent in their communications from the outset and throughout the life of the mine, and listen to and respond appropriately to issues raised by communities. Communities should be updated at regular intervals or whenever there is a change, such as an expansion or contraction of mining activities.

Where provincial and local government capacity is too weak to deliver services such as roads, health and education, infrastructure tax credits can be useful instruments. The government can permit mining companies to invest in community infrastructure

and offset this against tax liability. In addition, supporting local businesses provides an important means of benefiting communities and building human and financial resources. Preferential procurement policies for local suppliers and distributors should be incorporated into mining agreements and company policy as the employment of local people is essential. If skill levels in the local community are not sufficient at the outset, a staged approach to employment may be necessary, complemented by skills training. Local people should be trained and given the opportunity to hold senior managerial positions, not just the lowest-paid manual jobs.

## Conclusion

Mining operations routinely cause serious social, health and environmental impacts. In virtually all cases, these are disproportionately borne by local communities. Development indicators in Jordan's mining areas, including the unemployment rate, the human development index, the poverty line, health, education and the environment, under-perform relative to those in non-mining regions in the northern and central parts of the country. Improving the living, education, health and environmental standards of local communities would help to attract further investment and thereby sustain them after mine closures.

A policy is needed that obliges mining companies to contribute part of their profits to the development of local communities, especially during price booms. To help local communities generate positive impacts from large mines, the Jordanian government should redistribute some tax revenue from mining to local governments and encourage the mining companies to contribute more to local community welfare. Local communities should participate in decision-making and share the benefits of mining. Local governments and civil society organisations (academia, charities, voluntary entities, clubs, churches etc.) should also work as intermediaries between mining companies and local communities to ensure their right to gain part of the profits is protected. These go-betweens could show both companies and communities each other's fundamental nature and legitimate aspirations.

## Appendix 1

Table 1.1. The distribution of mineral wealth in northern, central and southern Jordan in 2018

Jordan in 2018

	<i>City</i>	<i>Major Minerals and ores</i>	<i>Quantity of production (Tons)</i>	<i>Value of Production (US\$)</i>
<b>North</b>	Ajlune	Quarries	28,000	280,000
	Mafraq	Quarries	35,000	350,000
		Dimension stone	470,000	4,700,000
		Volcanic Tuff	450,000	4,500,000
		Zeolite	15,000	150,000
Irbid	Quarries	200,000	2,000,000	
Jerash	Quarries	25,000	250,000	
				<b>12,230,000</b>
<b>Centre</b>	Amman	Quarries	500,000	5,000,000
	Balqa	Quarries	350,000	3,500,000
		Gypsum	80,000	1,600,000
		Clay	300,000	3,000,000
		Dimension stone	10,000	100,000
Zarqa	Quarries	180,000	1,800,000	
	Limestone	50,000	350,000	
	Gypsum	73,000	1,314,000	
	Zeolite	5,000	50,000	
	Basalt	50,000	750,000	
Madaba	Quarries	80,000	800,000	
	Volcanic tuff	30,000	300,000	
				<b>18,550,000</b>
<b>South</b>	Karak	Quarries	180,000	1,800,000
		Gypsum	150,000	1,500,000
		Limestone	85,000	850,000
		Potash	1,390,000	1,034,600,000
		Bromine	200,000	400,000,000
		Phosphate	2,000,000	140,000,000
	Tafilah	Quarries	250,000	2,500,000
		Gypsum	100,000	1,800,000
		Limestone	5,000	50,000
Volcanic tuff		120,000	1,200,000	
Phosphate		1,000,000	70,000,000	
Ma'an	Quarries	1,500,000	15,000,000	
	Kaolin	1,400,000	14,000,000	
	Glass Sand	700,000	7,000,000	
	Phosphate	4,400,000	308,000,000	
Aqaba	Quarries	70,000	700,000	
	Kaolin	20,000	200,000	
	Glass sand	200,000	2,000,000	
				<b>1,690,608,000</b>
<b>Total</b>				<b>1,721,388,000</b>

## Appendix 2

Table 2.1. Mean, standard deviation and mean differences of poverty, HDI and unemployment between mining and non-mining regions in Jordan

	<i>Non-Mining</i>	<i>Mining</i>
<i>Poverty</i>		
Mean	15.0%	21.1%
Standard Deviation	0.05	0.04
Mean Difference	6.0%	
F-ratio	3.6	
Sig	(0.09)*	
<i>HDI</i>		
Mean	0.73	0.71
Standard Deviation	0.01	0.02
Mean Difference	-0.013	
F-ratio	12.8	
Sig	(0.005)***	
<i>Unemployment</i>		
Mean	18.43%	23.0%
Standard Deviation	0.01	0.04
Mean Difference	5.0%	
F-ratio	13.5	
Sig	(0.004***)	
*Significant at the 10% level **Significant at the 5% level ***Significant at the 1% level The data on Table 2.1 shows that the mean difference is significant at the 10% level for poverty and at the 1% level for HDI and the unemployment rate.		



Table 2.2. Mean, standard deviation and mean differences of health indicators between mining and non-mining regions in Jordan

	<i>Non-Mining</i>	<i>Mining</i>
<i>Infant Mortality</i>		
Mean	20.5	28.0
Mean Difference	7.5	
F-ratio	11.7	
Sig	(0.0064)***	
<i>Life expectancy (Males)</i>		
Mean	71.0	68.5
Mean Difference	- 2.5	
F-ratio	10.0	
Sig	(0.008)***	
<i>Life expectancy (Females)</i>		
Mean	73	71.5
Mean Difference	-1.5	
F-ratio	10.5	
Sig	(0.008)***	
<i>% of children unvaccinated</i>		
Mean	0.73%	0.71%
Mean Difference	-0.02%	
F-ratio	13.3	
Sig	(0.004)***	
<i>% of Children suffering malnutrition</i>		
Mean	1.4%	2.7%
Mean Difference	1.3%	
F-ratio	12.4	
Sig	(0.0058)***	
<i>% of people suffering heart diseases</i>		
Mean	0.57%	0.78%
Mean Difference	0.21%	
F-ratio	4.0	
Sig	(0.07)*	
<i>% of people suffering chronic diseases</i>		
Mean	1.75%	2.5%
Mean Difference	0.75%	
F-ratio	13.0	
Sig	(0.004)***	
*Significant at the 10% level **Significant at the 5% level *** Significant at the 1% level		
The data on Table 2.2 shows that the mean difference is significant at the 1% level for all the health indicators except % of people suffering from heart diseases, which is significant at the 10% level.		

**Table 2.3: Mean, standard deviation and mean differences of educational indicators between mining and non-mining regions in Jordan**

	<i>Non-Mining</i>	<i>Mining</i>
<i>Adult Illiteracy rate (%)</i>		
Mean	8.13%	11.9%
Difference	3.8%	
F-ratio	4.03	
Sig	(0.072)*	
<i>Adult literacy (male)</i>		
Mean	0.95	0.93
Difference	-0.02	
F-ratio	6.0	
Sig	(0.035)**	
<i>Adult literacy (female)</i>		
Mean	0.87	0.83
Difference	-0.04	
F-ratio	4.3	
Sig	(0.065)*	
<i>% of Bachelor Degree holders</i>		
Mean	12.3%	10.7%
Difference	-1.6%	
F-ratio	3.7	
Sig	(0.062)*	
<i>% of Master Degree holders</i>		
Mean	0.68%	0.4%
Difference	-0.28%	
F-ratio	57.4	
Sig	(0.0000)***	
Sig	(0.0000)****	
<i>% of PhD Degree holders</i>		
Mean	0.21%	0.15%
Difference	-0.06%	
F-ratio	17.1	
Sig	(0.002)***	
<p>*Significant at the 10% level  **Significant at the 5% level  *** Significant at the 1% level</p> <p>The data on Table 2.3 shows that the mean difference is significant at the 1% level for all educational indicators except for adult literacy male, which is significant at the 5% level and adult illiteracy rate and % of bachelor degree holders , which are significant at the 10% level.</p>		

# The Role of Civil Society in Resolving the Natural Resources Crisis in Tunisia

Manel Ben Achour

## Executive summary

Since the Tunisian revolution, reforms in the extraction industry sector have not alleviated the waves of demonstrations in Gafsa due to ‘the phosphate curse.’ Movements in Tataouine, notably the Kamour sit-in in 2017, have originated from the oil and gas producing areas. The protesters demanded regional development, social justice and employment. The government repeatedly failed to deal with the increasing number of social movements until civil society intervened to mediate and reach a consensus. Local and national civil society organisations in Tunisia are playing an essential role in ensuring balance and accountability, managing the crisis and promoting transparency in the extraction sector.

**Keywords:** natural resources crises; social movements; civil society; Tunisia

## Introduction

Tunisia's natural resources are concentrated mainly in the central and southern regions. Despite their wealth, these inland areas suffer from poor development, high unemployment as well as social and environmental problems. After breaking with the long years of silence during the Tunisian Revolution, these problems have worsened and the challenges in the productive areas have grown bigger. Protests and sit-ins have arisen and generated local crises which have harmed the national economy through reduced production. Civil society has played an important role in addressing the local communities grievances around natural resources and has demonstrated on many occasions its effectiveness in conducting negotiations, contributing to the resolution of crises and reaching agreements

between all parties. This chapter analyses the state of natural resources in Tunisia and the different crises and challenges in three producing regions – Tataouine, Medenine and Gafsa – since 2011 as well as the role of civil society in resolving them.

## Natural Resources in Tunisia

### Tataouine

The governorate of Tataouine extends over a large area which constitutes 25% of the Tunisian territory and occupies 43.2% of the southern area. Tataouine is endowed with a variety of natural resources, namely clay, sand, gypsum, water and hydrocarbons. It contains the fourth largest global gypsum stock, of very high quality, which makes it an attractive pole for investment in the area. Despite the scarcity of surface water in the region, it has deep groundwater, of which, according to the Ministry of Agriculture, a significant proportion is used in extraction industries. Unlike the rest of Tunisia, Tataouine is known for its hydrocarbons, mainly oil and gas.

