



# GLOBAL WARMING, THE ENVIRONMENTAL CRISIS AND SOCIAL JUSTICE IN YEMEN

Helen Lackner

To cite this article: Helen Lackner (2020): GLOBAL WARMING, THE ENVIRONMENTAL CRISIS AND SOCIAL JUSTICE IN YEMEN, Asian Affairs

To link to this article: <https://doi.org/10.1080/03068374.2020.1835327>



Published online: 19 Nov 2020.



Submit your article to this journal [↗](#)



View related articles [↗](#)



View Crossmark data [↗](#)



## THE ENVIRONMENT AND SOCIAL JUSTICE IN ASIA

# GLOBAL WARMING, THE ENVIRONMENTAL CRISIS AND SOCIAL JUSTICE IN YEMEN

HELEN LACKNER

Helen Lackner is a visiting fellow at the European Council for Foreign Relations and a research associate at SOAS University of London. Her most recent book is *Yemen in Crisis: Autocracy, Neo-Liberalism and the Disintegration of a State* (Saqi Books, 2017). She is a regular contributor to Open Democracy, Arab Digest, and Oxford Analytica, among other outlets. She lived and worked in Yemen for over 15 years between the 1970s and 2010s.

### Introduction

With a full-scale internationalised civil war now in its sixth year, environmental issues are not at the forefront of discourse about Yemen. However they present fundamental challenges to the future of the country and its people, requiring both urgent and long-term action, as they will determine whether millions of Yemenis can continue to live, let alone thrive, in their country once the war is over. This article summarises the current status of Yemen's major environmental problems and their socio-political implications, in particular the extent to which they are worsening issues of social justice.

Environmental problems in Yemen include rising sea levels, soil deterioration, changes in rainfall patterns causing worsened droughts and floods, all affecting water availability in a country which is already suffering one of the world's worst cases of water scarcity. All these are extremely important as the country depends on imports for about 90 percent of its basic staples and 70 percent of its population are rural. Close to six years of military action have also had a significant immediate as well as long-term impact on the environment.

While briefly summarising the major environmental issues, this article includes two brief case studies as examples of the impact of these issues in worsening inequality: first, the series of disastrous floods in 2020 and, second, the situation in Soqatra.

## Yemen's climate

Climate change is not a remote and distant prospect in Yemen. It is already part of people's daily experience, although its future different impact in different parts of the country is difficult to predict. 'Unprecedented' catastrophic climate events have been taking place in recent years at a rate which almost make them routine. Overall, the World Bank forecast of 2010 remains valid, with three main scenarios for Yemen, the most likely being 'hot and dry' and 'warm and wet.' Regardless of which actually materialises,

Yemen will be getting warmer, most likely at a faster rate than the global average ... there will be more variability of rainfall patterns within years [and] there will probably be an increased frequency of intense rainfall events and therefore possibly an increased risk of floods.<sup>1</sup>

More recent studies have gone into greater details of likely developments, focusing on the expected very different impacts in the six different agro-ecological zones. Yemen's climate is arid: most of the country has less than 50mm rainfall per annum. Some highland areas have up to between 250 and 800 mm annual rainfall; hence this is where most of the population lives. Much rainfall is lost by evaporation: only 6 per cent ends up in the spate flows amounting to about 2 billion m<sup>3</sup> annually.<sup>2</sup> Changing rainfall patterns are mostly the result of human action at the planetary level, but local actors also play a role. In the past half-century, temperatures in Yemen have increased by 1.8 degrees centigrade and there has been a decrease of 9 per cent in total annual precipitation during this period.<sup>3</sup> With a wide range of regional variations, forecast of temperature rises average 2.3 degrees with longer heat waves.<sup>4</sup> The expected increase in rain fall and temperatures in the temperate highland zone is not expected to reduce the country's dependence on imports of basic staples [rice, wheat, sugar, tea], regardless of any local increases in production. By contrast, significant yield reductions are likely in other parts of the country, while desertification of existing agricultural land (currently at the annual rate of 3 per cent) will persist or worsen. Unsurprisingly both these studies predict more numerous and grave disasters, including floods, land degradation and destruction of infrastructure.

