

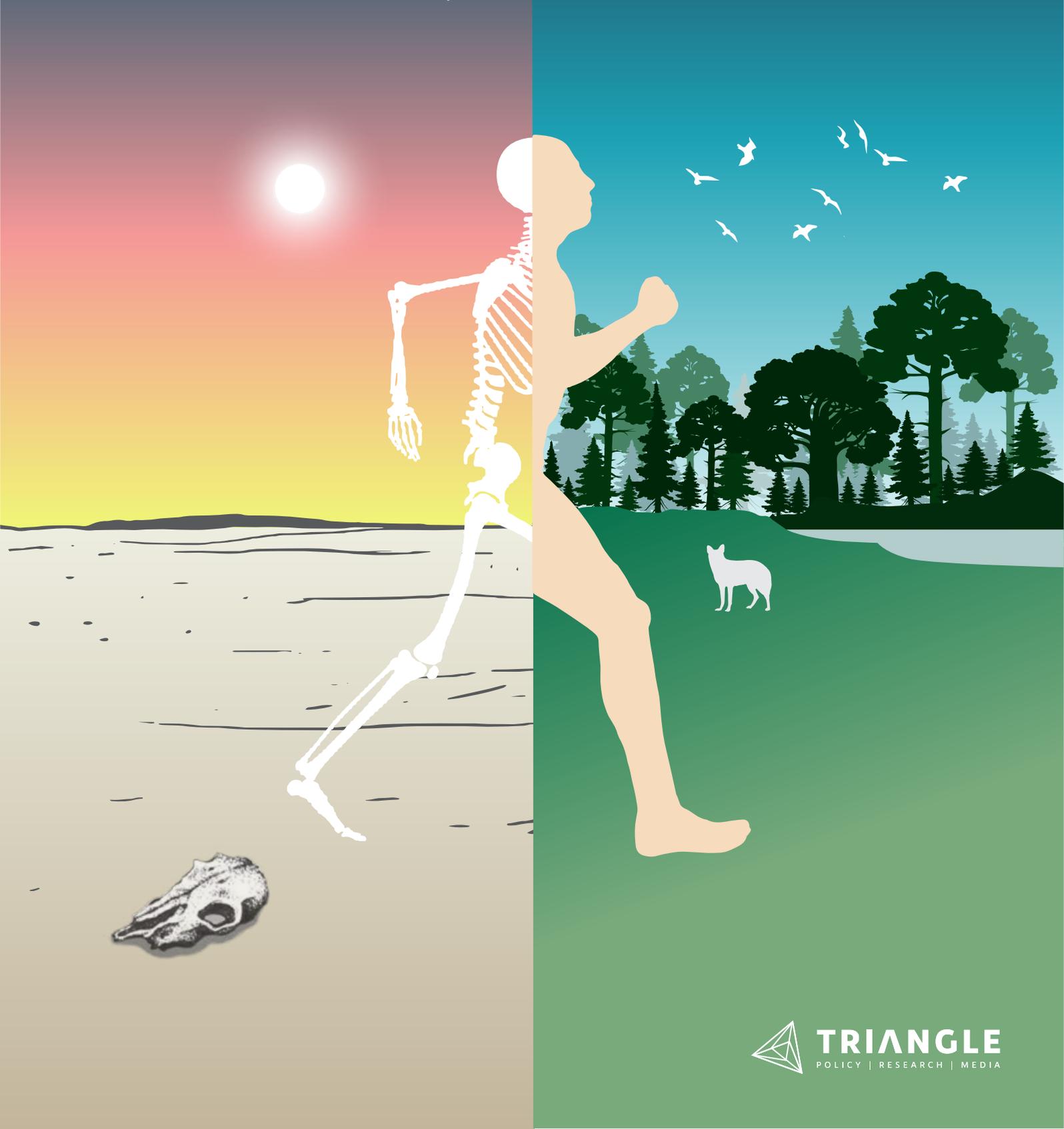
POLICY PAPER

**ADAPT OR TRAPPED:
THE URGENT NEED FOR CLIMATE
CHANGE ADAPTATION IN LEBANON**

AUG 2021

**CHARLES LAWRIE
DAVID WOOD**

CLIMATE CHANGE COULD RUIN LEBANON; ADAPTATION MUST BE CENTRAL TO ANY RECOVERY PLAN.





EXECUTIVE SUMMARY

As climate change bears down on nations and economies the world over, Lebanon is not adapting to the new reality. In October 2019, the Lebanese government had no answer to devastating forest fires in the Chouf region, which flourished in abnormally hot and dry weather conditions. Other climate change impacts are more subtle, but equally alarming—from the growing aridity of farms in Nabatieh and Bekaa to declining snowfall on Kfardebian’s mountain peaks.

These developments will spark more economic disaster for Lebanon if the country maintains its current, “business-as-usual” attitude. Already, vital sectors of the Lebanese economy face bleak futures, right when the country needs their productivity more than ever. Farmers suffer from diminishing crop yields and fishermen no longer haul in reliable catches. Lebanon is losing its lustre as a tourist destination, with disappearing wildlife and snow cover. All the while, national water reserves are evaporating at an alarming rate, driving up the cost of drinking and agricultural water.

In a familiar story, it will be normal Lebanese people who foot the bill for Lebanon’s impending climate disaster. One estimate suggests that, by 2040, climate change’s effects could cost each Lebanese household around \$13,100 per year, based on direct expenses and lost GDP. These added costs will disproportionately burden farmers and low-income families, which are already grappling with climate change’s most severe impacts.

Left unchecked, climate change will also shackle Lebanon to a brutal public health crisis. In 2011, the Ministry of Environment estimated that climate change’s effects will annually claim the lives of up to 5,200 Lebanese citizens—almost the same number as the country’s COVID-19 death toll up until July 2021. As temperatures grow hotter, the Lebanese people will fall prey to conditions like heat stroke

and cardiovascular disease—especially the elderly and infirm.

For Lebanon, the best path forward lies in climate adaptation. This approach encourages policymakers to equip society with the tools needed to ameliorate the negative impacts of climate change. Climate adaptation differs from policies of climate mitigation, which target the cause of climate change: greenhouse gas emissions. Lebanon, with a relatively minor overall carbon footprint (compared with high-volume polluting countries, such as the United States) and scant economic resources, can more realistically (and efficiently) promote climate adaptation.

Climate adaptation does not mean turning up the air conditioner. It means transforming Lebanon’s agriculture sector through drip irrigation and improved soil techniques; flood-proofing health clinics and people’s homes; and developing reliable emergency response systems for dangerous weather events.

Lebanon’s economic recovery must also be a climate recovery. The country’s environmental and financial futures are locked together as dancing partners in a high-stakes contest. By executing the right steps now—and funding climate adaptation policies without delay—Lebanon stands to recoup a huge financial return on investment. But this dance-off’s judges do not look kindly on the current tactic of avoiding the climate change policy dancefloor altogether, which will lead to enormous, compounding costs over time.

Climate adaptation lies within Lebanon’s reach. First, existing environmental projects desperately need funding, both from international donors and domestic sources. With financial support, policymakers can devise a coherent national action plan for all economic sectors and geographical regions, based on reliable meteorological data. Eventually, the parliament should enact a national climate law, which can finally compel Lebanese politicians to start leading in the struggle against environmental annihilation.



INTRODUCTION

Lebanon needs a gargantuan economic recovery across all its economic sectors, and climate considerations can and should play a pivotal role—particularly climate change *adaptation* projects. Policymakers and academics use the phrase ‘adaptation’ to describe measures that the state can take to protect citizens against the effects of climate change today. By contrast, climate change *mitigation* policies aim to reduce future greenhouse gas emissions, especially from high-polluting economic sectors.

Any mitigation project must contend with Lebanon’s thorny energy politics, dominated by shady business interests linked to fuel subsidies, rapacious generator networks, and opaque industry governance and accountability structures.¹ Adaptation projects are much simpler to implement—instead of punishing polluters for future emissions, they funnel money into limiting the economic and environmental toll of climate change today.