According to the Ministry of Industry, the national average monthly gross production of crude oil was estimated during the month of July 2019 at 138,890 metric ton, of which Tataouine contributes 62,578 metric ton, thus providing approximately 45% of Tunisia's total crude oil production.

In Tataouine 13<sup>1</sup> oil companies have exploitation concessions. These include the publicly owned Tunisian Foundation for Petroleum Activities and five private companies: ANADERCO, OMV, ENI, SITEP and Winstar (see Figure 2).

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1 The Tunisian Company of Petroleum Activities. (2020), “List of Concessions”, <http://www.etap.com.tn/index.php?id=1160>

Figure 1. The distribution of crude oil production in Tunisia

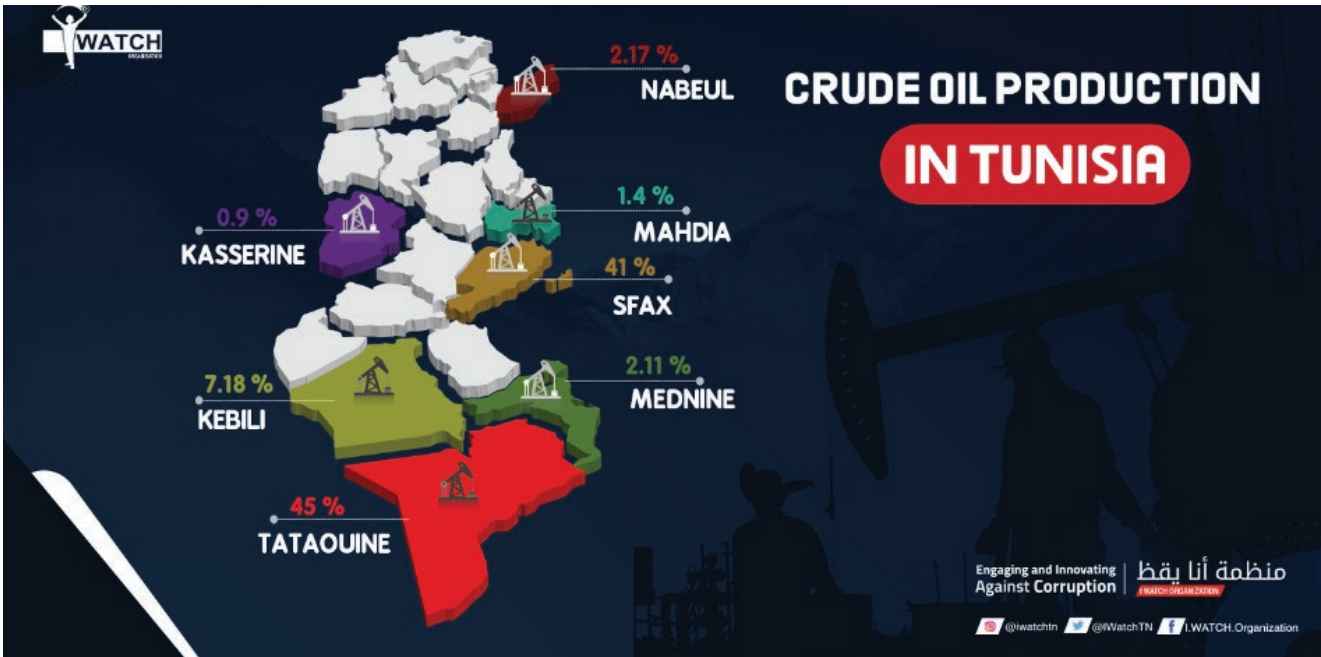
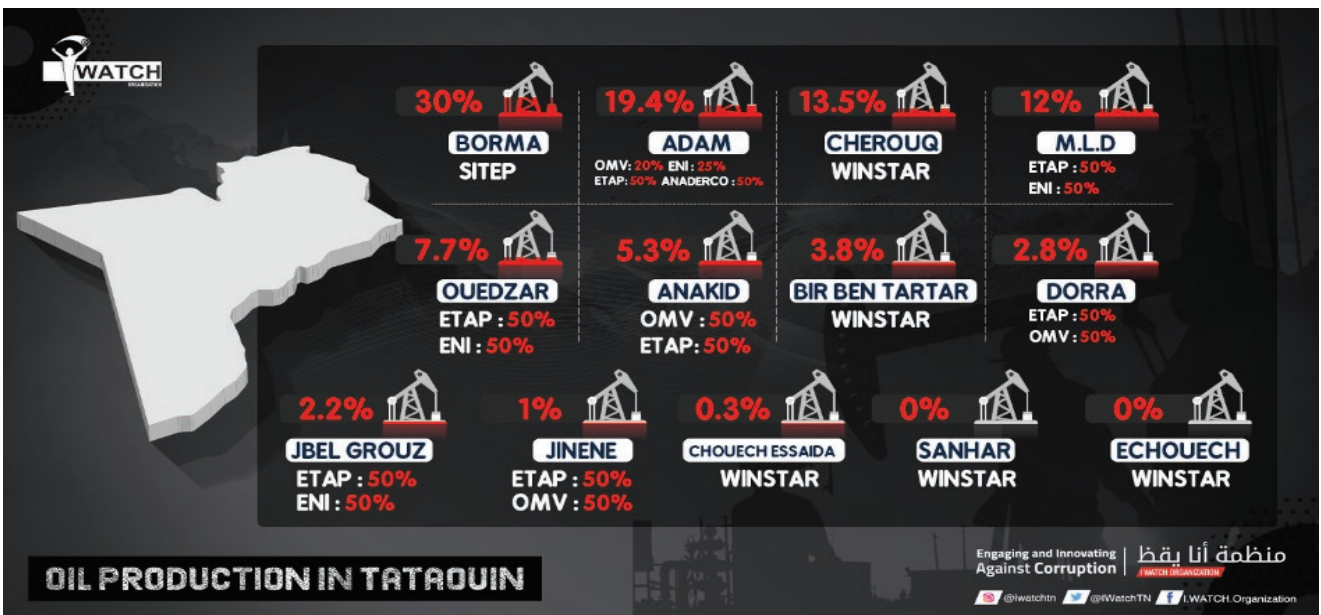


Figure 2. The distribution of crude oil production in Tataouine



## Medenine

The governorate of Medenine accounts for approximately 2.11% of Tunisia's total oil production. Oil is not the most important natural asset in the region since the Sbikha region in Medenine is characterised by the extraction of salt, which is used in many industrial fields, thus creating an opportunity to promote investment in the region.

There are many brine lakes in the region, particularly the Al-Maleh marsh near Zarzis, which extends over 13,200 hectares. These are currently being exploited by the Tunisian General Shipping Company (Cotusal), which is at the centre of turbulence and protests in the region for reasons related to its contract, which dates back to the colonial period. The total production of salt in Tunisia was about 1,280,000 tons in 2015 according to the Ministry of Industry and SME's energy, mining and renewable energy website.

## Gafsa

The governorate of Gafsa is characterised by phosphate production, which is exploited by the state-owned Gafsa Phosphate Company. There are no private companies working in Tunisia's phosphate production sector. However, many private companies operate in the phosphate transport sector. Approximately 32 of them transport phosphate in trucks from the mining basin to Sfax and Gabes.

Transporting phosphates in Gafsa is a sensitive topic and it is the first target for protesters in the region, who recurrently block the road for trucks or the railway. Many such cases of conflict of interests have been identified by IWATCH and by investigative journalists working on the extractive industries. The annual production of phosphate in Tunisia was 3,002 million tons in 2015, a modest figure compared to the annual production before the Tunisian revolution in 2011. Between 1996 and 2010 the production never fell below 7 million tons.