## Climate change and social justice

Climate change in Yemen is primarily manifested through the water crisis: worsening irregularity of rain episodes and of the timing and duration of rainy seasons prevents people from planning their agricultural

cycle for rain-fed agriculture, as practised on 60 per cent of cultivated land. More violent downpours reduce infiltration, and thus the replenishment of aquifers, as well as destroying agricultural and other infrastructure, from *wadi* banks to terraces, creating a snowball effect that accelerates deterioration.<sup>5</sup>

The increasing frequency and intensity of both floods and droughts has a significantly worse impact on the poor in a variety of ways: first, they are those with small and less productive rain-fed holdings or on pasture for their livestock, thus their incomes are insufficient for daily survival, let alone savings, as they are dependent on the vagaries of the weather. Second, they usually live in areas more vulnerable to environmental disasters. Third, in many areas their housing has low resistance to strong winds and massive downpours; this is particularly the case for displaced people and those from the most marginalised social groups. Finally, they have neither the physical (due to years of malnourishment) nor the financial resilience to plan for disasters, for example by moving to healthier locations, engaging in alternative economic activities or repair and reconstruct their homes.

Yemen's environmental problems are primarily caused by human action, both locally and internationally over a long period of time. Like most aspects of climate change, the politically-correct euphemism for what is more accurately defined as global warming, environmental developments are affected by human action in wealthier countries. While bearing a microscopic responsibility for this phenomenon, alongside other poor countries, Yemenis suffer from the consequences of the actions of the Northern/Western states which produce most of the emissions causing the world environmental crisis.<sup>6</sup> The most obvious case of this is the issue of rising sea levels: although, unlike other aspects of global warming, this one has not yet had a major impact on living conditions, the rise of sea levels in coming decades is expected to threaten three of the country's major cities, Aden, Hodeida and Mukalla, as well as, of course, the dozens of small artisanal fisher settlements along the Arabian and Red Sea coasts.

### **Oil pollution and the war's direct impact on environment and health**

Prior to the war, other than the clearly inequitable management of water discussed below, the main environmental damage was caused

by hydrocarbon exploitation. In Hadhramaut, Shabwa and Mareb, the main oil-producing governorates, little, if any, attention was paid to mitigating measures to protect the environment and in particular the air people breathe. Dangerous chemicals were re-injected with precious water into oil wells to increase pressure, and in other extraction processes. People in the affected areas complained of increased incidences of cancers as well as 'new' diseases. I clearly remember conversations in wadi Sah [Hadhramaut] and in Shabwa with communities who complained of increased human and livestock diseases as a result of the pollution of their water resulting from the oil extraction process, now clearly confirmed and demonstrated by Al Tamimi et al, who, concerning the field near that area state that 'the Masila block14 oil-production operation might be more accurately described as a water production operation with an oil by-product' (p 929).<sup>7</sup> As is often the case, the people failed to prevent damage or obtain any compensation as the oil exploration companies were linked to Saleh regime cronies, ensuring that such complaints were officially ignored. It has been demonstrated elsewhere how difficult it is to prove in the courts that energy production [whether oil or nuclear] is directly responsible for increased incidences of diseases primarily caused by the environmentally damaging side effects of energy production.<sup>8</sup> Companies hire expensive legal advice, while communities are poorly represented and usually lack the technical evidence necessary over decades, for example being unable to provide comparative health data between pre- and post-oil exploitation. Governments usually support the companies rather than their citizens: Yemen is no exception here. A few hundred impoverished Yemenis from remote areas never even got the opportunity of bringing their cases to a court. This does not detract from the fact that many have suffered disease and probably death as a result of the carelessness or indifference of profit-oriented oil companies who were unwilling to reduce their profits by providing the necessary environmental protection.<sup>9</sup>

While the war has reduced oil extraction, it has added a further environmental problem affecting a multiplicity of rural and urban areas in the country: land mines and other types of unexploded munitions caused by air strikes as well as ground military attacks. The majority of these are from the current war and found throughout the country and result both from the action of the coalition and of the Huthi movement. The Huthis control the majority of the country's population, though only about a third of its territory; they have placed land mines wherever they had fronts; the same has been done by the internationally-

recognised government (IRG) and the various groups allied to it, or indeed fighting it, such as the Southern Transitional Council (STC). Coalition air strikes have dropped bombs including cluster munitions which failed to explode, injuring people for decades after the attack, as do landmines. Unexploded munitions are found in towns, villages and cities, causing danger to adults and children whether playing or trying to rescue personal belongings or reconstruct damaged houses. In rural areas, they threaten livestock and their herders (often children), as well as preventing cultivation of fields which could otherwise contribute to crop production and food security, at a time when people are hungry and need to earn a living in an economy suffering deep recession.