Climate change adaptation does not mean building more air conditioning units. It means transforming Lebanon’s agriculture through drip irrigation, improved soil techniques, and better drainage systems. It means flood proofing health clinics and developing emergency response systems. It means introducing building codes that require insulated and efficiently cooled structures. It means extending beaches offshore to protect towns from storm surges.²

“Any mitigation project must contend with Lebanon’s thorny energy politics, dominated by shady business interests linked to fuel subsidies, rapacious generator networks, and opaque industry governance and accountability structures.”

These measures are all relatively cheap and easy to implement. Eventually, Lebanon must also conduct large-scale, capital-intensive projects to transform its sclerotic water system and guard against rising sea levels. Spending money on these projects will create thousands of jobs. Meanwhile, as farms boost their productivity, incomes (and, therefore, state tax revenue) will also improve.

The other, powerful consideration is the cost of *inaction*. Not spending the money to climate-proof Lebanon’s infrastructure today amounts to running up a massive bar tab; yet, in this high-stakes transaction, the barman’s interest rates are exorbitant, and the hangover is going to be unbearable. Solutions focused on climate change adaptation are all badly needed—and they should have arrived yesterday.

GREEN RECOVERY NEEDED

Lebanon’s policymakers have known about the severe impacts of climate change on Lebanon for decades. In 2011, the Ministry of Environment presented a report to the UNFCCC, the United Nations’ main climate change body, outlining the alarming climactic dangers lying in wait.³ Farmland would become arid due to rising temperatures and less predictable rainfall. Meanwhile, electricity demand would spike, as citizens cranked up the air conditioning. Within 80 years, Beirut will experience 50 more days with temperatures above 35°C, and 34 more nights with temperatures over 25°C.

As climate change looms large over Lebanon, the state’s response has been completely inadequate.⁴ At present, state action is coordinated by a skeleton team of UNDP staff, which is embedded at the Ministry of Environment. Other ministries, such as the Ministry of Agriculture, have paid lip service to climate change in their strategic reports. Yet precious little evidence exists that the state is preparing Lebanon to face climate change. Unless this attitude changes, Lebanon will have meteorological hell to pay.



FIGURE I WHY ADAPT NOW?

Given the rising cost of climate change in the years to come...



SOURCE: Vivid Economics, *Climate-proofing Lebanon's Development Plans*, 2021.

THE DOWNWARD SPIRAL

The need for climate adaptation runs up against competing emergency situations for Lebanese policymakers. In this tumultuous period of Lebanese history, other high-priority issues include restoring electricity access and rebuilding the collapsed national economy. Yet if Lebanon continues with a “business-as-usual” attitude to climate change, the human and financial toll will only compound over time.

In 2015, a report published by the Ministry of Environment found that unhindered climate change would impose enormous costs on Lebanon. Some economic losses extend from direct causes, such as drought, deaths, and illness. Others constitute ‘foregone GDP’, or GDP that Lebanon *could* have generated, but for climate change’s destructive impact. The report made the startling finding that Lebanon, by doing nothing, could experience \$320 million in direct costs and \$1.6 billion in foregone GDP of \$1.9 billion in 2020 (equivalent to \$1,500 per household), rising to a cumulative \$16.9 billion in 2040 (of which \$13,100 will be borne per household).^{5,6}

Urgent spending now can still blunt the worst effects of climate change. The economic advantages of climate

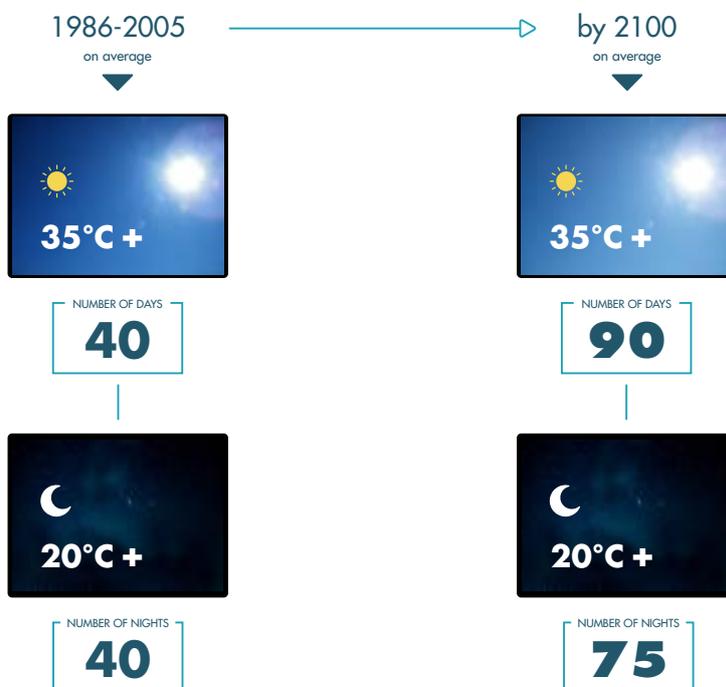
adaptation are clear, quantified, and well-known to Lebanon’s policymakers. As recently as March 2021, consultancy firm Vivid Economics found that ‘climate-proofing’ development projects would generate \$5.4 billion in benefits for a cost of \$1.7 billion, or a net benefit of \$3.7 billion (see Figure I).⁷ For every dollar spent, Lebanon would receive around \$3.20 back—an extraordinary return on investment.⁸ This is because investing in climate adaptation projects acts as a form of insurance policy against future risks such as flooding, drought, and electricity cut-offs. In short, replacing the crops, infrastructure, and electricity transmission networks costs more than protecting them from damage in the first place.

FARMERS ON THE FRONTLINE

Across Lebanon, local farmers stand at the frontline of the country’s battle against climate change. Examples abound of how changing weather conditions have wrought havoc on Lebanon’s agriculture sector. In southern towns such as Hasbaya and Khalwat, the country’s bees—which brought in \$1.2 billion in honey exports in 2017—struggle to survive ever-hotter summers. Without climate adaptation, the end may be nigh for this nascent and



FIGURE II
IT'S GETTING HOT IN HERE...



SOURCES: Ministry of Environment, Lebanon's Third National Communication to the UNFCCC, 2016; Ministry of Environment, Ministry of Environment, Lebanon's Second National Communication to the UNFCCC, 2011/2021.

lucrative domestic industry.⁹ In the Chouf, western conifer seed bugs have multiplied rapidly courtesy of the area's unusually warm, dry weather conditions. The spreading pests have devastated the pine nut industry of Bkassine and Qsaybeh, causing hundreds of thousands of dollars in lost exports.¹⁰ Mount Lebanon has hardly fared any better, as the governorate's \$20.3 million wine export industry grapples with record yield losses. Last summer, soaring temperatures scorched the region's vineyards; at the same time, prolonged heat is reducing soil acidity, which is essential to white wine production. Each of these impacts of climate change precludes the agriculture sector from accessing foreign currency, which Lebanon desperately needs amidst the ongoing economic crisis.¹¹

Climate change's impacts have started ravaging offshore food production sectors too. Rising sea temperatures have