Figure 3. Salt production in Medenine

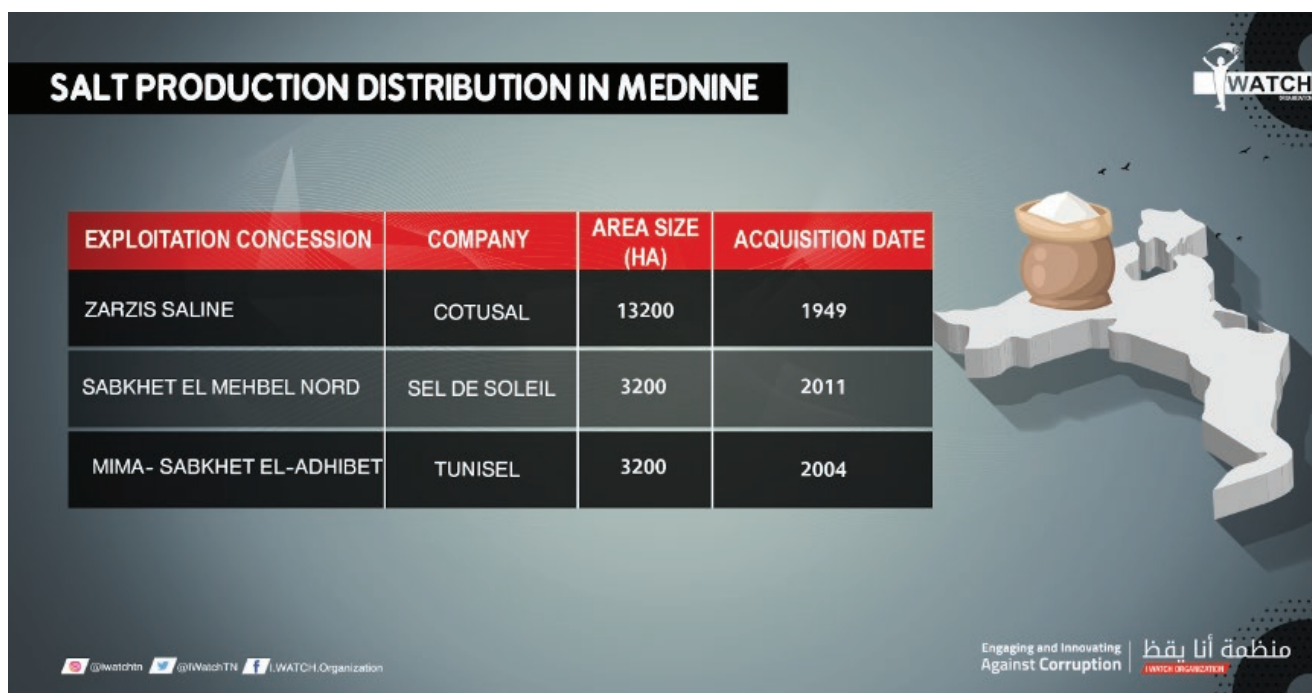
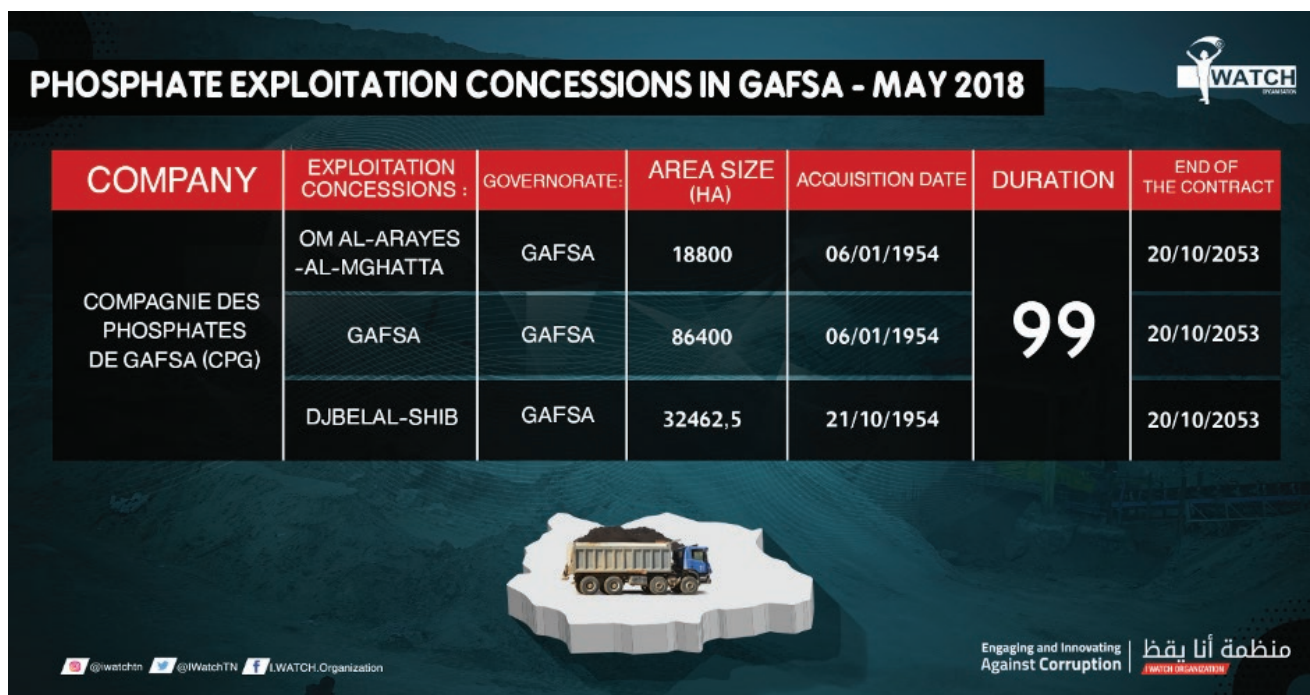




Figure 4. Phosphate exploitation concessions in Gafsa



## Issues and Challenges

### Social Issues and Challenges

The expansion of extraction activities in Tataouine has forced residents to leave their homes and farmers to reduce their activities, as can be seen from the sharp drop in the population size. According to the latest national census by the National Institute of Statistics in 2014, only 18 families, a total of 78 people, still lived in Burj Al-khadra.<sup>2</sup> This number might have further decreased because according to the Independent Higher Authority for Elections only 21 people were registered to vote in 2019.<sup>3</sup>

Regarding labour rights, extraction activities are characterised by precarious employment and by hazardous working conditions that can lead to serious

2 National Institute of Statistics. (2015), "The general census of population and housing" (Arabic), page 157, <http://census.ins.tn/sites/default/files/vol%201%20rgph%202014%20site%20%281%29.pdf>

3 Independent High Authority for Elections. (2018), "Statistics for the 2018 municipal elections" (Arabic), page 142, <https://bit.ly/37QvC3S>

health problems. In 2015, local civil society organisations, local people and trade unions were active on many occasions demanding employment, development, healthcare and transparency in the redistribution of production revenue. The demonstrations took a national dimension in a campaign called *Winou Al-Petrol* (Where is the oil?) and received great media attention. During a demonstration that took place on Saturday 30 May 2015 in Tunis, Sfax and Tataouine, demonstrators demanded more transparency regarding production rates and revenue, denounced the absence of development and called for a redistribution of the benefits from extraction activities.

In Gafsa, the Gafsa Phosphate Company is at the heart of the economy and is the largest employer in the region. Founded in 1897 the company counts more than 6,682 employees, but Local communities believe that its hiring processes are not transparent and involve favouritism, which has generated significant protests led by people rejected in the national selection contests. The governorate of Gafsa has been witnessing such protests since 2008, one of which lasted from April to June 2008 in Redeyef and culminated in the death of 4 protesters, many injuries and 38 trials, including 33

convictions of up to 10 years in prison. This was one of the biggest social movements in Tunisia since 1984.

The governorate of Medenine has similar social problems but on a smaller scale. Since March 2011, tensions between the residents of Zarzis and the Cotusal Company – a mixed capital company with French majority shareholding – have sharply increased.<sup>4</sup> Protesters believe that the company's activities do not benefit the region's inhabitants, either through employment or by promoting development. After decades of fear, the company's workers moved against what they considered remnants of French colonisation denouncing the environmental disasters it has allegedly caused and, more in general, the state of economic marginalisation of the region. The movement against Cotusal started in March 2011 and citizens and local civil society have organised several protests against the interference by the company in the region. Afterwards, the company held a meeting with civil society to decrease the tension.

## Economic Issues and Challenges

The economic problems in the Tataouine Governorate result mainly from the destabilisation of the local economy, which was dependent on agriculture, specifically irrigated agriculture, brought about by the growth of extraction industries in the region. The local population has not benefited from growth of extractive activities and the development of the Tataouine Governorate has remained very weak. Although the sector has contributed to the creation of some jobs, Tataouine's unemployment rate has remained the highest in Tunisia, reaching 32.4% in the second quarter of 2018 according to The National Institute of Statistics. This was twice the national unemployment rate (15.4%) and meant that there were more than 17,000 unemployed people in the region which produces 45% of Tunisia's total crude oil. Tataouine is followed by Gafsa, with a 28.2% unemployment rate, while the governorate of Medenine has a lower rate of 19.9%.

One of the challenges in these areas is the Tunisian government's lack of transparency in the redistribution

4 Nawaat. "Zarzis salt: stolen white gold" (Arabic), Youtube, <https://www.youtube.com/watch?v=rEucQiccgkY>

of production revenue, which feeds the anger and resentment of the local population. Since the revolution, salt, petrol and phosphate production have significantly declined. For example, the annual phosphate production rate in 2019 was approximately the same as that of 1973, a 44% fall from the annual production in 2010. Unlike Tataouine and Gafsa, Medenine is characterised by a greater diversity of economic activity and benefits from a strong tourist sector. Financial uncertainty makes it all the more difficult to monitor and estimate the economic impact of exploitation of natural resources in the region.

## Environmental Issues and Challenges

The oil companies based in Tataouine are located in a military zone and many local people are unable to assess the environmental risks of oil drilling. However, several employees have documented and published information on many environmental offenses in the oil extraction areas and documented environmental abuses in the Tataouine desert, in addition to making short documentaries. With the passing of time and with the involvement of local civil society activists concerned with preserving the environment, the local population is becoming more aware of the dangers that threaten their lives. Civil society organisation attempts to acquire studies on the impact of petrol extraction on the environment have failed.

Because of insufficient technical capabilities and human resources to implement the necessary regulations the control of the National Agency for Environment Protection over oil companies remains weak. In Medenine and Gafsa air and water pollution have led to an increase in cancer cases and caused infertility in both men and women and the emergence of new types of epidemics. According to the testimony of a doctor in Gafsa, cancer is increasing and the number of patients in 2016 exceeded 1,000. He also said that most of the cases are young people, aged between 30 and 40 for lung cancer and between 20 and 30 for breast cancer. Pollution caused by the phosphate company and the chemical complex<sup>5</sup> is one of the causes of the spread

5 Alchourouk. (2017), "Because of artificial pollution in the cities of the mining basin ... "cancer" ... kills the population" (Arabic), <https://bit.ly/37TJn1A>

of cancer, especially in the mining areas, is the Other problems in these governorates include desertification and deterioration of soil quality.

## Protest movements

This section examines three cases of mass protests. These protests were results of the social tensions caused by economic issues and difficulties in the interior regions. The cases are important as they have had a big impact on the social and political situation in Tunisia. They have affected political dynamics as many politicians have tried to use the social instability to their advantage during election campaigns. Successive governments have made promises to solve the economic, environmental and social issues in these regions, particularly regarding investment and employment.

### The Kamour Protests

The accumulation of social, economic, environmental and political issues led to a rise in protest movements. Tataouine unemployment rate is among the highest in country: 32% in 2017, or 15.4 thousand people. In 2017, demonstrations started in Tataouine's Qsar Ouled Dabbab demands related to employment and the development of marginalised areas. The protesters blocked roads and prevented trucks and cars belonging to oil companies from crossing, They demanded the wealth of the region be distributed equitably and that job opportunities be provided to the governorate's locals by the oil companies that operate in the region.