In addition the bombing and destruction of Yemen's already limited infrastructure is contributing further to environmental deterioration as vehicles further damage slopes and wadi banks when they cannot use the roads or bridges.

### **Inequitable Rural Water management and its impact on social justice.**

Before discussing the issues of floods and droughts, this section examines the situation in rural areas. As just mentioned, many rural people have lost agricultural and pasture land from military action and the presence of landmines and unexploded ammunition. But overall, livelihoods in these areas have suffered for decades from water scarcity for three main reasons: rapid population growth, averaging 3 per cent per annum, which has increased demand and thus reduced per capita water and land availability over generations to well below self-sufficiency levels for domestic, let alone agricultural use. Second, the introduction of diesel-operated pumps and deep well drilling technology for irrigation has enabled extraction of water significantly above recharge levels, thus causing depletion of the aquifers. Third, increasingly violent downpours have further reduced replenishment, as the loss of top soil prevents absorption of flows, particularly where terraces have deteriorated following decades without maintenance as people relied on other sources of income during the peak international migration period of last century. As is all too often the case, the impact of climate change is expected to disproportionately affect the most vulnerable groups, the rural poor and women who, moreover, are likely to suffer from increased exposure to extreme weather events [droughts, floods] and have insufficient resources to recover from climate disasters.

The following is based on pre-war data, largely because no recent reliable data are available. In addition, readers should note that all figures should be considered indicative of trends rather than absolute and statistically correct: with respect to water, actual data are scarce. Yemen is currently using about 3.4 billion m<sup>3</sup> of water annually; one-third of which is from non-renewable fossil aquifers and most of the rest is from shallow aquifers, as there are no permanent river flows.<sup>10</sup> The World Bank estimated in 2010 that the country's groundwater reserves are likely to be depleted by about 2040,<sup>11</sup> though there have been estimates suggesting far earlier dates. Per capita water availability has dropped steadily in past decades as known available resources have remained static, if not diminished, while the population has increased. In 2018 per capita availability was estimated at 95m<sup>3</sup>, expected to drop to 55m<sup>3</sup> by 2031, at a time when anything below 500m<sup>3</sup> is considered absolute water scarcity.<sup>12</sup> As in many other countries, about 90 per cent of the country's water is used in agriculture [rain-fed and irrigated], about 8 per cent of water is used for domestic consumption and 2 per cent for industry, a situation that provides the basis for a solution to basic survival: a small transfer of water out of agriculture and into domestic use would have a major impact on the ability of Yemenis to continue living in their homeland. The situation is not one of 'water today, none tomorrow', the change is gradual and villages have already been abandoned due to the lack of domestic water, while fields remain fallow as farmers either sow seeds which do not germinate or grow due to lack of rain, or alternatively do not even bother sowing when there is no prospect of rain.

The expansion of well-irrigated agriculture in the past three decades has been considerable, increasing from 37,000 ha in the 1970s to more than 400,000 ha in the 2000s, which partly explains the worsening water crisis. During the same period, as irrigated areas increased by a factor of 15, rain-fed agriculture declined by 30 per cent.<sup>13</sup> The Sana'a basin is a prime example of this situation. It is both an agricultural area for high-value crops such as *qat* and grapes and the source of water for the country's rapidly growing capital city: extraction is estimated at five times recharge.<sup>14</sup> At the current rates of extraction, it is likely that a number of aquifers will be depleted by 2025. Villages in different parts of the country have already been evacuated due to the exhaustion of local aquifers.