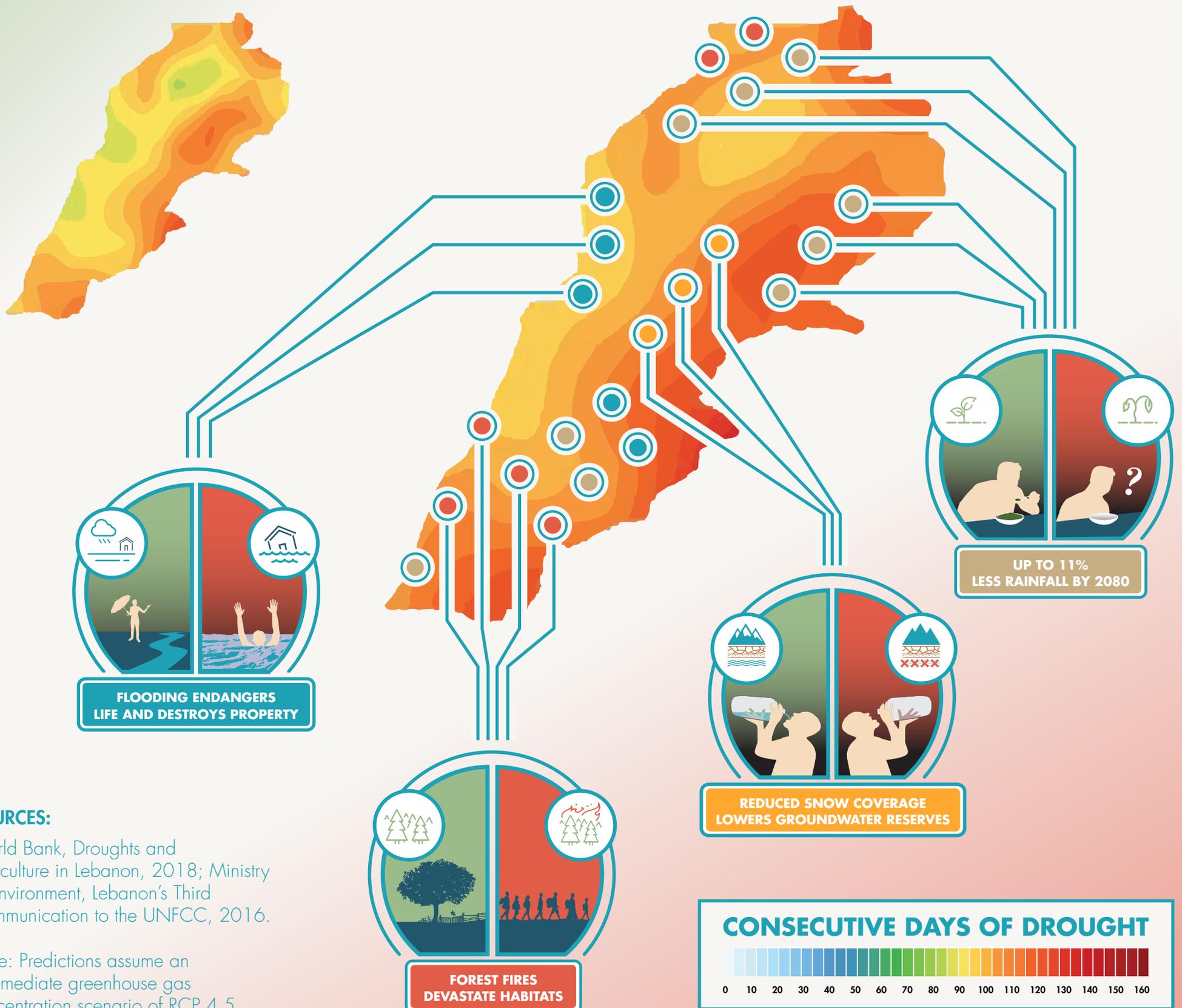
altered the migration patterns of target fish species, which is increasingly placing pressure on fishing businesses. In Batroun, for example, the overall yield of fish products varied markedly between 2006 and 2011, making fishermen's business models more unstable than previously.¹² Catches have similarly dwindled in Sour, where overfishing and unsustainable fishing techniques have contributed to the shortfall. At the same time, local demand remains high for fish products, providing further incentives for Lebanese fishing enterprises to accelerate, rather than ameliorate, the negative impact of climate change on fish resources.¹³

Worryingly, these climate change impacts threaten to amplify inequality between cities and rural areas. A 2014 AUB study concluded that countryside regions will most likely suffer from disproportionate economic stagnation unless Lebanon takes decisive action on climate change.¹⁴

LEBANON'S IMPENDING CLIMATE CRISIS

DROUGHT PERIODS BEFORE 2005

PREDICTED DROUGHT PERIODS 2031-2050



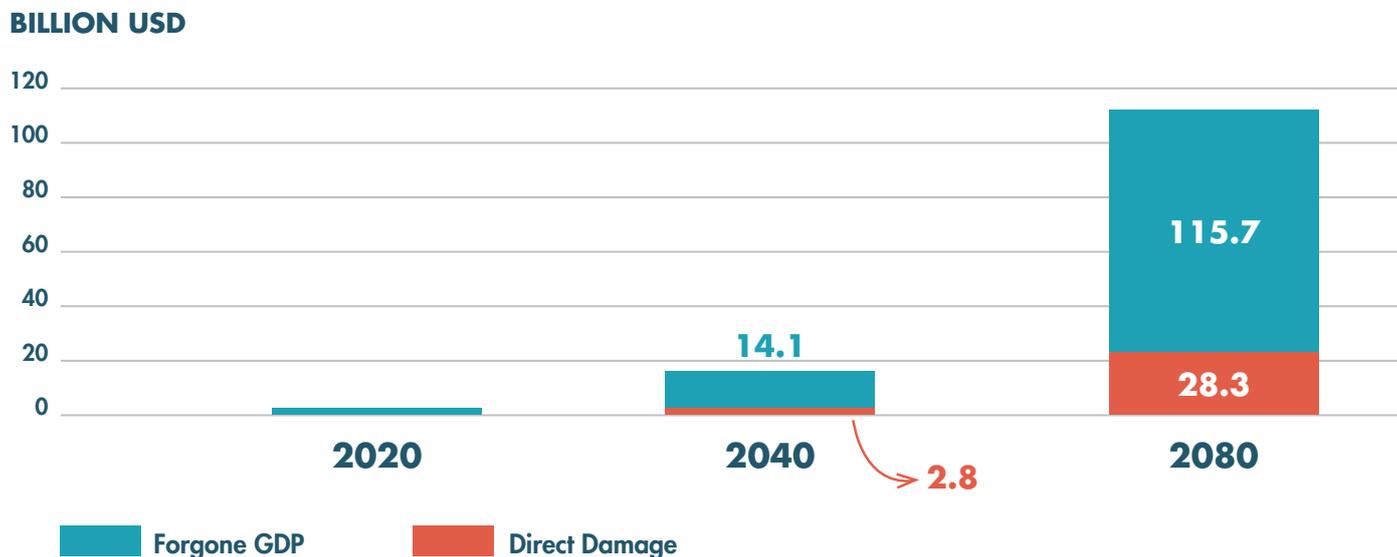
SOURCES:

World Bank, Droughts and Agriculture in Lebanon, 2018; Ministry of Environment, Lebanon's Third Communication to the UNFCCC, 2016.

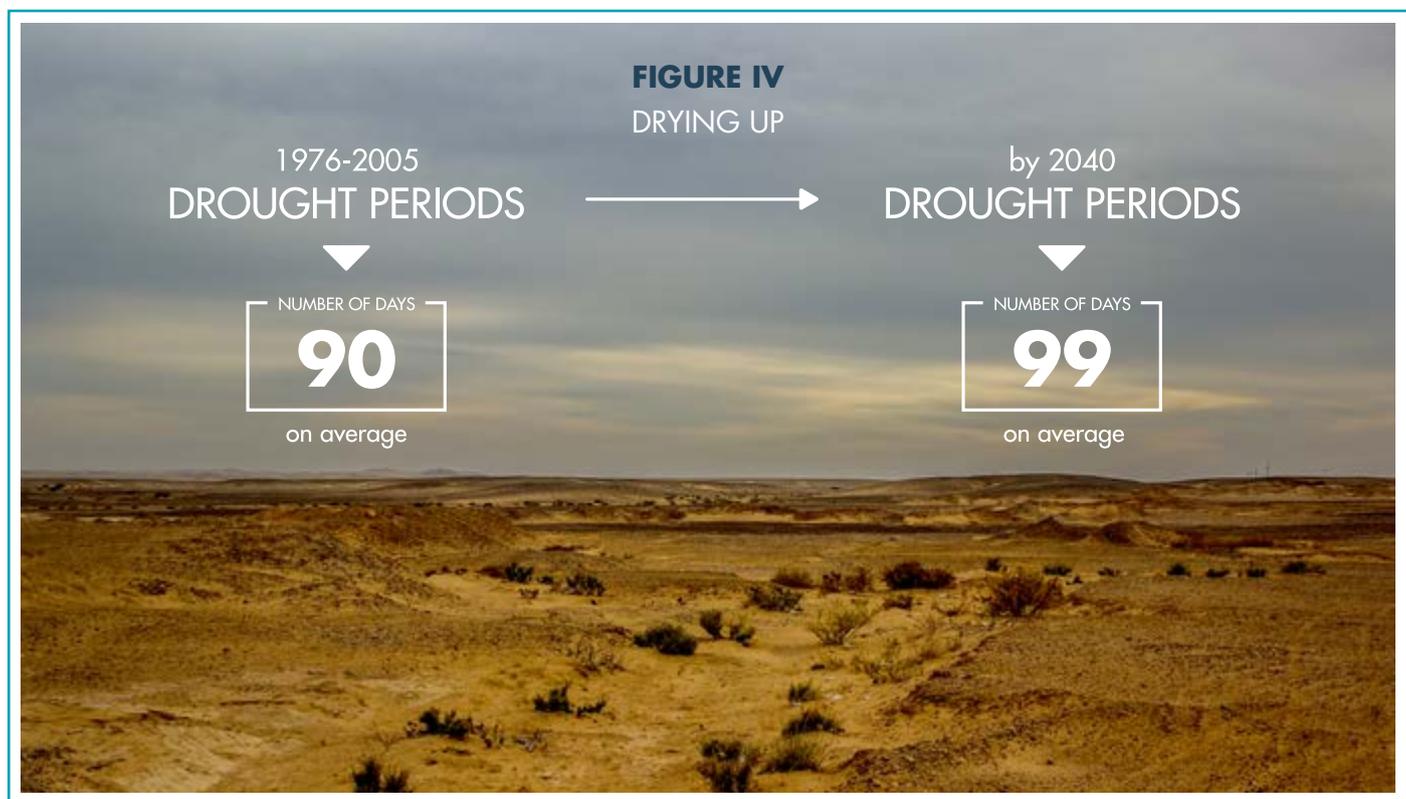
Note: Predictions assume an intermediate greenhouse gas concentration scenario of RCP 4.5.