The government sent a ministerial delegation to Tataouine, but negotiations failed to solve the issue and the protesters headed to Kamour, which is a major valve and pump station for oil extraction in an isolated desert region of Tataouine. The prime minister made a second attempt, visiting the governorate and taking 64 decisions over the heads of the local authorities, but the promises he made were deemed insufficient by the protesters. The movement had a national impact, with the support of the Tunisian General Labour Union (UGTT) and the success of the general strike. This led to the intervention by President Beji Caid Essebsi, who

ordered the deployment of the national army to protect oil installations.

Violent confrontations erupted between the protesters and the security forces, which used nerve gas and buckshot, widely known in Tunisia as '*errach*.' A number of protesters' camps and civil protection vehicles were set on fire. 23-year-old Anwar al-Sakrafi, one of the protesters in Kamour died instantly after being run over by a National Guard vehicle. The headquarters of the National Guard and the Public Security Region were also burnt down.

In this critical situation, civil society intervened to relieve the tension and solve the crisis. Various associations contributed in the mediation process but, officially, the secretary-general of the Tunisian General Labour Union conducted the meetings and negotiations with the protesters on behalf of the government, leading to the signature of an agreement on the night of 15-16 June, after more than 3 months of crisis. The UGTT acted as mediator and pledged to guarantee the implementation of the terms of the agreement. The Kamour protesters initially refused to sign but the agreement was eventually signed on the following morning. The honour of signing it was given to Anwar al-Sakrafi's father. The agreement included the creation of 3000 jobs in oil companies between 2017 and 2019 and 1500 jobs in petrol companies before the end of 2019. A budget of 80 million dinars was set aside for the development of the region, and the government pledged it would not prosecute the protesters. On their side, the protesters promised to lift the sit-in, not to disrupt or block the roads, to allow the pump valve to be reopened and the oil companies to return to their regular activities.



## The evolution of the El- Kamour movement

March	• Demonstrations started in Qsar Ouled Dabbab in Tataouine
March 25	• Protests spread to the governorate city centre
April 2	• The Tunisian General Labour Union declared its support and issued a statement
April 4	
April 23	• The protesters blocked the access point to the El-kamour petrol fields
April 27	• the Prime Minister Youssef Chahed travelled to Tataouine and took 64 decisions negotiations with a ministerial delegation
April 29	• Youssef Chahed dismissed Mr. Mohsen Ben Ali, the governor of Tataouine and ended the duties of the delegates from Remada and D'hiba
May 10	• President Beji Caid Essebsi ordered the national army to officially protect oil installations
May 20	• The protesters shut down the oil pump valve
May 21-15 June	• Violent confrontations with the security forces that left a number of victims wounded
16 June	• The government signed an agreement with the Kamour protesters with the UGTT acting as mediator and after pledging to guarantee the implementation of the terms of the agreement

## The Mining Basin Uprisings

Even before the 2011 revolution, the decline in phosphate production coincided with several social and security disturbances in the city of Gafsa. The mining basin uprisings started in 2009 in Al-Rdayef, Omm Al-Arayes, Metlaoui and Al-Mdilah and lasted for six months, with strikes and large protest movements following the results of the national selection contests for the Gafsa Phosphate Company. The protests then took the form of civil disobedience and led to direct confrontations between the repressive

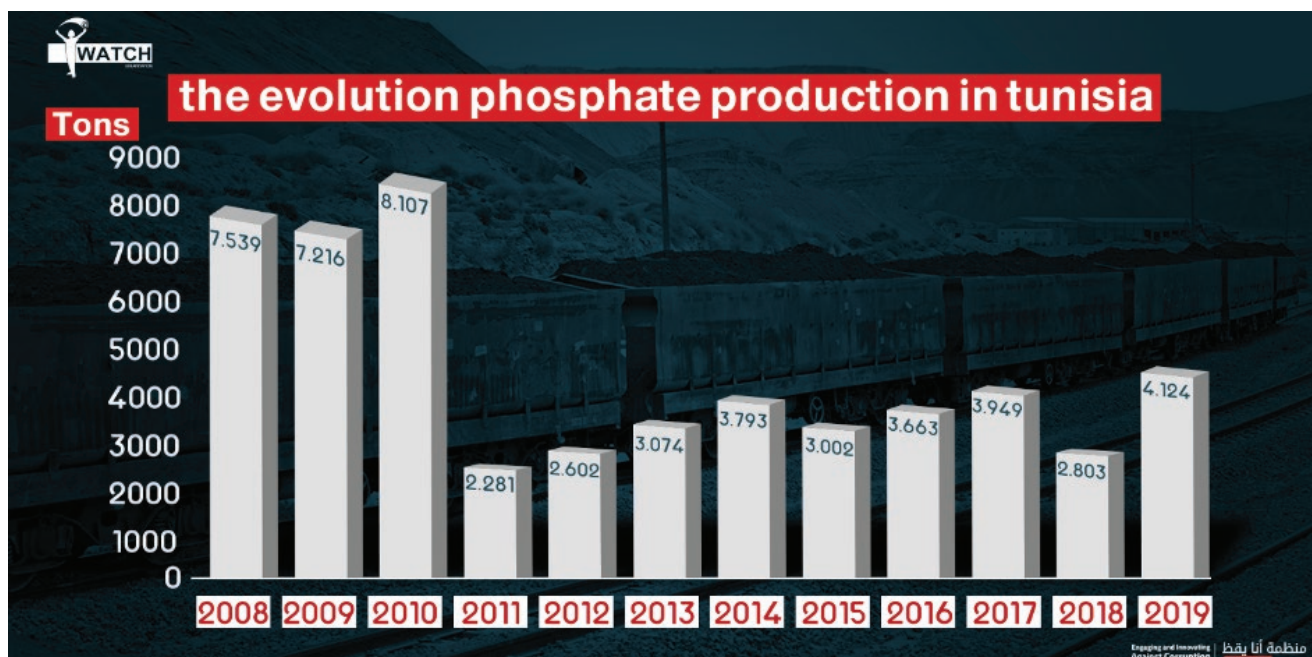
apparatus of the Ben Ali regime and many members of the local community, including unemployed locals, workers, trade unionists and women. Protesters fled to the surrounding mountains to escape. Many civilians were imprisoned, four protesters were killed and at least 25 others suffered from injuries. During this crisis, some local associations made sure that the voices of protesters reached the foreign media and played the role of mediators between the authorities and the protesters. The local labour union was the most prominent civil society actor in the mining basin.

According to the National Institute of Statistics, in 2010 the unemployment rate in Gafsa was 28.3% when the national average unemployment was 13%.

In June 2011 protests culminated in bloody events in the region of Metlaoui, where 13 citizens were killed in disputes between the Al-Jaridiya and Awlad Bouyahyi families over employability after the announcement of the national selection contest results. During these events, civil society was once again the mediator. For example, the Labour Union started a dialogue between the government and the protesters which led to a lowering of the tension.

After the revolution, the waves of protest in the regions around the mining basin increased and production declined from 8 million tons in 2010 to 2 million tons in 2011 due to repeated sit-ins and the disruption of phosphate transport. The protests spread outside Gafsa to the nearby city of Sidi Bouzid, and protesters in the district of Menzel Bouzayan stopped the passage of a train.

Figure 5. The evolution of phosphate production in Tunisia



Civil society organisations, mainly IWATCH, played a major role as a mediator between the administration and the protesters by organising local meetings to discuss the problems in the sector, come up with solutions and put pressure on the authorities. The organisation also conducted investigative research, revealing poor governance and advocating for more transparency.

Civil society was at the centre of events on different occasions, sometimes through the Tunisian Forum for Economic and Social Rights, which accompanied and supported many protesters in their efforts to counter court rulings related to their protest movements. In 2014, several regional meetings were held with officials of the Gafsa Phosphate Company, the National Railway Company and members of civil society organisations, to discuss the decline in production, the social movements in the mining basin and the problematic public contracts. IWATCH used the law on access to information to obtain the contracts and conducted a press investigation revealing that private company lobbies had taken control of the phosphate transport sector after the train was put out of service.

Overall, national and local civil society organisations played a role in calming the situation by reconciling views and calling for the establishment of transparency principles in the governance of the phosphate sector.

### Salt exploitation in Medenine: The case of the Cotusal company

Conflicts in the Medenine governorate, particularly in Zarzis, emerged over the French Cotusal company and the 1949 convention<sup>6</sup> on the exploitation of salt dating back to the reign of the Beys and French colonisation, which is to be renewed automatically until 2029. Cotusal monopolised salt production until 1994 and in 2017 it was still producing almost 70% of the national salt output, of which it exported 77%. The revenue of the sector reached 51 million Dinars in 2016, of which Cotusal benefits from 34 million Dinars. The company employs approximately 430 people at various production sites in Tunisia.

6 Nawaat. (2017), "Action de 100 francs au Porteur", <http://nawaat.org/portail/wp-content/uploads/2017/10/COTUSAL-accord-26-oct-1949.pdf>

The company's activities caused great controversy after the revolution when people decided to break their silence about a controversial agreement which gives it the right to extract salt in southern Tunisia for a period of 50 years at a fixed symbolic price of one franc per hectare per year. The agreement has not been amended for more than 60 years. Civil society organisations and MPs have called for a review of the agreement since 2003.

The agreement between France and Tunisia was supposed to expire in 1989 and provides for automatic renewal every 15 years after 1989, stipulating that if one of the parties wishes to cancel the contract, it must notify the other party 10 years before the expiration.

Zarzis, a city in the governorate of Medenine, witnessed several social movements and sit-ins demanding that the government stop implementing the agreement or revise its provisions. The practices of the French company also negatively affected the environment, agriculture and the fishery sectors. Unregulated exploitation led to the destruction of olive trees on the banks of the marsh and a loss of soil fertility. Fishermen in the region believe that the process of filling basins pushed the fish towards the shore and exhausted the fishery stocks, as was reported in an investigation conducted by Nawat in 2015.<sup>7</sup>

The government ignored the farmers' movements and on many occasions the company tried to engage with the protesters offering small amounts of money as compensation. Despite a commitment it made to review the mechanisms of mobilisation and exploitation of sea water, the company returned to its old practices.