Decades of unregulated well drilling have contributed to worsening social differentiation. Equipment which has enabled cultivation of irrigated high value cash crops, particularly *qat*, at the expense of the subsistence and cash crops of the smallholders who can't afford the

equipment or the fuel, has led to smallholders' shallow aquifers being drained away, thus preventing them from cultivating their land and thus earn an income, eventually forcing them to sell their land and become landless labourers in agriculture or in the cities. In the highlands, the Amran, Saada and Sana'a basins are the main examples.<sup>15</sup> A detailed analysis of the impact of climate change on a community in the Tihama provides details of all the different impacts of worsening water scarcity over decades, including desertification, reduced agricultural land and the resulting impoverishment forcing people to migrate.<sup>16</sup>

This process simultaneously increased the concentration of landholding to the benefit of a few larger landholders; in the absence of comparative data, the 2002 agricultural census (the only one ever carried out) indicated that 7 per cent of landholders owned 56 per cent of the total agricultural land, in holdings of 5 ha or more, while 73 per cent of landholders with less than 1 ha, held a total of 16 per cent of the land.<sup>17</sup> There is no doubt that the situation has worsened since, given the increased poverty of the majority and the rise of a small number of war profiteers. Land is an asset of considerable social value.

Other than the direct impact of violent downpours on water retention and the replenishment of aquifers, there is also an indirect impact of climate change: the serious deterioration of soils by caused by the washing away of top soils and *wadi* banks. This reduces the already very limited area available for agriculture, as it is less than 3 per cent of the country's surface.<sup>18</sup> Soils have been removed by wind erosion, worsened when pasture grasses and shrubs are eaten by livestock or blown away. Years of experience of rural development in the country have provided numerous examples both of abandoned villages and of reduced agricultural land. The overall phenomenon of rural communities no longer being able to fulfil their basic needs through cultivation and livestock was clear in the increasing role of casual labour [rural and urban] in household incomes. While in the 1980s and 1990s, the overwhelming majority of rural households whom I studied lived primarily and often exclusively from their holdings and livestock; by the 2000s, only very few did. The vast majority explained that the main source of household income was the cash sent by men working in the towns and as casual labourers locally in building or even in agriculture.

Reduction of irrigation, and particularly of the use of deep aquifers to feed cash crops owned by the wealthy would be a major contribution



to reducing the injustice caused by decades of privileging the wealthy by subsidies for irrigation equipment.

### **Injustice in domestic water supply**

Domestic water supply is one sector where social injustice systematically prevails without being seriously challenged. The poor pay far more per litre of water than the rich, as they have to buy their water at far greater cost or else fetch and carry it using human energy and time spent collecting water, drawing them away from other less strenuous and more productive activities, such as attending school for children or engaging in income-generating activities for women. Tap water, when available, is far cheaper than tanker or donkey loads.

The country has no nationally managed interconnected domestic water supply infrastructure, whether urban or rural. As pointed out by Christopher Ward, Yemen's geography, and the conditions of its water basins, make it a "naturally decentralized country" whose "topography has broken the country up into thousands of little valleys and isolated settlements,"<sup>19</sup> which would make a single system both extremely costly and technically inappropriate. This also has major political and social implications.

Rural domestic water supply comes from a wide variety of sources, e.g. springs, wells, agricultural irrigation systems, and household or village rainwater collection tanks. While some areas now have piped systems to villages and even to homes, in many cases water is still collected by women and children and carried home in 20-litre jerry cans on their heads or by donkeys. This is another case where the poor are left with least access to water and need the greatest effort to get it while the wealthier can afford either to get connections or to pay for water to be brought to their homes. One reason for the increase in incidence of malaria and other water-borne diseases in recent decades has been the installation of water supply systems without simultaneously addressing sanitation ones, leaving many areas with ponds of stagnant used water, which are mosquito-breeding paradises.

Rural-urban transfers of water are another fundamental political issue which remain on the priority agenda.<sup>20</sup> The example of Taiz, which has suffered major water crises since the mid-1990s, is a 'model' for what may happen in Sana'a and other major cities. There will be some

modifications with respect to the coastal cities of Aden and Hodeida where the additional problem of saline water intrusion of the hinterland aquifers which supply the cities has to be taken into consideration when planning domestic water supplies. In all these areas, worsening scarcity increases the cost of water and reduces the quantities available to the poor. Although Sana'a has been reputed for more than a decade to be the first capital city likely to run out of water, this is less frequently mentioned in 2020 for a number of reasons, first and foremost that other major world cities, (e.g. Mexico,<sup>21</sup> Delhi,<sup>22</sup> Cape Town<sup>23</sup>) have reached similar crisis level, and second that in Yemen the situation of Taiz has been far more acute now for more than a quarter century.<sup>24</sup> In both Sana'a and Taiz (pre-war) about 40 percent of households were connected to the urban network, but in Sana'a they received water about once or twice a week, whereas in Taiz water came out of the taps about once every 40–60 days. Most people had to buy supplies from tanker deliveries to underground or rooftop reservoirs, at far higher cost and also, for those who could afford it, separately purchase expensive water for drinking.