FIGURE III
THE COST OF CLIMATE CHANGE TO LEBANON



SOURCE: Ministry of Environment, UN Development Programme, and Global Environmental Facility, 'Economic Costs to Lebanon from Climate Change: A First Look'.



SOURCE: Ministry of Environment, Lebanon's Second Communication to the UNFCCC, 2011; World Bank, Droughts and Agriculture in Lebanon : Causes, Consequences, and Risk Management, 2018.



“Overall, the agricultural sector is expected to lose nearly half of its value by 2030, based on 2010 figures. These trends would cause heightened hardship outside major cities, where communities tend to rely heavily on agriculture for food security and livelihoods.”

The report modelled the impact of climate change on agricultural productivity, concluding that Lebanese agricultural output will sharply decline across various climate change scenarios. Overall, the agricultural sector is expected to lose nearly half of its value by 2030, based on 2010 figures. These trends would cause heightened hardship outside major cities, where communities tend to rely heavily on agriculture for food security and livelihoods.

A marked contraction of Lebanon’s agriculture sector would cause ripple effects for the entire country, extending even to urban centres. Evidently, reduced agricultural output would decimate local economies in rural areas, many of which already contend with high unemployment rates. Low-income communities in Nabatieh, South Lebanon, the Bekaa Valley, and North Lebanon would likely suffer the steepest declines in gross regional product. As one example, Nabatieh is expected to lose nearly a quarter (22.64%) of its 2010 output by 2030.¹⁵ Rural families will also suffer more from climate change’s impact on food prices than urban households. Poor families tend to spend more of their incomes on food compared with wealthier families; as a result, low-income farming households are expected to lose a quarter of their incomes by 2020, and half of their income by 2040 (see Figure V).^{16,17} Inevitably, Lebanon’s cities would eventually face repercussions from these regional downturns, which would prompt yet more job-seeking migration to Beirut and other cities. In fact, recent statistical studies suggest that climate change has already been associated with forced migration in the Arab world.¹⁸

Lebanese farmers have begun implementing their own climate adaptation initiatives, in the absence of state

support. Evidence suggests that agricultural communities already recognise the changes in weather patterns brought on by climate change. A recent study of smallholder farmers conducted in the Bekaa Valley found that 96 percent of farmers believed that climate change was happening.¹⁹ What is more, nearly all smallholder farmers are already using methods such as mixed cropping and soil conservation techniques to adapt to the new realities of climate change.

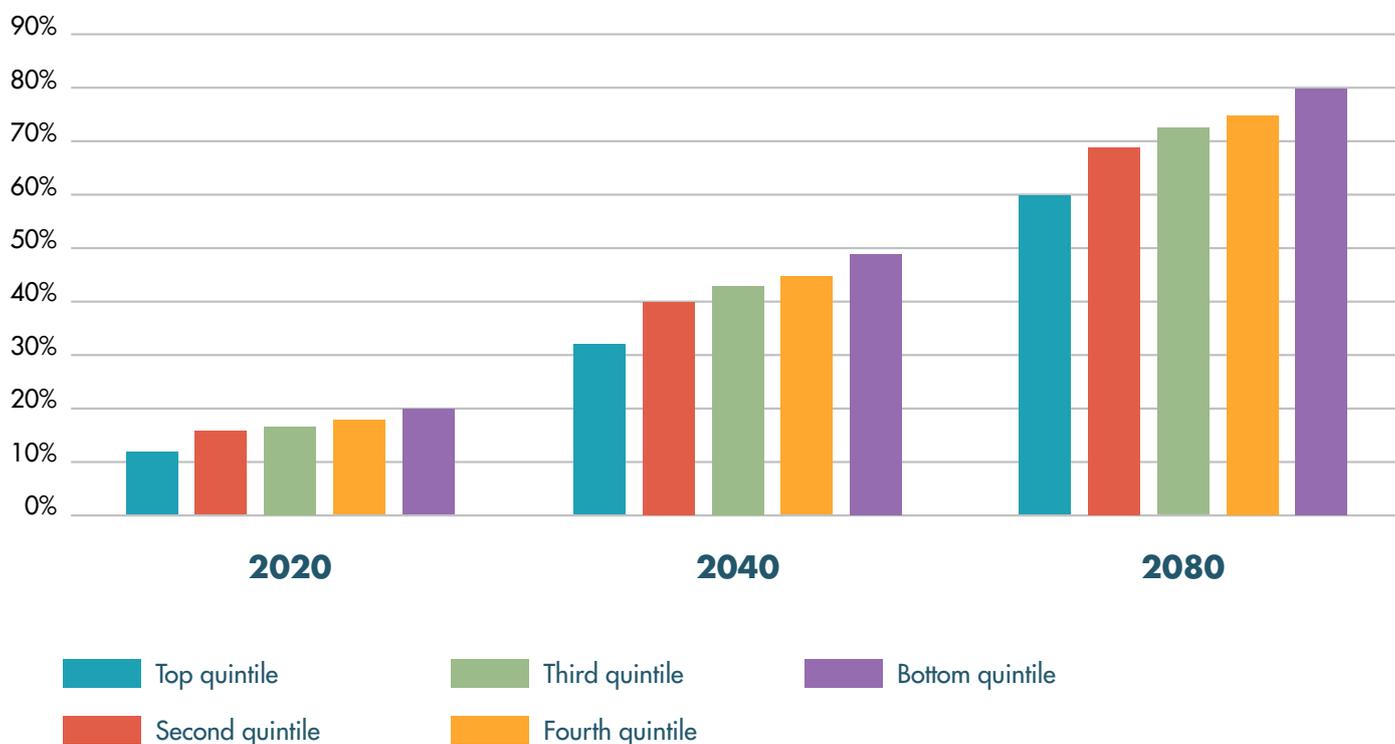
Meanwhile, the Ministry of Agriculture claims to address climate change in its 2020-2025 National Agriculture Strategy (NAS)—but the plan is leaky and woefully underfunded.²⁰ For instance, the NAS does not address the need to improve agricultural water systems, which farmers will need to combat ever drier and hotter seasons. With a proper agricultural strategy, climate-proofing farmers’ water supply could increase the programme’s net benefits by \$16 million and create an extra 1,460 jobs for Lebanon’s farming communities, a shot in the arm as strong as any COVID-19 vaccine.²¹

WATER, WATER—NOWHERE?