Civil society at the central level gave greater resonance and a national dimension to this controversy, directly influencing decision-makers like the Assembly of the Representatives of the People and the Prime Minister through advocacy campaign and national marches. Civil society was restless in its attempts to track, remind and enforce accountability. In addition,

7 Nawaat. (2015), "The salt of Zarzis: The stolen white gold" (Arabic), <https://nawaat.org/portail/2015/02/05/%D9%85%D9%84%D8%AD-%D8%AC%D8%B1%D8%AC%D9%8A%D8%B3-%D8%A7%D9%84%D8%B0%D9%87%D8%A8-%D8%A7%D9%84%D8%A3%D8%A8%D9%8A%D8%B6-%D8%A7%D9%84%D9%85%D8%B3%D9%84%D9%88%D8%A8/>



many investigations revealed the hidden truths and contributed to mobilising the largest number of advocates.

The work of civil society continued for years until the Tunisian Prime Minister formally announced a decision to suspend the convention and reconsider the terms of the contract on 27 February 2019. However, the company is still set to operate under the old agreement until 2029.

## The role of civil society in resolving crises

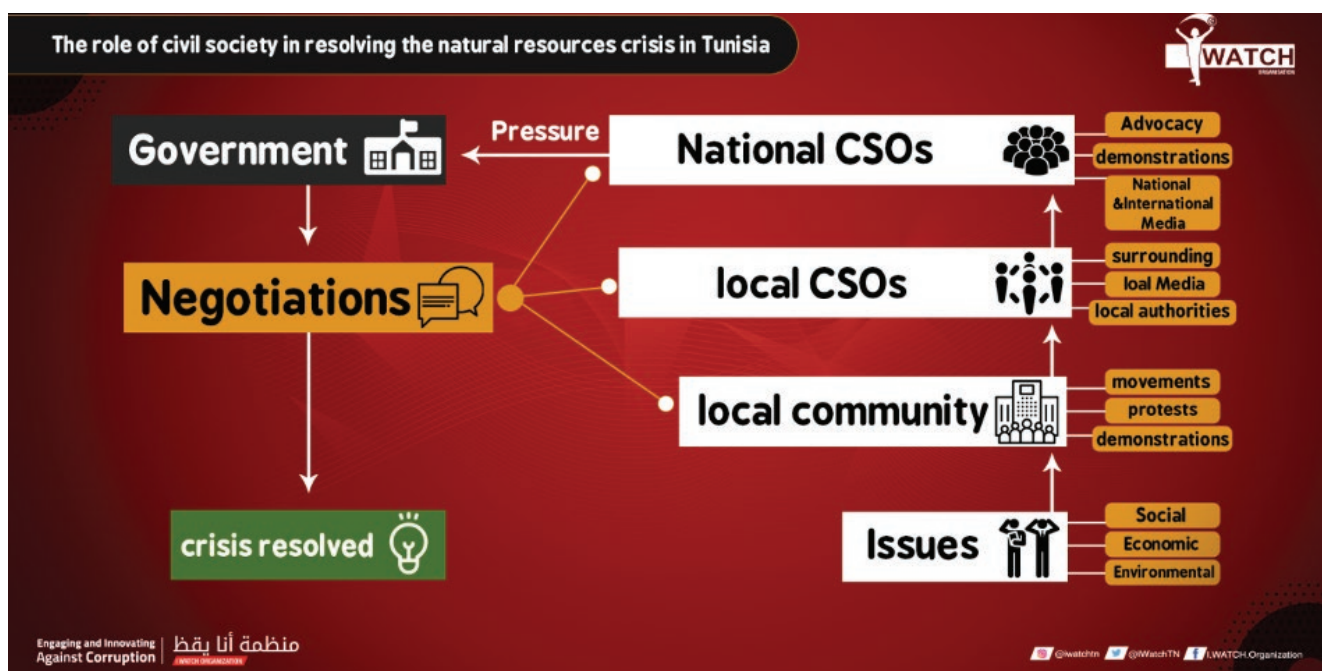
Prior to 2011, associative activities in Tunisia were subject to significant restrictions both in terms of receiving permits and conducting activities. Intelligence services classified associative work as a threat to national security. The political police surveilled the headquarters of associations and followed activists inside and even outside the country. Associations were co-opted and monopolised by supporters of the former regime.

From the womb of the revolution emerged a free civil society which adopted principles of good governance and democracy, and determined to push for change after decades of restrictions and the absence of liberties. After the 2011 revolution, there was an explosion in the

number of associations with more than 100 associations created in less than 3 months. This number continued to grow and reached 22,892 associations by the end of October 2019, according to the official website of Ifeda and the Presidency of the Government's Centre for Information, Training, Studies and Documentation on Associations.

These associations are distributed across the Tunisian governorates, with the largest number of associations in Tunis (20%) and 31.69% in the Greater Tunis governorates, while the presence of associations in the inland cities ranges between 2% and 4%. This distribution has led to a central civil society which has acquired more maturity and experience than local civil society. However, local civil society has an important role in resolving natural resource crises for producers. There is a need to ensure the decentralisation of civil society. Major associations that operate in the capital should not interfere or monopolise associative activities as they do not have a clear and comprehensive idea about the specific needs of local communities. Unfortunately, most funding goes to the major organisations even though they cannot have the same impact as local organisations. They should instead help local civil society to grow and develop and even support it financially and technically. This role of Tunisian civil society is illustrated in Figure 6 below.

Figure 6. The role of civil society in resolving natural resources crisis in Tunisia



Many methods and techniques have been used to resolve conflicts. The first spark always started from the local population as a result of an accumulation of economic, environmental and social problems and most of the actions were related to questioning the results of national selection contests. Taking Gafsa as an example, the protests were mainly due to underdevelopment, increased unemployment, a lack of transparency in the redistribution of natural resource revenue and the fact that the region did not benefit from its wealth.

Local civil society intervened after the first spark of the protest movements. Its role was based mainly on framing and uniting ranks, containing the problem and trying to reach a consensus with the authorities responsible at the local level. For example, during the Kamour events in Tataouine, the local population resorted to local civil society and intellectuals in the region. They coordinated to organise movements and formulate demands. In the absence of a solution or consensus with the local authority, the next step was an escalation by the protesters, such as closing the main oil and phosphate transport routes. If this phase continued over a long period of time, in most cases the police would intervene and the army would be deployed to protect facilities and companies. This recurring vicious circle was due to the inability of local authorities to address the demands of protesters. Such crises were often overcome with the intervention of civil society, the spread of support movements and calls for support from the capital. This is where the pressure on the government, advocacy campaigns in the Assembly of the Representatives of the People and the use of the national media and in some cases the international media began. This phase was the beginning of resolution of the problem and consensus. Support at the national level and mobilisation on an issue affected the government and forced it to intervene and start negotiations.

Negotiations, in which civil society was always present, led to finding common ground and a solution to the problem. Therefore, civil society's role became that of settling conflicts and facilitating discussions to reach effective solutions. For example, IWATCH participated in the negotiations on Kamour and followed up the outputs of the negotiations and promises periodically

on Chahed Meter, a platform that enables citizens to follow up on promises that have been made and promises in progress that have not been fulfilled. In Tunisia this model has usually been adopted in all major protest movements which were fruitful in terms of problem resolution.

Confidence in civil society has grown since the Tunisian revolution, for civil society on many occasions showed its readiness to resolve the conflicts that culminated in 2015. Four national organisations received the Nobel Peace Prize for their success in conducting a national dialogue following the assassination of the politician Mohamed Brahmi in 2013. These organisations intervened to save the democratic transition and avoid dividing the people. They led an inclusive national dialogue that brought all the parties in confrontations together to seek and develop a political roadmap in a participatory manner. The success of this experience has strengthened the role of civil society and created a consensual model for the management of public affairs.

## Conclusion

Civil society has played an important role in ensuring equilibrium and stability during and following democratic transition, as well as in areas with extraction industries or natural resources in general. These areas are more vulnerable to the outbreak of crises fuelled by disparities between different regions and inequality when it comes to social and economic development. This is when the role and importance of civil society is more obvious. In fact, its role is not restricted to negotiating and contributing to the resolution of crises but it also has awareness and a proactive role through investigative research, uncovering the truth, seeking to ensure transparency and awareness of citizen's rights and duties and activating the role of citizen censors. Civil society must keep the same distance from all the parties involved in order to be able to fulfil its role. Civil society should act impartially and independently and set an example of transparency.

In addition to influencing citizens and pushing for building public awareness aimed at achieving social peace, civil society should work at building employees' capacity and help establish good governance in state

institutions in a transitional period, civil society covers areas and fields that the state is unable to reach. Moving from a closed administration and a centralised system to a decentralised and participatory decision-making system, civil society must further safeguard and ensure the success of what is known as the ‘Tunisian exception.’ Civil society, local communities, extraction companies and the government should all play roles to achieve the necessary reforms.

The government is now working on amending the hydrocarbon and mining codes, and civil society should be involved in the reform process. Moreover, the government has to develop mechanisms for communication between decision-makers, civil society and local communities.

Tunisia should join the Extractive Industries Transparency Initiative (EITI)<sup>8</sup> in order to ensure more transparency in the sector. By becoming a member of the EITI, the government should commit to disclose information along the extractive industry value chain. This will ensure good governance and provide the data to ensure greater transparency and accountability in the extraction sector.

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8 The Extractive Industries Transparency Initiative. (2020), “The Global Standard for the Good Governance of Oil, Gas and Mineral Resources”, <https://eiti.org/standard/overview>



## **CONCLUSION**



# Making Sense of the Changing Role of Natural Resources in the Middle East and North Africa

Luigi Narbone and Hood Ahmed

## 1. The Geopolitics of Natural Resources

### The energy scene

The first section of this ebook examined the ongoing changes in the energy and natural resources sectors in MENA, together with how these changes have affected regional geopolitical dynamics and in turn been affected by them. It also looked at how the region could transform itself in the post-oil and gas era.