While in Sana'a, a solution to the problem would require a government challenging the powerful rural *qat* and vine growers in the Sana'a basin, something which had not become sufficiently urgent to affect government policy by the time the war started, in Taiz the issue of rural-urban water transfers caused civil strife since the 1990s. A World Bank-supported project to build deep wells and pipelines to supply the city resulted in armed local resistance, primarily because the rural population was deprived of its water, leaving its agriculture to die without any compensation for the communities deprived of their water. This is a prime example of the absence of any form of social justice, privileging city dwellers at the expense of the rural population.

### **Floods, droughts and worsening social injustice**

Recent decades have witnessed an increasing frequency and length of droughts as well as more destructive episodes of rains and floods. The frequency and intensity of 'unprecedented' floods is a symptom of climate change. Starting in 2015 when two major cyclones, Chapala and Meg, hit Yemen within a week, the trend continued with Sagar and Mekunu in 2018 and the devastating floods of 2020, whereas 'normally' the country does not suffer more than one cyclone or major event a year.

The 2020 series of devastating floods is unprecedented as it is the first time that a series of three major rain episodes caused massive and destructive floods throughout the country. In ‘normal’ years, there may be one or two floods in the course of the year, causing damage to relatively small areas, rather than affecting most of the country. This year there have been three major episodes, in March-April, June and August. Each lasted longer than usual, and affected a much larger geographical area as well as population, causing worse death and destruction. As is so often the case, internally displaced people (IDPs) sheltering in temporary accommodation, tents or other, suffered disproportionately, and these include many whose solid quality homes were destroyed by the downpours.

The increased downpours in recent years, combined with the war situation, have been a bonanza for locusts, who have found the best possible terrain for multiplication. There has been a major invasion of locusts throughout East Africa up to the Asian subcontinent, with Yemen being both a breeding ground for new generations and a staging post to travelling swarms. While in the immediate short term, people have snacked on these insects, this has not prevented them from destroying crops and rangeland, thus depriving the rural population of their basic livelihoods.<sup>25</sup>

Even before the devastating August floods in Sana‘a, the international Federation of Red Cross and Red Crescent Societies pointed to more than 80,000 people affected by flood damage in 12 of the country’s 22 governorates,<sup>26</sup> including major damage in Aden in both April and June, as well as in Mareb where thousands of internally displaced people are located. Then the August floods caused major damage in Sana‘a and were reported as unprecedented.<sup>27</sup> They surprised people used to the vagaries of Yemen’s weather, and the head of the ICRC in Yemen said that ‘At least 170 people across the country have died because of flooding, more than 7,000 have been displaced, and dozens of shelters and public buildings have been destroyed.’ In the north, dams were breached,<sup>28</sup> and even the lake of the historic Mareb dam, reconstructed in the 1970s, overflowed for the first time in a generation.

Yet again, it is the poorer who have suffered most. For example in the case of damage to the historic buildings of the old city of Sana‘a and Shibam in *Wadi Hadhramaut*, both listed on the UNESCO World Cultural Heritage register, damage has mainly affected historic buildings inadequately maintained by their poorer inhabitants, while the wealthier

had moved out to modern ‘suburban’ housing. This is ignoring the situation of internally displaced people living in tents and temporary housing around Mareb city.

## Soqatra

Besides the current war, other aspects of Yemen have achieved international attention including the Soqatra archipelago (included in UNESCO’s World Natural Heritage list) for ‘harbouring globally important biodiversity and a high proportion of endemics.’<sup>29</sup> Often described as the Galapagos of the Indian Ocean, Soqatra remained largely isolated during the PDRY period (1967–1990) but has since then suffered numerous forms of invasive species, undermining both its biodiversity and society.

