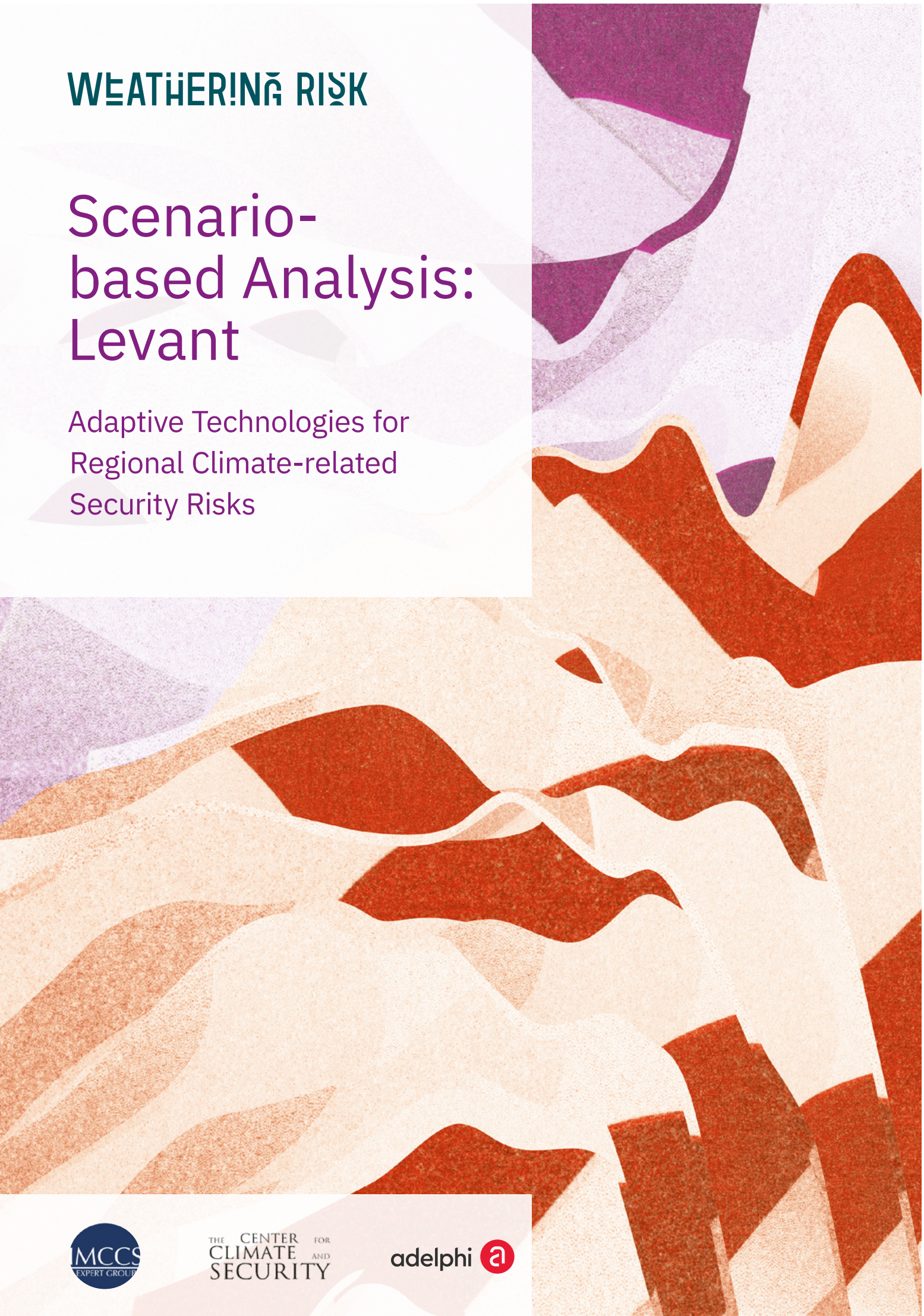
WEATHERING RISK

Scenario-based Analysis: Levant

Adaptive Technologies for Regional Climate-related Security Risks



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ACKNOWLEDGEMENTS
Thanks to Hannah Kurnoth (adelphi), Spencer McMurray (adelphi), Lukas Rüttinger (adelphi), Erin Sikorsky (Center for Climate and Security) and Francesco Femia (Council on Strategic Risks) for their review and support during the scenario exercise and editing process.

This research was conducted by the International Military Council on Climate and Security Expert Group and the Center for Climate and Security, an institute of the Council on Strategic Risks as part of the multilateral Weathering Risk initiative. This flagship climate security initiative unites state-of-the-art climate impact data and expert conflict analysis to provide analysis, capacity support tools, dialogues and trainings to promote peace and resilience in a changing climate.