Among the factors underlying the current transformations in the energy sector, the waning role of oil is the most prominent one. In recent years, the global oil market has been shaken by two parallel developments: the US shale revolution, which has boosted oil supply worldwide, and acceleration of the energy transition in many countries, which has initiated a long-term downward trend in the global demand for oil. While the MENA region holds 60% of proven world reserves, these developments are starting to call into question the Middle East's special status as the centre of global energy supply. The centrality of hydrocarbons remains a defining element for MENA to date, but the region's oil revenue has almost halved in recent years, falling from over \$1trn in 2012 to \$575bn by 2019.<sup>1</sup> After reaching a peak of \$107.95 per barrel in June 2014, oil prices had significantly dropped to \$44 in January 2015 and have ranged between \$30 and

\$70 ever since.<sup>2</sup> In April 2020, Saudi Arabia's oil price war against Russia, coupled with the drop in the global demand induced by the Covid-19 pandemic, even led to an unprecedented crash in oil prices, and oil was for a brief period traded at negative levels.

As lower oil prices are set to continue, so will be the acceleration of a downward trend in rent per capita, which started in the early 1980s, raising serious doubts about the long-term viability of the rentier state model and of the Arab social contract. Lower oil prices have strained the fiscal capacity of states across the region and even the Middle East's oil-rich monarchies have been faced with harsh fiscal policy dilemmas. After 2014, Arab Gulf states were forced to cut subsidies, increase taxation and run budget deficits. Overspending resulted in important reductions in sovereign wealth fund reserves, while pressures to diversify the economies away from hydrocarbons grew considerably. However, the impact of the oil price downturn has not only been limited to oil-producing countries in the region. With a drop in the number of migrant workers and labour remittances from oil-rich countries, lower oil revenues have also impacted the economies of non-oil-producing countries, shaking a long-lasting regional division of labour between oil-rich labour-poor and labour-rich resource-poor countries. With these transformations, the entire regional order has been put into question.

### The gas scene

During the same period, gas in MENA has acquired a new predominance. Over the past decade, massive gas discoveries in the Eastern Mediterranean, accounting for some 5% of global reserves, have presented the region with the opportunity to become a major producer of natural gas, able to satisfy internal consumption needs and to transform the Eastern Mediterranean into an export hub for Europe.

Discoveries have also promoted regional gas cooperation, which culminated in 2020 with the launch

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1 The Economist. (2020), "Twilight of an era: The end of the Arab world's oil age is nigh," *The Economist*, <https://www.economist.com/middle-east-and-africa/2020/07/18/the-end-of-the-arab-worlds-oil-age-is-nigh>

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2 Mead, Dave and Porscha Stiger. (2015), "The 2014 plunge in import petroleum prices: What happened?" *Bureau of Labor Statistics*, <https://www.bls.gov/opub/btn/volume-4/pdf/the-2014-plunge-in-import-petroleum-prices-what-happened.pdf>

of the 'Eastern Mediterranean Gas Forum.'<sup>3</sup> Through the creation of a regional gas market, the Forum can foster the coordination of energy policies and improve both trade and political relations between countries inside and outside the region.

However, not all the dynamics are positive. By excluding Turkey, the Forum has contributed to raising tensions in the eastern Mediterranean. In turn, by drilling and increasing its navy presence off the coast of the divided island of Cyprus, Turkey has heightened tensions with Greece and prompted EU sanctions in response.<sup>4</sup> In addition, in reaction to the Forum's decision and in order to secure its interests in the eastern Mediterranean gas game, in 2019 Turkish President Erdogan signed an agreement on maritime jurisdiction delimitation with Libya's Government of National Accord.<sup>5</sup> The deal was dismissed by European countries and Egypt as illegal under international law.<sup>6</sup> Disagreements over gas exploitation rights have also had transnational ramifications in the Libyan conflict, as Turkey's support for the GNA resulted in reshaping the balance of forces, weakening Haftar's camp.<sup>7</sup>

The above-mentioned examples show how, through a complex web of actions and reactions, developments in the energy field have been able to exacerbate existing geopolitical fault lines and to trigger new divisions and escalatory processes in the region.

- 3 DW. (2020), "EastMed Gas Forum fuels energy diplomacy in troubled region," DW, <https://www.dw.com/en/eastmed-gas-forum-fuels-energy-diplomacy-in-troubled-region/a-55206641>
- 4 DW. (2020), "EU targets Turkey's oil drilling off Cyprus coast," DW, <https://www.dw.com/en/eu-targets-turkeys-oil-drilling-off-cyprus-coast/a-51200320>
- 5 Helal, Ahmed. (2020), "For Turkey, the Libyan conflict and the eastern Mediterranean are inextricably linked," *Atlantic Council*, <https://www.atlanticcouncil.org/blogs/menasource/for-turkey-the-libyan-conflict-and-the-eastern-mediterranean-are-inextricably-linked/>
- 6 DW. (2020), "Turkey-Libya maritime deal triggers Mediterranean tensions," DW, <https://www.dw.com/en/turkey-libya-maritime-deal-triggers-mediterranean-tensions/a-51477783>
- 7 Eljarh, Mohamed. (2020), "Turkey's Intervention in Libya Disrupts the UAE but Opens the Door for Russia," Washington Institute, <https://www.washingtoninstitute.org/fikraforum/view/Turkey-Intervention-Libya-UAE-Russia-USA-Middle-East>

## 2. Conflict, Security and Natural Resources

### The geopolitical dimension

Section two of this ebook explored the links between natural resources and the civil wars that have been raging in the Middle East and North Africa since 2011. Because of their geopolitical and strategic importance for the region, natural resources have historically shaped regional conflicts and it is therefore unsurprising that they have also played a significant role in both igniting and perpetuating the latest cycle of wars. For example, as tensions between Saudi Arabia and Iran soured, concerns over Iranian threats to Saudi energy security and oil supply and delivery have figured high among the Saudi motivations to intervene in the Yemeni civil war. The Kingdom has long sought to create alternative trans-shipment ports and pipelines to bypass the Strait of Hormuz, the world's biggest oil checkpoint, and a stable and friendly Yemen was always perceived as key for Saudi Arabia to achieve this strategic goal.<sup>8</sup> Ironically, however, during the course of the conflict the Houthi heightened the Kingdom's energy security vulnerability by carrying out a missile attack on the Abqaiq oil facilities in the Persian Gulf.<sup>9</sup>

In another example, Russia's and Iran's strategic objectives and the motivations behind their interventions in the Syria conflict have also much to do with the desire to acquire access to natural resources, ports and other key infrastructure for energy supply. Russia sees post-conflict Syria as a natural transit for oil and gas shipments into Europe and Africa and has been positioning itself to take advantage of future opportunities by involving itself in the country's energy infrastructure rehabilitation and reconstruction.<sup>10</sup>

- 8 Johnson, Keith. (2018), "Iran's Yemeni Proxies Put Oil Shipments in Crosshairs," *Foreign Policy*, <https://foreignpolicy.com/2018/07/26/irans-yemeni-proxies-put-oil-shipments-in-crosshairs-saudi-bab-el-mandeb-hormuz-houthi/>
- 9 Orkaby, Asher. (2019), "Saudi Arabia's War in Yemen Is About Oil," *National Interest*, <https://nationalinterest.org/blog/middle-east-watch/saudi-arabia-s-war-yemen-about-oil-90736>
- 10 Watkins, Simon. (2020), "Why Syria Is A Critical Part Of Russia's Energy Strategy," *Oil Price*, <https://oilprice.com/Geopolitics/Middle-East/Why-Syria-Is-A-Critical-Part-Of-Russias-Energy-Strategy.html>

Similarly, the idea of resuscitating the Iran-Iraq-Syria oil pipeline project has also played a role in pushing Iran to get involved in the conflict.<sup>11</sup>

While natural resources have fed and heightened the ongoing conflicts and geopolitical rivalries in MENA, they could also become an important area for cooperation. Improving the region's energy security is of utmost importance for all players. Through greater connectivity, integration and joint investments, stakeholders could enhance energy security at the regional level while boosting economic growth and social wellbeing in MENA. Regional integration and cooperation in the fields of energy and natural resources is an alternative to zero-sum game approaches, but the path has unfortunately been insufficiently explored in the region.

## The struggle for natural resources

The struggle for access to strategic resources has also been an important factor in determining the evolution of these conflicts. State and non-state actors have weaponised natural resources and used them to support and finance combat operations. In both Syria and Iraq, oil fields have become battlegrounds in the fight against Islamic State. Control of oil facilities was an essential part of the ISIS strategy to ensure the economic sustainability of the 'caliphate' and their loss was key in its military defeat.<sup>12</sup> It is also telling that when the US withdrew from northern Syria in October 2019 it maintained troops to guard oil facilities, along with Kurdish-led forces, which are currently the main beneficiaries of production.<sup>13</sup>

Across the region, rebel groups have looted and taken control of natural resources to finance war needs. To facilitate access to funds, rebels have expanded

black markets for natural resources and tried to institutionalise ownership rights, as was explained in Ahrām's chapter in this ebook. Through illicit economic activities rebel groups have created war economies in which natural resource exploitation and smuggling play important roles. War economies have also acquired a regional dimension, with networks which go well beyond the boundaries of conflict countries, further weakening state control over border regions in non-conflict countries too. The high profits deriving from illicit activities have boosted the power of militias and other non-state actors, increasing their capacity to act as spoilers in mediation and conflict-resolution processes. These dynamics linked to war economies and natural resources are likely to have a lasting impact on the region.

## Water and food security

The post-2011 upheavals in the region and their transnational repercussions have led to a primacy of security on the agendas of MENA governments and multilateral organisations. However, the narrow scope of the concept of security adopted has given emphasis predominantly to military responses to terrorist and other threats which have emerged in the region. This limited approach has undermined the capacity to tackle broader human security issues such as environmental threats and threats to food and water security.