Perceived worldwide by environmentalists and lovers of nature as an idyllic site of environmental uniqueness, its population has a very different perception of its conditions. First, if you live somewhere forever, you take its environment for granted and have no reason to think of it as unique. Second, life on the archipelago has been extremely tough for centuries and it depended on the import of basic food from East Africa [the nearest mainland], something which was particularly problematic during times of environmental stress, whether droughts or floods. Poverty and hunger were rife, with major famines in the last century in the years 1943, 1956, 1999 and 2007. It is worth noting that in each case famines have been exacerbated by the inability of Soqatris to access imports, mainly for political and financial reasons and that the only period without a famine was that of the PDRY when the state ensured the availability of food at all times by stockpiling basic supplies. Both under the British and since unification, famines occurred.<sup>30</sup>

Hunger and hardship have been features of life on the archipelago throughout its history. For centuries, the islands were inaccessible during the windy monsoon season for up to six months a year, so when the people had been unable to stock up from their own resources due to drought, they were dependent on their rulers to provide food during droughts. Droughts led to famines, some of which remained famous (particularly in the years mentioned above) and were given names by the population. Floods and major damage from rains have also occurred regularly, some examples being in 1972 and 2004 when the Indian Ocean tsunami caused significant damage in Soqatra’s coastal areas. However

the greatest devastation occurred in November 2015 when two cyclones hit the islands within a week, the first time in recorded history when the islands suffered more than one cyclone in a season. While both Chapala and Megh included winds peaking at 205 km/hour, the destruction came from the torrential rains that accompanied them, which killed 18 people, destroyed more than 50 houses and 785 fishing boats, while damaging a further 3,000 houses and displacing 45,000 people, or almost the entire 60,000 people living in the islands.

In the past, when starvation threatened, careful husbandry of the archipelago's resources was essential to maximise production and availability of pasture and food for the population who could not afford to buy imports. The increased availability of cash combined with privatisation of common lands, reduces people's commitment to caring for their physical environment, something which increases social injustice as the poor have less access to cash and are not those who are buying land, while they lose access to what was previously common land.

Unification of Yemen led to the arrival of hundreds of mainlanders, mostly from the major areas of emigration in Taiz and neighbouring governorates. Some of them were military personnel who chose to settle in the island's capital Hadibo and open shops and other small businesses, thus displacing the Soqotris whose history and culture was more focused on livestock husbandry, fisheries and some agriculture. Most moved there as they could no longer make an adequate living in their home areas for the reasons described earlier in this article; so, to a limited extent they can be described as environmentally displaced; certainly, worsening poverty would have been their fate had they stayed or returned home. The area's biodiversity also led to the establishment of a series of scientific development projects, focused on conservation and accessorially on supporting the establishment of eco-tourist enterprises.

These phenomena combined with decades of Soqotri emigration to the UAE, mainly Ajman, where some achieved wealth way beyond anything known previously on the islands. This also transformed economic relations so that they were based on cash, facilitating increased social differentiation with a few benefiting disproportionately while the majority remained poor. The current war has created new opportunities for islanders: all the mainland political actors are seeking supporters among the Soqotri population; the distribution of material goods and cash are strong elements in the process. The additional involvement of

the UAE and Saudi Arabia have exacerbated all these trends which combined with a series of climate-related emergencies to impact seriously on social cohesion and the economic circumstances of the population. In Soqatra, the UAE have taken a dominant role by comparison with al Mahra where the Saudis are the dominant external element. The UAE's main instruments in Soqatra are the Emirati Red Crescent and Khalifa Bin Zayed Al Nahyan Foundation, both of whom increased their involvement considerably after the 2015 cyclones and remain the main UAE agents in 2020.

In a complex society where poverty and destitution were largely shared, issues of social justice have always been relevant, but to a far lesser extent than they are now. In the current century, this started with the prospect of comparative wealth as perceived locally, by accessing the 'benefits' of biodiversity conservation projects, and tourism, as well as involvement with Yemeni political factions. In recent years, the phenomenon has expanded as Emiratis of Soqotri origin, as well as other Emirati nationals, have been purchasing large areas of land, transforming formerly collectively owned and managed land into private property. This has had a double impact: first, it increases the gap between rich and poor, worsening inequality and second it reduces the national population's commitment to protecting its environment, thus reducing the productive potential of the islands and therefore their ability to sustain the population.