As climate change intensifies, Lebanon faces the grim reality of evaporating national water reserves. In real terms, climate change is expected to contribute to 160 million cubic litres in water losses by 2040. Less rainfall and increased evaporation mean that Lebanon’s groundwater supplies are expected to reduce by 1 percent in 2020 and 8 percent in 2040.²² As a result, Lebanese households will have to forego economic activities like growing crops, which will compound the downward pressure on agricultural yields. Long



FIGURE V
 PROJECTED REDUCTIONS IN URBAN LEBANESE HOUSEHOLD INCOMES DUE TO CLIMATE CHANGE, 2020-2080



SOURCE: Ministry of Environment, UN Development Programme, and Global Environmental Facility, 'Economic Costs to Lebanon from Climate Change: A First Look

mismanaged, Lebanon’s water sector will come under further pressure as temperatures increase worldwide.²³ According to the World Resources Institute, Lebanon is projected to be the 11th most water stressed country in the world by 2040. This means that Lebanon’s renewable water sources are being tapped too quickly for their effective replenishment.²⁴

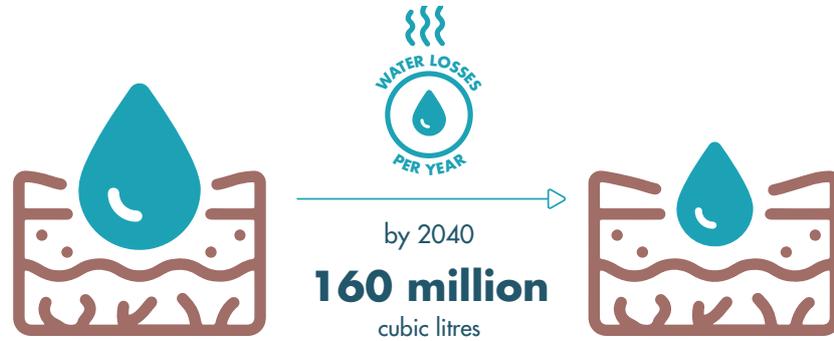
Lebanon’s dwindling water reserves will directly impact the state’s already fraught fiscal position. As the productive output of Lebanese households declines, the state will lose vital sources of tax revenue. Out of necessity, the state will need to replace lost water reserves with wastewater reuse and desalination investments, which will not generate direct tax revenue. In total, the cost of replacing water lost due to climate

change is expected to amount to \$320 million in annual costs by 2040. World Bank research suggests that Lebanese households will bear about 60% of this total amount, meaning that Lebanese households would pay \$190 million annually by 2040.²⁵

Yet again, the state has failed to introduce any coherent strategy for climate adaptation in relation to national water reserves. The National Water Sector Strategy, passed into law in 2012, barely mentions climate change as a concern,²⁶ and no national water strategy has been published since. Water and wastewater initiatives do feature in the state’s Capital Investment Plan, which proposes 206 different projects across both sectors. These projects include expanding the piped water system, improving irrigation systems, and developing



FIGURE VI
DOWN AND DROUGHT



SOURCE: Ministry of Environment, Lebanon's Second Communication to the UNFCCC, 2011; World Bank, Droughts and Agriculture in Lebanon : Causes, Consequences, and Risk Management, 2018.

wastewater treatment plants at Daoura and Ghadir. Sound policymaking could adapt each water project to climate change; for instance, they could protect water systems and wastewater plants against flooding. Such climate-proofing could generate an extra \$1.97 billion on top of the existing plans and add an extra 33,910 jobs to the Lebanese economy.²⁷ Depressingly, however, the Capital Investment Plan remains unfunded, as donors wait for Lebanon's intransigent elites to accept conditional political reforms.

As Lebanon fumbles, ingenious water adaptation projects are already taking off elsewhere in the Arab world. In Egypt, dozens of kilometres of sand dunes are being built along the Nile Delta to reduce the risk of coastal flooding for millions of local communities. In Morocco, irrigation networks are being constructed to pipe water across the country and reduce overreliance on groundwater sources.²⁸ In Bahrain, the Water Resource Council is conducting public awareness campaigns to reduce high levels of water consumption in the country.²⁹ Lebanon could have also sought funding for similar projects earlier on, but is only getting around to it now.

TOURISM TURMOIL

Another key economic sector, tourism, is already suffering from the effects of climate change. When tourists visit Lebanon, they flock to its ski resorts, coastal areas, and nature reserves. In future, however, they may have to look elsewhere for amusement. Lebanon's skiers will be disappointed to learn that they will have forty percent less snow in the decades to come—which will also mean less water for Lebanon's reservoirs.³⁰ Away from the slopes, two species of tree—the Lebanese cedar and Sicilian fir—are expected to recede as average temperatures increase in Lebanon. Mice and rats, as well as their predators—jackals and foxes—should thrive in the warmer conditions; meanwhile, mammals such as otters, which depend on water habitats such as the Aamiq wetlands in the Bekaa Valley, are expected to become extinct. When coupled with the fact that climate change is changing birds' migratory patterns, shifts in biodiversity will likely deter people from visiting Lebanon's areas of natural beauty.

When the UNDP tried to model the impacts of climate change on the tourism sector, they assumed that these decreases in biodiversity would mean fewer people



visiting tourist sites—but only at the coasts. Even this limited analysis, however, suggested that the tourism sector is expected to incur \$160 million by the year 2040.³¹ At present, no report exists that quantifies the impacts of climate change on the entire tourism sector—a fact conceded in the government’s own update on its climate change action.³²

HOSPITAL HEAT

Most troubling of all, however, climate change poses massive threats to the health of Lebanon’s citizens. In its 2011 submission to the UNFCCC, the Ministry of Environment declared that up to 5,200 Lebanese citizens are expected to die *each year* due to increased temperatures; for scale, this figure is slightly less than Lebanon’s total number of COVID-19 mortalities by the end of June 2021.³³ Higher ambient temperatures make a host of health problems more likely, including heat stress, heat cramps, heat syncope, heat exhaustion, malnutrition, diarrhoea, floods, malaria, and cardiovascular disease. These ailments will become especially threatening for the elderly and people with pre-existing medical conditions.³⁴

As heat-related health problems proliferate, Lebanese taxpayers will need to pay a higher price for the increased risk of death associated with climate change. By 2040, the extra costs involved in reducing the risk of these deaths are expected to reach \$54.7 billion, while the increased risk of illness and disability is expected to amount to \$194.3 billion—a total of \$249 billion in additional health bills. These figures become even more alarming in light of a 2020 Greenpeace report, which indicated that nearly 3,000 people die prematurely in Lebanon every year from preventable fossil fuel pollution. Based on these statistics, Lebanon has earned the dubious accolade of having the region’s highest air pollution death rates—with the worst impacts of climate change still to come.³⁵

The Lebanese state has taken precious little action to address the looming public health crisis stemming from

“**Higher ambient temperatures make a host of health problems more likely, including heat stress, heat cramps, heat syncope, heat exhaustion, malnutrition, diarrhoea, floods, malaria, and cardiovascular disease.**”