The bias in the security approach stems from a tendency to underestimate the impact of the environment on the course of historical events in MENA. On various occasions, environmental threats have affected domestic and even regional security in the region. The recent events in Sudan are a good case in point. A series of floods produced a natural disaster that affected over half a million people and led to food shortages, crippled infrastructure and destroyed livelihoods.<sup>14</sup> This crisis combines with Covid-19 and armed conflict, challenging the transitional government's efforts to consolidate democracy in the country.

## Rising climate and environmental concerns have

11 Middle East Monitor. (2019), "Tehran reactivates oil pipeline project reaching Syria," *Middle East Monitor*, <https://www.middleeastmonitor.com/20190828-tehran-reactivates-oil-pipeline-project-reaching-syria/>

12 Solomon, Erika, Guy Chazan & Sam Jones. (2015), "Isis Inc: how oil fuels the jihadi terrorists," *Financial Times*, <https://www.ft.com/content/b8234932-719b-11e5-ad6d-f4ed76f0900a>

13 Detsch, Jack. (2020), "U.S. Troops Really Are in Syria to Protect the Oil – for the Kurds," *Foreign Policy*, <https://foreignpolicy.com/2020/08/05/kurds-oil-syria-us-troops-trump/>

14 Middle East Monitor. (2020), "UN: More than half a million people affected by Sudan floods," *Middle East Monitor*, <https://www.middleeastmonitor.com/20200912-un-more-than-half-a-million-people-affected-by-sudan-floods/>

further increased the centrality of natural resources for the region's security. Climate change is already affecting the Middle East and North Africa in dire ways. Desertification has led to an increasingly drier and hotter climate, while extreme weather has the potential to make parts of the region uninhabitable.<sup>15</sup> Rising temperatures and the already scarce water resources will put intense pressure on crops, increasing migration and conflict risks. With brown economies that result in air and water pollution and land degradation, MENA countries are further depleting natural resources above sustainable levels. Despite alarming trends that make MENA potentially the region most affected by climate change, it continues to be one of the least prepared to tackle it.<sup>16</sup>

One of the most pressing issues has been the increasing scarcity of water resources. MENA is the world's driest region, with twelve of the world's driest countries and with more than 60% of its population concentrated in places affected by high or very high surface water stress, compared to a global average of about 35%.<sup>17</sup> Left unchecked, climate-related water scarcity is expected to cause economic losses estimated at 6% to 14% of the region's GDP by 2050,<sup>18</sup> the highest in the world. With climate change, resource mismanagement and an increased demand for water from growing populations, rising water scarcity is threatening the region's agriculture and food security.

Transnational dynamics add to this dire picture. The power of hydro-politics in escalating geopolitical tensions has recently been demonstrated with Ethiopia's construction of the Grand Ethiopian Renaissance

Dam and its impact on disputes with downstream Sudan and Egypt.<sup>19</sup> Similarly, in the Euphrates-Tigris Basin, dam construction in Turkey has led to tensions with Iraq and Syria. Israel's water policies have also been politicised to aggravate water insecurity for the Palestinians, triggering a dynamic which has deepened the long-lasting conflict.

### 3. The Political Economy of Resource Exploitation

#### Natural resources and protests

By examining the political economy of resource exploitation, section three showed how extractive industries have failed to foster socioeconomic development, particularly in peripheral regions. On several occasions, the social repercussions of transformations in the energy scene combined with the region's food and water insecurity have challenged political regimes across MENA. In 2018, when the Jordanian government raised fuel and electricity prices, protests erupted across the country pushing the government to withdraw its decision.<sup>20</sup> In the period 2018-20, economic grievances triggered by the energy crisis sparked protests across the Arab world and gave way to what has been referred to as the second wave of the Arab Spring. This also occurred in Iran, where increasing fuel prices and declining access to clean water and electricity contributed to waves of protests in 2019 and 2020,<sup>21</sup> the most violent and severe anti-government unrest since the 1979 revolution.

#### With mineral reserves in the MENA region accounting

15 Young, Michael. (2020), "Will the Middle East Remain Habitable?," *Carnegie Middle East Centre*, <https://carnegie-mec.org/diwan/83256>

16 World Economic Forum. (2015), "Global Risks 2015," Tenth Edition. *World Economic Forum*. Geneva.

17 Fahmy, Nabil. (2020), "The Most Severe Threat Facing MENA," *The Cairo Review of Global Affairs*, <https://www.the-cairoreview.com/midan/the-most-severe-threat-facing-mena/>

18 Hofste, Rutger Willem, Paul Reig and Leah Schleifer. (2019), "17 Countries, Home to One-Quarter of the World's Population, Face Extremely High Water Stress," *World Resource Institute*, <https://www.wri.org/blog/2019/08/17-countries-home-one-quarter-world-population-face-extremely-high-water-stress>

19 European Union External Action Service. (2020), "The Nile and beyond: geopolitics of water," [https://eeas.europa.eu/headquarters/headquarters-homepage/83120/nile-and-beyond-geopolitics-water\\_en](https://eeas.europa.eu/headquarters/headquarters-homepage/83120/nile-and-beyond-geopolitics-water_en)

20 Sweis, Rana F. (2018), Jordan Withdraws Tax Bill That Fueled Nationwide Protests, *The New York Times*, <https://www.nytimes.com/2018/06/07/world/middleeast/jordan-tax-bill-protests.html>

21 Fassihi, Farnaz & Gladstone, Rick. (2019), "With Brutal Crackdown, Iran Is Convulsed by Worst Unrest in 40 Years," *The New York Times*, <https://www.nytimes.com/2019/12/01/world/middleeast/iran-protests-deaths.html>



for over 30% of global reserves, mineral exports figure highly in the region's economies.<sup>22</sup> Mineral resources have increasingly been at the centre of widespread contestation by local communities frustrated at the unsatisfactory contribution of energy and mining companies to job creation and local development. Resource-rich peripheral regions are also suffering from long-term neglect and marginalisation after years of central state development policies favouring investment in metropolitan areas and coastal regions. Protests against the unequal distribution of revenue from natural resource extraction and the environmental and health damage produced by the mining industry have become increasingly vocal. In Tunisia in 2008, in Syria in 2011 and in Sudan and Algeria in 2019, resource-rich peripheries were at the heart of unrest which in time spread to the entire countries.<sup>23</sup> For example, in 2008, Tunisian phosphate miners staged a series of strikes across the interior provinces in what became known as the Gafsa Revolt.<sup>24</sup> Although the strikes were repressed, they helped trigger the cycle of mobilisations that paved the way for Tunisia's revolution and that continued even after 2011. As in Tunisia, mining-inspired protests took place in Morocco and Turkey in 2018 and 2019, with protesters

calling for the redistribution of mining revenue.<sup>25</sup>

Governments in the region have often over-exploited natural resources for short-term economic gains only to suffer from environmental repercussions in a later stage. For instance, in Syria, the pre-war government implemented policies to increase agricultural production so as to garner the support of rural constituents. However, such over-engineering of nature endangered water security by exploiting limited land and water resources without regard for sustainability. Reduced groundwater made Syria more vulnerable to droughts and eventually contributed to unrest.<sup>26</sup> Poor hydrological policies can further socio-economic pressures while causing rapid demographic changes that can result in political instability.

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22 Solomons, Ilan. (2016), "Middle East, North Africa on mining periphery despite hosting 30% of the world's minerals," *Mining Weekly*, [miningweekly.com/article/middle-east-north-africa-on-mining-periphery-despite-hosting-30-of-the-worlds-minerals-2016-04-15](https://www.miningweekly.com/article/middle-east-north-africa-on-mining-periphery-despite-hosting-30-of-the-worlds-minerals-2016-04-15)

23 Ghanem, Dalia. (2019), "Distance and Marginalization: Spatial Disparities in Rural Algeria," *Carnegie Middle East Center*, <https://carnegie-mec.org/2019/11/22/distance-and-marginalization-spatial-disparities-in-rural-algeria-pub-80394>; Abbas, Reem. (2019), "Sudan's protests: The revolt of the periphery," *Al Jazeera*, <https://www.aljazeera.com/opinions/2019/1/28/sudans-protests-the-revolt-of-the-periphery/>

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26 Kelley, Colin P., Shahrzad Mohtadi, Mark A. Cane, Richard Seager and Yochanan Kushnir. (2015), "Climate change in the Fertile Crescent and implications of the recent Syrian drought," *Proceedings of the national Academy of Sciences* 112, no. 11: 3241-3246.



## 4. Towards a new governance of natural resources in MENA

### Trade and cooperation

Natural resources are not necessarily doomed to produce only negative scenarios in MENA. Through new natural resource governance models MENA countries could avoid the benefits from extraction being exclusively captured by politically connected local business elites and multinational companies. The revenue generated by mining could therefore serve to promote re-investment in local development, environmental protection and future generations. It could be invested in education, vocational training and in a general improvement of human capital. It could fund infrastructure projects and increase connectivity both inside countries and with neighbouring nations. In this way, countries in the region, one of the least integrated in the world, could create the conditions for regional integration and improve their insertion in global value chains. Economic integration and regional cooperation could also result in a reallocation of resources to more efficient higher value production activities. Coupled with policies aimed at improving public finance management and increasing the transparency of public policies and accountability of government authorities, countries in the region could better the business environment and become more attractive to national and international investors. All these reforms would give rise to positive developmental dynamics, while economic engagement and cooperation which emphasise mutually beneficial activities would help resolve geopolitical tensions.

There are lessons to be learned from the achievements of other world regions. The EU is the best example of how regional integration has produced over seventy years of peace and shared prosperity. But there are several other examples around the globe which show how historical and geopolitical tensions can be overcome through cooperation. In East Asia, for instance, China is Vietnam's biggest trading partner despite both countries having suffered from historically

tense relations.<sup>27</sup> Similarly, China is the biggest trading partner of Taiwan and many other Asian countries.<sup>28</sup> Through the African Continental Free Trade Area, Africa has embarked in an ambitious process of economic integration which has the potential to spur economic growth, spreading technological innovation, reducing dependency on foreign markets and triggering positive transformations which directly benefit the populations of the continent. Trade, greater connectivity and economic diplomacy can be powerful tools in fostering sustainable economic development and increasing human wellbeing.