Most relevant here is the fact that these phenomena have all contributed to environmental degradation. Younger generations have a limited awareness of the natural and cultural value of their unique environment, and are more attracted by the appeal of cash-based modern assets. Soqotris' knowledge and interest in protecting their environment has decreased alongside their reduced dependence on their natural environment, the availability of cash, and increased competition for access to the new resources, between original Soqotris and recent immigrants from the mainland. The synergy between climatic and political factors are transforming both the physical and social environments of the archipelago.

But a major aspect of environmental degradation is maritime. Complete disregard for exclusive economic zones affects all Yemeni coasts, however Soqatra is particularly vulnerable due to its distance from the mainland and the absence of enforcement mechanisms. Powerful trawlers have, in the past two decades, destroyed much of the marine environment

around Soqatra, even fairly close to the land, thus dramatically reducing fisheries catches and the ability of the population to live from local resources and therefore worsening poverty locally.<sup>31</sup> In addition, the unique species and other biodiversity of Soqatra's marine environment are suffering irreparable damage. A friend recalls being woken up at night by what he thought was an earthquake but was a large trawler scraping the sea bed a short distance offshore, totally illegally but without any need for concealment due to the absence of any law enforcement.

## Conclusion

While the current war is the direct cause of only a few of Yemen's environmental problems, it is contributing to exacerbating environmental problems and injustice through the competition between external agents and war profiteers to acquire assets, particularly land, at the expense of those becoming increasingly impoverished as a result of the war and the collapse of the economy. This is the case both in urban and rural areas. Meanwhile the long-term environmental problems, primarily water scarcity, deterioration of agricultural soils and other results of climate change are all reducing the country's already limited economic resources, while also simultaneously worsening social injustice as the poor lose and the rich benefit from their already greater resources. Unaddressed, Yemen's environmental problems will, within a generation, force millions of its citizens to become climate refugees, most likely to their closest neighbouring states, Saudi Arabia, Oman and the UAE.

### *Author's note*

Whilst I am responsible for the views and any errors in this text, I thank Abdul Rahman Fadhl al Eryani for help and advice in the preparation of this article.

## NOTES

1. World Bank, *Assessing the Impacts of Climate Change and Variability on the Water and Agricultural Sectors and the Policy Implications*, 2010, reportno54196-YE, p. 20.
2. T. Taher, B. Bruns, O. Bamaga, A. al Weshali and F. Van Steenberg, 'Local Groundwater Governance in Yemen: Building on Traditions and Enabling Communities to Craft New Rules'. *Hydrogeology Journal* (2012): 1177.