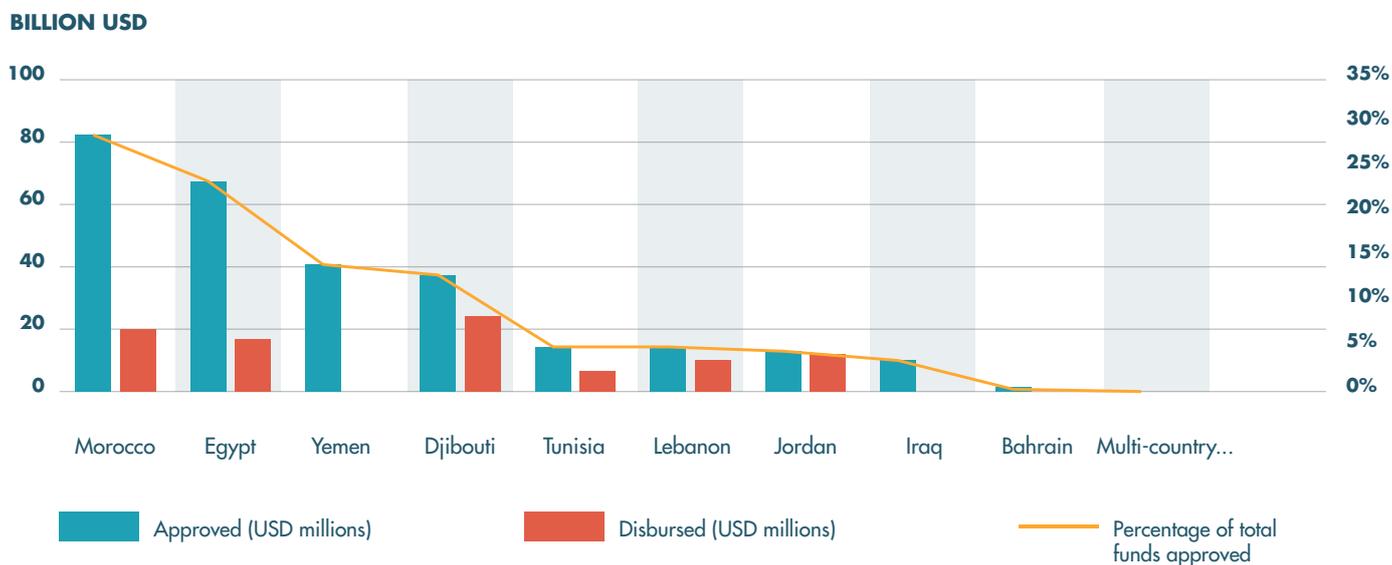
climate change, despite being aware of the problem. In its 2016 submission to the UNFCCC, the state proposed various actions for dealing with climate change.³⁶ The plan tasked the Climate Change Coordination Unit with a set of health-related activities, such as assessing the public health sector’s vulnerability to climate change. This signal of intent would have represented an encouraging step—if anything more had happened since 2016. The Ministry of Public Health has compounded uncertainty about the country’s medical plan for facing climate change. The ministry has made no mention of climate change in its most recent overarching strategy, let alone allocating specific budget lines to tackle climate change-related illnesses.³⁷ Other countries in the region have already stolen a march on Lebanon: Jordan launched a National Climate Change Health Adaptation Strategy and Action Plan as long ago as 2012.³⁸

FUNDING AND LEGAL VACUUMS

Lebanon faces several structural challenges in adopting climate adaptation policies, prominent amongst which is a lack of external funding. Analysis of green development finance flows to the Arab world indicate that Lebanon has received barely any of the funding disbursed, with most of the funding flowing to projects in Morocco and Egypt (see Figure VII).³⁹ The UNDP Climate Change team, Lebanon’s main body dedicated to climate change policy, is currently drafting Lebanon’s National Adaptation Plan (NAP). The NAP will set out a list of geographic and thematic areas where



FIGURE VII
SHARE OF ADAPTATION FUNDS ACROSS MENA COUNTRIES, 2003-2020.



SOURCE: Ministry of Environment, Lebanon’s Second Communication to the UNFCCC, 2011; World Bank, Droughts and Agriculture in Lebanon : Causes, Consequences, and Risk Management, 2018.

adaptation projects can take place.⁴⁰ Yet the UNDP team is lamentably understaffed and cannot create the NAP until it receives funding from the Green Climate Fund, the principal international development fund for climate change adaptation projects. These challenges come in addition to the fundamental concern of the government having outsourced key environmental functions to a development agency.

Lebanese policymakers have also struggled to attract funding for climate adaptation policies from other sources. The UNDP team is trying to secure private sector investment for green projects through the ‘Lebanese Green Investment Facility’, which is expected to launch later this year. The World Bank is expected to pledge between \$50 and \$60 million to the Green Investment Facility—but it is unclear when this will materialise.⁴¹ Separately, municipalities could try to implement localised climate adaptation initiatives—if they had the capacity to raise funds independently. Yet under Lebanese law, municipalities are prohibited from attracting funding through fiscal means

(principally, taxation) or through capital markets. As a result, municipalities remain highly dependent on central government funds through the Independent Municipal Fund (IMF) for development projects, which are often delayed, or simply not forthcoming.⁴²

A second obstacle to crafting climate adaptation policies is the absence of sector-specific data on how climate change is affecting key value chains. Lebanon suffers from a lack of reliable meteorological data, which prevents accurate early warning systems from being implemented. Lebanon’s only weather station is based at Rafic Hariri International Airport, which severely limits the Lebanese state’s capacity to monitor weather conditions. Meteorological blind spots leave policymakers groping around in the dark, often unable to warn farmers about extreme weather events such as heat waves, drought, or floods. In October 2019, the shortage of weather stations precluded the state from warning citizens about the high risk of forest fires breaking out. Curiously, Lebanon used to have weather stations operating in various locations,



including at Al-Arz, Dahr Baidar, Houche-Al-Oumara, Ksara, Merdjayoun, Rayack, and Tripoli.⁴³ Today, however, none of these facilities appears to be operational.

Thirdly, Lebanon's complete lack of a climate law—a legally binding framework for climate action—stymies climate adaptation. In other countries, climate laws compel governments to address climate change mitigation and adaptation. In the United Kingdom, for example, the 2008 Climate Change Act requires the British government to design and report on adaptation policies. The Climate Change Act also set up the Committee on Climate Change, an expert and politically independent committee that oversees climate change programmes in the UK.⁴⁴ By contrast, Lebanon has failed to enforce even more circumscribed environmental laws. Most notably, the Environmental Protection Law requires that all new buildings undergo Environmental Impact Assessments. Yet of the first 100 projects assessed in the law's first two years of implementation (2012-14), the Ministry of Environment rejected only one building application on environmental grounds.⁴⁵

RECOMMENDATIONS

In general, climate change adaptation requires effective, centralised policymaking, which is typically undertaken by a central government. In other countries, the state has instituted and overseen climate adaptation policies,

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“Lebanon’s climate activists are badly underfunded and suffer from the perception that climate change is of secondary concern. Donors should demonstrate their commitment to climate change by funding local climate action and amplifying the efforts of Lebanese climate change activists.”

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while also forming collaborative partnerships with key non-state actors, including the private sector and CSOs. Of course, Lebanon does not currently have a legitimate government in place, which naturally limits the potential of climate change adaptation policies for now. Accordingly, this report provides long-term recommendations (for after any new government that enters office) as well as interim recommendations, which offer practical guidance on steps that can be taken immediately.

INTERIM RECOMMENDATIONS

The international community must be prepared to fund grassroots climate activist organisations. Lebanon's climate activists are badly underfunded and suffer from the perception that climate change is of secondary concern. Donors should demonstrate their commitment to climate change by funding local climate action and amplifying the efforts of Lebanese climate change activists through their own bilateral engagement with the Lebanese government and through media interventions.

Lebanon’s civil society organisations must lead demands for climate change adaptation. NGOs, schools, and research institutes should cry out for a green economic recovery, framing mitigation and adaptation programmes as job-creating, economically sound, and health-enhancing. This report has pointed to analysis conducted by the Lebanese government itself suggesting that ‘climate proofing’ projects will increase employment opportunities and reduce the future opportunity costs of climate change on the Lebanese economy. NGOs must take note and insist that the Lebanese government follows through with these recommendations, rather than allowing them to rot on the shelf. NGOs should pay attention to calls by Greenpeace MENA and the Arab Forum for Alternatives to consider a green and just recovery across the Arab world.⁴⁶

Civil society organisations and educational institutions must include climate change



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“Any new government must implement a National Green Recovery Plan—and ensure that it benefits Lebanon’s poorest the most.”

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adaptation in their work. Lebanon’s NGOs should take swift steps to understand how climate change will affect their activities, schools should embed climate change in their curricula, and academic institutes should prioritise climate change studies in their research agendas. Such action should not be limited to organisations that traditionally deal with environmental issues: migrants’ rights organisations, for instance, should investigate the impact of rising temperatures on migrant workers’ physical and mental health.

Civil society organisations must conduct quarterly national and local-level polling to make climate change a politically salient issue. Experience from other countries—the United States being one notable example—suggests that politicians pay attention to climate change when voters do. Lebanese citizens have indicated their concern for climate change in the past, and fresh polling data would give climate change policy the political boost that it needs.

LONG-TERM RECOMMENDATIONS

When any new Lebanese government enters office, it must pass a National Climate Law. In addition to committing Lebanon to zero GHG emissions by 2050 at the very latest, the law should oblige all public and private infrastructure projects to include ‘climate-proof’ climate change adaptation measures. The National Climate Law should significantly expand the Climate Change Coordination Unit within the Ministry of Environment, as well as establishing an independent Climate Change Oversight Committee. The committee should produce annual climate change adaptation and mitigation progress reports, which

monitor the Climate Change Coordination Unit’s activities. The National Climate Law should also embed Nationally Determined Contributions, as recently updated, to ensure that Lebanon makes good on its green policy commitments.