### Conflicts and resource management

Conventional wisdom condemns illicit wartime economic activities as predatory tools that sustain wars. However, formalising natural resource-based black markets could also be a helpful way to foster peacebuilding. Natural resource revenue-sharing plans in peace agreements can enhance economic recovery, restart growth and contribute to peace. The examples of Botswana, Namibia, Brunei and Gabon show how natural resources can help rebuild fragmented markets and transform natural resources from weapons to tools to strengthen peace.<sup>29</sup>

At a broader level, breaking the cycle of conflict in the MENA region requires reforming natural resource governance. This dimension needs to be built into resolution settlements. Studies have found that fewer than a quarter of peace negotiations aiming to resolve conflicts linked to natural resources have addressed

27 Truong-Minh, Vu. (2015), The Politics of "Struggling Co-evolution: Trade, Power, and Vision in Vietnam's Relations with China," *The Asian Forum*, <http://www.theasianforum.org/the-politics-of-struggling-co-evolution-trade-power-and-vision-in-vietnams-relations-with-china/>

28 Norris, William. (2013), "Economic Statecraft as a Tool of Peacemaking? China's Relationships with India and Russia." Chapter in Blanchard, Jean-Marc F. and Norrin M. Ripsman, *Economic statecraft and foreign policy: Sanctions, incentives, and target state calculations*. Routledge, 2013.

29 Onder, Harun & Cordella, Tito. (2016), "Cash for peace? How sharing natural resource revenues can prevent conflicts," *Brookings*, <https://www.brookings.edu/blog/future-development/2016/12/05/cash-for-peace-how-sharing-natural-resource-revenues-can-prevent-conflicts/>

resource management programmes.<sup>30</sup> The absence of such mechanisms makes conflicts almost twice as likely to relapse into renewed conflict in the first five years of peace.<sup>31</sup> This is highly relevant to the now frozen conflicts in MENA as conflict stalemates deprive local actors from fully benefiting from resource exploitation.

Resource management programmes can help in resolving resource-linked disputes, such as those related to distribution of land or the allocation of oil revenues. They can also include an environmental assessment to serve peacebuilding objectives, helping to restore sustainable water, sanitation, energy and other basic services. By introducing co-management approaches that share responsibilities between the central government and the resource users, such programmes can also limit predatory behaviour by political and business elites. Finally, reforming the governance of natural resources allows countries to attract foreign investment and knowledge-sharing, while a transparent and accountable revenue management system can facilitate a peaceful political transition, as is demonstrated by the post-independence trajectory of oil-dependent Timor-Leste.<sup>32</sup>

More than designing resource management programmes, the international community can assist in enforcing them. Governments emerging from conflict are generally fragile, which reduces their capacity to regulate natural resource exploitation and resolve disputes over property rights and revenue. The end of conflicts opens the way to foreign investor bids for previously inaccessible resources, but governments are often unable to effectively negotiate concessions with large multinational firms. Mismanagement of resource exploitation can lead to a revamping of conflict dynamics, as is demonstrated by the case of Sudan. Towards the end of the second Sudanese civil war, oil became an incentive to end the conflict, as the conflicting parties needed to ensure a minimum level of collaboration among themselves to attract the high levels of foreign investment necessary for oil

30 Matthew, R. A., Brown, O. & Jensen, D. (2009), "From conflict to peacebuilding: the role of natural resources and the environment," *UNEP/Earthprint*.

31 Ibid.

32 Cali, Massimiliano. (2014), "Trading away from conflict: using trade to increase resilience in fragile states," *The World Bank*.

exploitation. On the contrary, after South Sudan gained independence, with the institutional setting of the new country being unclear, foreign companies negotiated and made deals for licenses with several institutions, including military and government officials, many of whom demanded a personal stake in mining projects. In 2010 the resulting widespread corruption and confusion led the Southern Sudan Legislative Assembly to declare a moratorium on new mining licenses.<sup>33</sup> With the passing of a new mining act in 2012 the moratorium was lifted, but the proliferation of mining licenses continued to cause conflicts over land and resource rights between communities, investors and the government. Granting natural resource concessions without considering the people holding rights to land under customary tenure can lead to a resumption of conflict. International donors could assist recipient countries in strengthening their administrative capacity to negotiate and implement mining concessions, which would help address these issues.

## Water security

Approaches to water security in MENA have privileged high-level interstate initiatives, high-modern 'solutions' to water insecurity and expensive infrastructure development schemes that appear to benefit sections of societies that already enjoy a high degree of water security such as those in urban industry and commercial agriculture. They also often result in increasing marginalising those who stand to be the most affected by water insecurity such as the rural and peri-urban poor. Local economies and marginalised rural populations which are highly dependent on agricultural production are often the victims of grandiose water and irrigation schemes, which help hollow out traditional agriculture. For example, in constructing the Aswan High Dam, the Egyptian government controversially displaced Egyptian Nubians, which had wide-ranging repercussions on

33 Bruch, Carl, Lydia Slobodian, Sandra S. Nichols, and Carroll Muffett. (2016), "Facilitating peace or fuelling conflict? Lessons in post-conflict governance and natural resource management." In *Governance, Natural Resources and Post-Conflict Peacebuilding*, pp. 953-1040. Routledge.

the marginalisation of Nubians that persists today.<sup>34</sup>

Agriculture is also the biggest consumer of water and the mainstay of rural economies. Efforts to improve the productivity of water use and to produce higher yields and income with less water will also help cut pressure on shared basins.<sup>35</sup> At the same time, international water agreements which include mechanisms to address changing social, economic or climatic conditions could represent an effective contribution to solving the problem of water scarcity. Tensions over water in the region have predominantly assumed a zero-sum game character in which one country's access to an increased share of water means that another country will suffer the consequences in inverse proportion. But transboundary water issues cannot be solved through national policies and the lack of international agreements over shared water resources poses a challenge to stability.<sup>36</sup> In addition, promoting agreements between different stakeholders can highlight the external incentives and shared economic interests that can accrue from such cooperation. Negotiations over the allocation of the Tigris and Euphrates Rivers, for example, could include adjustable allocation strategies, water quality standards, response strategies for extreme events such as droughts and floods, amendment and review procedures in the event of disputes and joint management institutions.<sup>37</sup> Such policies can allow countries to pursue their developmental visions without having to compete over water.

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34 Diab, Khaled. (2012), "Hope for the Egyptian Nubians damned by the dam," *The Guardian*, <https://www.theguardian.com/commentisfree/2012/apr/21/egypt-nubians-dam>

35 Harrigan, Jane. (2014), *The political economy of Arab food sovereignty*. Springer.

36 Steduto, Pasquale, Lars Anders Jagerskog, Christopher Ward, Edoardo Borgomeo, and Sandra Meryl Ruckstuhl. (2018), "Water Management in Fragile Systems: Building Resilience to Shocks and Protracted Crises in the Middle East and North Africa." No. 129634. The World Bank.

37 Ibid.

## Corporate social responsibility and natural resources

One of the free-market technocratic assumptions concerning natural resources in MENA is that poor governance would be reduced by boosting international private sector investment, which would in turn promote technological modernisation and rapid growth in countries. However, empirical evidence shows that gains from mining do not automatically translate into sustainable development for countries and neither do they trickle down to the general population and to local communities. Both Alrawashdeh's and Achour's chapters in this ebook have shown how the asymmetric distribution of benefits has reinforced social exclusion while also aggravating the inequality between capitals and peripheries. States in the region have been incapable of controlling and regulating natural resources to ensure a more equitable distribution of profits. There is, therefore, a need for bottom-up approaches that give local communities a voice in the governance of natural resources.

To respond to the legitimate demands of marginalised local communities, policymakers in the region should establish appropriate policies to retain and reinvest locally part of the value created by industry. Responsible private sector investment could be achieved through support for the adoption of voluntary international standards by companies and through publicising local and international accountability mechanisms that have helped communities make their voices heard. Over recent decades, several international good governance initiatives have emerged to address resource management challenges.

These initiatives were introduced by Western NGOs to attenuate the impact of lootable resources on civil conflict, increasing the odds that resource revenue would be used in economically rational pro-development ways that contribute to political stability and the improvement of human rights. Over time, these initiatives were expanded to address longer-term development considerations beyond conflict resolution. However, while these initiatives have centred on Africa, where abundant resources and weak institutions have deepened conflicts, none have focused on the MENA region.

The effectiveness of these initiatives has varied depending on the industry structure and the vulnerability of major extractive firms to international shaming campaigns. They are also sensitive to the political interests of the dominant powers, the relative importance of human rights concerns and geological and other considerations that affect the availability of alternative sources of supply, together with the technical ability to implement certification procedures. It is not a coincidence that these initiatives have targeted primarily poor weak states and not major resource producers such as Russia or the Gulf states, where challenges with respect to transparency and human rights can also be found.

The MENA region could benefit from adhering to the Extractive Industries Transparency Initiative (EITI) and the National Resource Charter (NRC), which can trigger reforms of political accountability and more transparent and effective management of natural resources.<sup>38</sup> The EITI provides a global standard for transparency in the oil, gas and mining industries, while the NRC, which builds on the transparency initiative, offers more comprehensive principles for governments and societies on how to best harness the opportunities for development generated by extractive commodity windfalls. Of all the countries in the region, only Yemen and Iraq participate in the Extractive Industries Transparency Initiative, but Yemen was suspended after 2013.<sup>39</sup>

However, the region's other highly resource-dependent countries, including Algeria, Libya and Saudi Arabia, would benefit from the transparency and public dialogue that comes with participation.

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38 Revenue Watch Institute. (2013) "Resource Governance Index: The Middle East and North Africa," *Resource Governance*, <https://resourcegovernance.org/sites/default/files/countrypdfs/Index-MENA.pdf>

39 Ibid.





QM-04-20-713-EN-N



Publications Office  
of the European Union



With the support of the  
Erasmus+ Programme  
of the European Union

doi:10.2870/082270  
ISBN:978-92-9084-953-7