COVER IMAGE
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SUPPORTED BY

Federal Foreign Office

PUBLISHED BY
adelphi research gGmbH
Alt-Moabit 91, 10559 Berlin, Germany
www.adelphi.de

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Date: April 2022
Editorial responsibility: adelphi and and the Center for Climate and Security, an institute of the Council on Strategic Risks
Layout and design: Studio GOOD Berlin and Hannah Kurnoth (adelphi)
Infographics: Hannah Kurnoth (adelphi)

This report should be cited as: Bentley, Robert; Brigitte Hugh and Dr. Rod Schoonover 2022: Weathering Risk Scenario-based Analysis: Levant. The International Military Council on Climate and Security Expert Group and the Center for Climate and Security, an institute of the Council on Strategic Risks. Published by adelphi.

Introduction

The impact of climate change is already adversely shaping security in the Levant, the region comprising Israel, Jordan, Lebanon, Palestine, and Syria. Analysts of the 2011 political upheavals have concluded that the popular unrest, the political reaction to which caused disastrous effects, was, amongst other causes, triggered by climate-driven effects like sharp rises in global food prices and local droughts that displaced rural populations (Femia et al. 2014). Climate forecasts indicate that rising temperatures, increasing droughts, and changing rainfall patterns will further affect the region in the future, while its dependence on food imports means it will remain vulnerable to adverse climate developments elsewhere. Regional states, meanwhile, vary widely in their quality of governance and ability to develop and implement climate-adaptive policies. Building from this analysis, this assessment projects possible climate security outcomes in the region via a scenario analysis method.

The four scenarios developed are solution-oriented, focusing on the potential of adaptive technologies against the background of more or less cooperation:

SCENARIO 1
It takes a lot of villages: In which local to regional cooperation is high and climate-adaptive technologies are small-scale and widely available.

SCENARIO 2
It takes big tech, big money, big organisation: In which cooperation is high but the environment strongly favours large-scale adaptive projects.

SCENARIO 3
Big tech but no village: In which local to regional fragmentation is high but financial or technological factors nonetheless favour large-scale adaptive approaches.

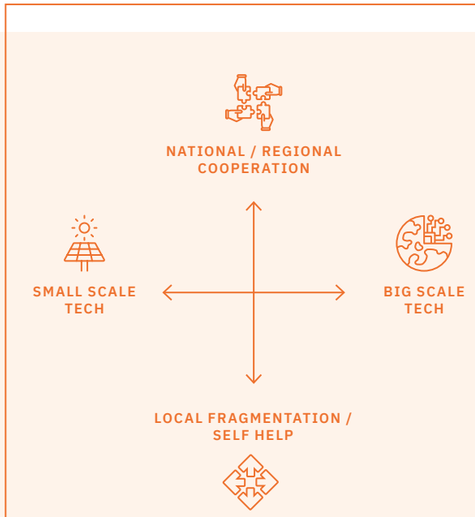
SCENARIO 4
Every village for itself: In which fragmentation is high but small-scale adaptive technologies are effective, affordable, and widely available.

The process of developing and analysing these four scenarios highlighted the importance of state policy, governance, and cooperation as variables shaping states' coping capacity. While the exercise did not identify significant new entry points for addressing regional governance or cooperation deficits, it did reveal that even in states with poor or absent governance and low levels of cooperation, societies may find ways of coping with adverse climate impacts if the means to cope are readily available. Our scenarios suggest that making small-scale adaptive technologies widely available may offer a path to increasing climate resilience in societies suffering from low cooperation and poor or even predatory governance.

A note on the method: Using scenarios to inform analysis and policy

We sought to probe the future of the Levant using a scenario analysis method. We began with a "climate snapshot" of expected physical risks to the region over the next 5 to 10 years, and then convened an expert discussion group to identify key drivers – the social, cultural, economic, political, technological, or other forces likely to shape the climate security future. Our expert panel sought to identify the most important and most uncertain or difficult to predict forces or drivers. From those forces or drivers that emerged from the discussion, two were selected as the axes of a matrix with four quadrants (see illustration). Each axis is envisioned as a force or condition with opposing extremes; e.g., high levels of regional and local cooperation at one end, little or no regional and local cooperation at the other. Combining the drivers in the matrix produces four possible futures shaped by the interaction of the drivers. After developing the four scenarios below, we reconvened the panel to consider the scenarios and explore their implications.