Any new government must implement a National Green Recovery Plan—and ensure that it benefits Lebanon’s poorest the most. The government already has a playbook of 100 climate-proof infrastructure projects it could launch. Yet the likelihood of these projects being implemented remains uncertain because no overarching strategy exists for committing Lebanon’s economy to a zero-carbon future. Instead, the report includes worrying proposals for new fossil fuel power plants. The new umbrella strategy should address all emissions-producing sectors, including transport, power, buildings, agriculture, industry, and tourism. It should be devised in consultation with the Ministries of Environment, Agriculture, Water, Tourism, Transport, and Finance and be given legal weight by the National Climate Law. The Plan should benefit Lebanon’s poor and rural communities must benefit from these plans—for instance, by ensuring that smallholder farmers receive grants for drip irrigation—since they will be the most exposed to climate change shocks.⁴⁷

Any new government must commission a set of detailed, independently assessed reports on climate change’s impacts on tourism, biodiversity, healthcare, water, and agriculture. Among these reports, the Ministry of Environment should conduct or commission a comprehensive analysis of climate change across all areas of Lebanon’s domestic



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“Local municipalities should also have the option of independently seeking grants and concessional lending from multilateral development funds such as the Green Climate Fund and Global Environmental Facility.”

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tourism industry. Any such analysis should quantify the spending per visitor-day and the extent to which the benefit consumers enjoy per visitor-day exceeds what they spend (i.e. tourists’ ‘willingness to pay’, an essential element of economic analysis).⁴⁸ The relevant line ministries should be prepared to adopt the recommendations of these reports as part of their multi-year strategies.

The government must also drastically expand Lebanon’s climate data collection capabilities, including meteorological infrastructure. At present, there is a glaring lack of publicly available weather data in Lebanon. It appears impossible, for example, to obtain reliable data on historical snowfall patterns in the country. Expanded weather station coverage would provide the Lebanese government with the data needed to make evidence-based interventions across all sectors affected by climate change, from agriculture to the tourism sector.

Any new government must also enable municipalities to independently levy green fiscal and monetary policies. Municipalities—already desperately underfunded and in need of economic stimulus—should be allowed to raise local environmental taxes and charges on environmental issues such as pollution, parking, and solid waste. Local municipalities should also have the option of independently seeking grants and concessional lending from multilateral development funds such as the Green Climate Fund and Global Environmental Facility.

Responsibility for addressing Lebanon’s climate crisis also rests with the international community. The Green Climate Fund, World Bank,

International Monetary Fund, UN agencies and foreign embassies all have their part to play. To begin with, they must fund a comprehensive Lebanese National Climate Adaptation Plan. It is unacceptable—and, given that adaptation work needs local support to succeed, entirely counterproductive—that Lebanon cannot conduct a full NAP involving a national consultation process. External donors should commit to Lebanon’s climate-safe future by supporting the NAP’s development in Lebanon. The final NAP should provide for climate adaptation, while also transitioning Lebanese commerce to a circular, sustainable economy. This revamped system would incentivise innovative policies in areas such as agritech, green building design, and sustainable transport.

EDITOR’S NOTE

Triangle would like to express its heartfelt gratitude to all the economists, researchers, journalists, academics, and industry sources who anonymously contributed to this policy paper. The paper was compiled before the Intergovernmental Panel on Climate Change released its recent report (IPCC, 2021: Summary for Policymakers); all global climate change predictions made in this report thus build on previously available research.