3. USAID, 2016, <https://www.climatelinks.org/resources/climate-change-risk-profile-yemen>, p. 2.
4. Kingdom of the Netherlands, Ministry of Foreign Affairs, *Climate Change Profile Yemen*, 2019, <https://www.government.nl/documents/publications/2019/02/05/climate-change-profiles>, p. 4.
5. I have addressed these aspects in greater detail in Hamid Pouran and Hassan Haki-mian (Eds.), *Environmental Challenges in the MENA Region: The Long Road from Conflict to Cooperation*. Chicago: Gingko, 2019; and ‘Climate Change and Security: Major Challenges for Yemen’s Future’, in Troy Sternberg (Ed.), *Climate Hazard Crises in Asian Societies and Environments*. Abingdon: Routledge, 2017, pp. 103–119.
6. <https://www.theguardian.com/environment/2020/sep/21/worlds-richest-1-cause-double-co2-emissions-of-poorest-50-says-oxfam>.
7. S. M. Altamimi, R. M. Nor, and M. S. Hassan, ‘Impact of Oil Wells Drilling Process on Human Health in Hadhramout, Yemen’. *International Journal of Academic Research in Business and Social Sciences* Vol. 9. Issue 12 (2019): 924–939. Available online at [https://hrmars.com/papers\\_submitted/6831/impact-of-oil-wells-drilling-process-on-human-health-in-hadhramout-yemen.pdf](https://hrmars.com/papers_submitted/6831/impact-of-oil-wells-drilling-process-on-human-health-in-hadhramout-yemen.pdf) (accessed 9 October 2020).
8. In the UK, the numerous and lengthy public and legal struggles over the pollution caused by the Sellafield nuclear plant are one of many examples.
9. In the course of fieldwork in Shabwa and Hadhramaut, between 1998 and 2000, I met many villagers and others who complained, but had no expectation of redress in the dysfunctional Yemeni legal system.
10. al Asbahi, Qahtan Yehya, ‘Water Resources Information in Yemen’, in *IWG-Env International Work Session on Water Statistics, Vienna, June 20–22 2005*, p. 1.
11. World Bank, op. cit., p. 21.
12. DFID, *Effects of War on Water Security in Yemen, Stocktaking Study*, 2019, p. 8.
13. A. Closas and F. Molle, *Groundwater Governance in the Middle East and North Africa*, IWMI project report no 1, 2016, p. 76.
14. World Bank, op. cit., p. 21; Mohamed Al Hamdi, *Competition for Scarce Groundwater in the Sana’a Plain, Yemen, a Study on the Incentive Systems for Urban and Agricultural Water Use*. Rotterdam: Brookfield, 2000.
15. Al Hamdi, 2000 for Sana’a, Liechtenthaeler 2003 for S’ada, personal information for Amran 2009.
16. W. al-Qubatee, H. Ritzema, A. al Weshali, F. van Steenbergen and P. Hellegers, ‘Participatory Rural Appraisal to Assess Groundwater Resources in Al Mujaylis, Tihama Coastal Plain, Yemen’. *Water International* Vol. 42. Issue 7 (2017): 810–830.
17. H. Lackner, *Yemen in Crisis, Autocracy, Neo-liberalism and the Disintegration of a State*, 2017, p. 281.
18. <https://blogs.lse.ac.uk/mec/2017/12/30/the-once-happy-land-economic-prospects-for-yemen-after-the-war/>.
19. Christopher Ward, *The Water Crisis in Yemen* book launch at St. Antony’s College, Oxford, June 4, 2015.



20. Lackner, 'Extreme Environmental Challenges in the Context of Lasting Political Crisis: the Case of Yemen' in H. Pourian and H. Hakimian (Eds.), *Environmental Challenges in the MENA Region, the Long Road from Conflict to Cooperation*. London: Ginko, 2019, pp. 112–113.
21. <https://watercenter.sas.upenn.edu/mexico-city-a-city-that-is-flooding-but-is-still-running-out-of-water/>.
22. <https://india.mongabay.com/2019/06/delhi-is-running-out-of-water-and-it-is-everybodys-problem/>.
23. <https://www.theguardian.com/world/2018/may/04/back-from-the-brink-how-cape-town-cracked-its-water-crisis>.
24. Lackner, op. cit., pp. 221–223.
25. <http://www.fao.org/ag/locusts/en/info/info/index.html>.
26. IFRC, *Emergency Plan of Action, Yemen Floods*, 30 June 2020.
27. See [https://www.washingtonpost.com/world/middle\\_east/torrential-rain-and-floods-batter-the-glorious-ancient-quarter-of-yemens-capital/2020/08/19/29be7870-e229-11ea-ade1-28daf1a5e919\\_story.html](https://www.washingtonpost.com/world/middle_east/torrential-rain-and-floods-batter-the-glorious-ancient-quarter-of-yemens-capital/2020/08/19/29be7870-e229-11ea-ade1-28daf1a5e919_story.html) (accessed 9 October 2020).
28. See <http://floodlist.com/asia/yemen-floods-update-august-2020> (accessed 9 October 2020).
29. F. Attore and K. VanDamme, 'Twenty Years of Biodiversity Research and Nature Conservation in the Soqatra Archipelago', in *Rendiconti Lincei, Scienze Fisiche e Naturali*, Accademia Nazionale dei Lincei, Springer, online 2020.
30. Nathalie Peutz, *Islands of Heritage, Conservation and Transformation in Yemen*, 2019, pp. 81–83.
31. A recent example is mentioned here <https://www.aa.com.tr/en/middle-east/iranian-ships-conduct-illegal-fishing-off-yemen-coast/1988499>.