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REFERENCES AND ENDNOTES

- 1 BBC Arabic, 'البنان - شبكة الفساد: تحقيق جديد عن قطاع الكهرباء في لبنان', BBC News عربي, July 2021, <https://www.bbc.com/arabic/middleeast-57696979>.
- 2 For a comprehensive overview of specific climate change adaptation strategies, see ClimateWorks Foundation et al., 'Shaping Climate-Resilient Development: A Framework for Decision-Making', 2009.
- 3 Ministry of Environment, GEF, and UNDP, 'Lebanon's Second National Communication to the UNFCCC', 2011, https://unfccc.int/sites/default/files/resource/lebanon_snc.pdf.
- 4 This report acknowledges the recently published IPCC report (IPCC, 2021: Summary for Policymakers. In: Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Masson-Delmotte, V., P. Zhai, A. Pirani, S. L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M. I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J.B.R. Matthews, T. K. Maycock, T. Waterfield, O. Yelekçi, R. Yu and B. Zhou (eds.)]. Cambridge University Press. In Press.), which confirms the physical trends in regional climate change outlined in this report"
- 5 All figures in 2015 inflation-adjusted US dollars unless otherwise stated. Ministry of Environment, UN Development Programme, and Global Environmental Facility, 'Economic Costs to Lebanon from Climate Change: A First Look' (Ministry of Environment, 2015), <http://climatechange.moe.gov.lb/viewfile.aspx?id=228>.
- 6 These losses are associated with the so-called representative concentration pathway (RCP) 8.5, a future world scenario produced by the Intergovernmental Panel on Climate Change (IPCC) that represents a business-as-usual scenario where countries do nothing to curb their emissions. If global emissions reduce, of course, the costs that Lebanon would incur both directly and indirectly could be significantly limited, but cannot be fully eradicated.
- 7 UNDP, 'Climate-Proofing Lebanon's Development Plans' (Beirut, Lebanon: UNDP, 2021).
- 8 'Climate-Proofing Lebanon's Development Plans', Vivid Economics, accessed 19 June 2021, <https://www.vivideconomics.com/casestudy/climate-proofing-lebanons-development-plans/>.
- 9 'Climate Change, Economic Crisis Take Heavy Toll on Lebanon's Honey Industry - Global Times', accessed 2 July 2021, <https://www.globaltimes.cn/page/202105/1224627.shtml>; 'List of Importing Markets for a Product Exported by Lebanon | Product: 0409 Natural Honey', accessed 2 July 2021, https://www.trademap.org/Country_SelProductCountry_TS_Graph.aspx?nvpm=1%7c422%7c%7c%7c0409%7c%7c%7c4%7c1%7c2%7c2%7c1%7c2%7c1%7c1%7c2.
- 10 Layal Abou Rahal, 'Insect Pest Eats into Lebanon's "white Gold" Pine Nut Trade', AFP, 4 June 2021, <https://www.france24.com/en/live-news/20210604-insect-pest-eats-into-lebanon-s-white-gold-pine-nut-trade>; 'Pins Du Liban : Ravages et Solutions', L'Orient-Le Jour, 1 May 2017, <https://www.lorientlejour.com/article/1049410/pins-du-liban-ravages-et-solutions.html>.
- 11 Sarah Dadouch, 'Climate Change Is Upending Lebanon's Booming Business of Boutique Wineries', Washington Post, 13 February 2021, <https://www.washingtonpost.com/world/2021/02/13/climate-change-is-upending-lebanons-booming-business-boutique-wineries-provisional/>.
- 12 These findings form part of an as-yet unpublished AUB study on climate change and its impacts on commercial value chains.
- 13 Halabi S & Ghanem N, 'Rapid Market Opportunity and Value Chain Analysis for Small and Microenterprise Development of the Fisheries Sector in the Tyre Caza of Lebanon', IUCN and ADR, https://www.iucn.org/sites/dev/files/content/documents/rapid_market_assessment_infographic_in_tyre_caza.pdf
- 14 Nadim Farajalla et al., 'Climate Change in Lebanon: Higher-Order Regional Impacts from Agriculture', Climate Change, 2014, 23.
- 15 Farajalla et al.
- 16 As of 15 July 2020, the U.S. dollar was trading at above 20,000 Lebanese lira. See: Ben Hubbard, 'Lebanon's Designated Prime Minister Quits Amid Swirling Crises', The New York Times, 15 July 2021, sec. World, <https://www.nytimes.com/2021/07/15/world/middleeast/lebanon-prime-minister-saad-hariri.html>.
- 17 Source: These figures are based on two assumptions relating to income per capita and income distribution. Mean annual gross national income per capita in Lebanon is assumed to be USD 8,500 in 2010, based on World Bank, (2015). "World Development Indicators: Size of the Economy." <http://wdi.worldbank.org/table/1.1>). Second, income distribution is based on El-Laithy, Heba, Khalid Abu-Ismaïl, and Kamal Hamdan, (2008). Poverty, Growth and Income Distribution in Lebanon. <http://www.lb.undp.org/content/dam/lebanon/docs/Poverty/Publications/Poverty,%20Growth%20and%20Income%20Distribution%20in%20Lebanon.pdf>. For a full explanation of how these income brackets were calculated, see Ministry of Environment, UN Development Programme, and Global Environmental Facility, 'Economic Costs to Lebanon from Climate Change: A First Look', 18.
- 18 Guy J. Abel et al., 'Climate, Conflict and Forced Migration', Global Environmental Change 54 (1 January 2019): 239–49, <https://doi.org/10.1016/j.gloenvcha.2018.12.003>.
- 19 Aliaa Al Dirani et al., 'Exploring Climate Change Adaptation Practices and Household Food Security in the Middle Eastern Context: A Case of Small Family Farms in Central Bekaa, Lebanon', Food Security, 26 June 2021, <https://doi.org/10.1007/s12571-021-01188-2>.
- 20 The Pillar outlines measures for dealing with climate change adaptation, sustainable use of natural resources, efficient water uses and renewable energy in the agricultural sector. See Ministry of Agriculture, 'Lebanon National Agriculture Strategy 2020-2025', 2020, <http://www.agriculture.gov.lb/getattachment/Ministry/Ministry-Strategy/strategy-2020-2025/NAS-web-Eng-7Sep2020.pdf?lang=ar-LB>.
- 21 UNDP, 'Climate-Proofing Lebanon's Development Plans'.
- 22 Ministry of Environment, GEF, and UNDP, 'Lebanon's Second National Communication to the UNFCCC'.
- 23 For an extensive investigation of Lebanon's neglected water sector, see Karim Eid-Sabbagh and Alex Ray, 'Breaking Point: The Collapse of Lebanon's Water Sector' (Triangle Consulting, 2021), <https://secureservercdn.net/160.153.137.163/f62.e5d.myftpupload.com/wp-content/uploads/2021/06/Breaking-Point-The-Collapse-of-Lebanons-Water-Sector-1.pdf>.
- 24 Claudia Sadoff and Edoardo Borgomeo, 'Beyond Scarcity: Water Security in the Middle East and North Africa' (Washington, DC: World Bank, 2018).
- 25 Ministry of Environment, UN Development Programme, and Global Environmental Facility, 'Economic Costs to Lebanon from Climate Change: A First Look'.
- 26 Gebran Bassil, 'National Water Sector Strategy'.
- 27 Author's calculations based on UNDP, 'Climate-Proofing Lebanon's Development Plans'.
- 28 Green Climate Fund, 'Enhancing Climate Change Adaptation in the North Coast and Nile Delta Regions in Egypt', Text, Green Climate Fund (Green Climate Fund, 6 November 2017), <https://www.greenclimate.fund/document/enhancing-climate-change-adaptation-north-coast-and-nile-delta-regions-egypt>; Green Climate Fund, 'FP043: The Saïss Water Conservation Project', Text, Green Climate Fund (Green Climate Fund, 6 April 2017), <https://www.greenclimate.fund/project/fp043>.
- 29 Green Climate Fund, 'SAP003: Enhancing Climate Resilience of the Water Sector in Bahrain', Text, Green Climate Fund (Green Climate Fund, 20 October 2018), <https://www.greenclimate.fund/project/sap003>.
- 30 Ministry of Environment, GEF, and UNDP, 'Lebanon's Second National Communication to the UNFCCC'; Amin Shaban et al., 'Influence of Snow Cover on Water Capacity in the Qaraaoun Reservoir, Lebanon', Arabian Journal of Geosciences 14, no. 1 (6 January 2021): 10, <https://doi.org/10.1007/s12517-020-06295-6>. Lebanon\{uc0\{u8217}\}, {\i\}Arabian Journal of Geosciences} 14, no. 1 (6 January 2021
- 31 Ministry of Environment, UN Development Programme, and Global Environmental Facility, 'Economic Costs to Lebanon from Climate Change: A First Look', vii.
- 32 Lebanon Ministry of Environment, 'Lebanon's Third National Communication to the UNFCCC', 135.
- 33 On 23 June 2021, the number of COVID-19 related deaths was 7,832. Data available at: Ministry of Public Health, 'الموقع الرسمي لمتابعة أخبار - وزارة الإعلام - الجمهورية اللبنانية - فيروس كورونا في لبنان', accessed 1 July 2021, <https://corona.ministryinfo.gov.lb>.
- 34 M. A. McGeehin and M. Mirabelli, 'The Potential Impacts of Climate Variability and Change on Temperature-Related Morbidity and Mortality in the United States', Environmental Health Perspectives 109 Suppl 2 (May 2001): 185–89, <https://doi.org/10.1289/ehp.109-1240665>.{\i\}Environmental Health Perspectives} 109 Suppl 2 (May 2001
- 35 Aidan Farrow, Kathryn A Miller, and Lauri Myllyvirta, 'Toxic Air: The Price of Fossil Fuels' (Greenpeace MENA, 2020).
- 36 Lebanon Ministry of Environment, 'Lebanon's Third National Communication to the UNFCCC', 2016.
- 37 Ministry of Public Health, 'Health Strategic Plan: Strategic Plan for the Medium Term (2016 to 2020)', 2016, <https://www.moph.gov.lb/userfiles/files/%D9%90Announcement/Final-StrategicPlanHealth2017.pdf>.



- 38 Khalil Kanani et al., 'National Climate Change Health Adaptation Strategy and Action Plan of Jordan', 2012, 259.
- 39 Author's calculations based on Heinrich Böll Stiftung, 'Climate Funds Update Data Dashboard', accessed 18 June 2021, <https://climatefundsupdate.org/data-dashboard/themes/>.
- 40 While no draft of the NAP exists in the public domain, its existence was confirmed by an expert familiar with the drafting process.
- 41 Based on discussions with subject matter experts. See: World Bank, 'Establishing a Green Investment Facility – Lebanon', accessed 2 July 2021, <https://thedocs.worldbank.org/en/doc/343911583862050713-0020022020/original/EstablishingaGreenInvestmentFacilityLebanonNDCSFT3.pdf>.
- 42 Sami Atallah et al., 'Restructuring Subnational Governance in Lebanon: Towards Efficient Public Spending and Reduced Regional Inequalities' (Beirut, Lebanon: Democracy Reporting International, 2020), https://democracy-reporting.org/wp-content/uploads/2020/11/DRI-LEB-DE-Fiscal-Decentralisation_29102020_combined-with-appendix_online-1.pdf.2020
- 43 'Weather Data for Lebanon', accessed 1 July 2021, https://geographic.org/global_weather/lebanon/index.html.
- 44 Expert, 'Climate Change Act 2008' (2008), <https://www.legislation.gov.uk/ukpga/2008/27/contents>.
- 45 'قانون حماية البيئة في لبنان: تشريع رمزي يتخبط بين المصالح السياسية وضعف الإدارة', Legal Agenda (blog), 6 October 2014, <http://www.legal-agenda.com/لبنان-تشريع-رمزي-قانون-حماية-البيئة/>.
- 46 'Greenpeace MENA and Arab Forum for Alternatives Announce Team Up to Promote the Discussion of a Green and Just Recovery in the Region', Greenpeace MENA, accessed 2 July 2021, <https://www.greenpeace.org/mena/en/greenpeace-mena-and-arab-forum-for-alternatives/>.
- 47 Stéphane Hallegatte et al., 'Shock Waves: Managing the Impacts of Climate Change on Poverty' (Washington, DC: World Bank, 2016), <https://openknowledge.worldbank.org/bitstream/handle/10986/22787/9781464806735.pdf?sequence=13&isAllowed=y>. DC: World Bank, 2016
- 48 Lebanon Ministry of Environment, 'Lebanon's Third National Communication to the UNFCCC.', 136.



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