The scenarios are not predictive, and the expert panel was not asked to assess the likelihood of the different futures. Nor are they exclusive – different drivers would produce a different set of futures. The exercise, rather, illustrates how wide-ranging possible futures could plausibly look like by showing how the interaction of just two drivers can produce very different outcomes, avoiding the trap of the single-line projection. Imagining the drivers operating at their strongest or weakest extremes helps highlight their potential effects. Asking what would have to happen or change to bring about a scenario helps identify indicators for policymakers and practitioners to monitor as they prepare today to manage the climate security risks of the future.



Snapshot: Climate adding to regional stress

The regional climate forecast by the IPCC indicates climate change will add substantially to the region's political and economic stresses in the coming decades. The two tables below provide a summary of climate-related and additional factors that we concluded will shape the climate security challenges the Levant faces in the coming years.

Near-term regional climate trends

(IPCC 2021)

- Severe summer heatwaves becoming increasingly intense, more common, and longer
- Significant increases in warm days
- Significant reduction in rainfall
- More meteorological, agricultural, and hydrological drought
- Warming waters and ocean acidification changing marine ecosystems
- Sea level rise and storm surges further exacerbating saltwater intrusion into groundwater

Additional factors shaping the climate security landscape

(Fund for Peace 2021; ODNI 2021a; ODNI 2021b)

GOVERNANCE

- Exempting Israel, which rates "more stable", Levant states are rated above "elevated warning" on the Fragile States Index.
- The gap is widening between public demands for improved services and governments' ability to provide them.
- Weak governments increasingly rely on repression to maintain stability.

DEMOGRAPHICS AND MIGRATION

- Lebanon and Jordan host an estimated 1.5 and 1.3 million Syrian refugees, respectively. Refugees already face hostility from receiving populations and experience profound obstacles to integration.
- Working-age population is likely to increase by ~2% by 2040, and unemployment is high in the region.

ECONOMICS

- Levant countries, such as Lebanon, face large debt burdens with few prospects for relief.
- The region is one of the largest food importers in the world.
- The region used to be a net exporter of labour services, but the COVID-19 pandemic has shifted expatriates back home, limiting income from remittances.

CONFLICT AND VIOLENCE

- The Arab-Israeli conflict is diminishing in importance for younger demographics.
- Longstanding terrorist groups, such as Hezbollah and HAMAS, will likely continue to play a role; other terrorist groups may also influence regional politics.
- Ongoing internal conflicts continually risk expanding into regional conflicts.

Drivers:
Technology and cooperation

Our expert discussion identified two of the most important and uncertain factors shaping the climate security landscape in the Levant as “the fragmentation axis” and “the technology axis.”

The fragmentation axis: Cooperation at every level vs. no cooperation at any level

This axis stipulates local factionalism and fragmentation, and a breakdown of national cohesion and regional cooperation at one end, exemplified by current conditions in Syria and to a lesser extent in Lebanon. At the other end is increasing cooperation at all levels, with climate-stressed societies overcoming factional, local, national and regional differences to cope with a set of common challenges. The 2021 Jordan-Israel agreement to exchange solar power from Jordan for desalinated water from Israel in a project financed by the UAE illustrates this potential (Vohra 2021).

The technology axis: Small, local and widely available vs. big, transnational and complex

This axis stipulates the widespread availability of inexpensive climate adaptive technologies at one end, while at the other end we stipulate a dominance of large-scale adaptive technologies. Inexpensive, widely available solar panels exemplify the small-scale end. We postulated for the scenario that similar small-scale technologies for coping with water shortages would become widely available as well (unlike solar panels, such technologies may be available soon but are not yet widely deployable). The opposite end is a relative dominance of large-scale solutions that require state involvement, financing, and national/regional-level cooperation. Again, the Jordan-Israel-UAE water-for-solar power deal provides an example, requiring international financing and large-scale, cross-border infrastructure.

Each axis represents a spectrum of possibilities. For example, it is quite possible to envision various combinations of small and large-scale technological adaptations. Solar panels, for example, can be deployed in vast energy farms or on individual homes, or both, in the same region. Our scenarios suggest how regional cooperation could foster more large-scale projects, while more fragmentation might lead to small-scale solutions becoming the default.

Summary of scenarios:
A matrix of four potential futures

National / regional cooperation

IT TAKES A LOT OF VILLAGES

- Rapid commercialisation of adaptive technologies (greenhouse farming, recycled water, etc.)
- Local governance, NGOs, international aid organisations cooperate to deploy inexpensive adaptive tech
- Decentralised governance of basic services empowers smaller actors, lessens governmental influence

IT TAKES BIG TECH, BIG MONEY, BIG ORGANIZATIONS

- Cooperation on climate change is seen as a means to advance agendas for large actors
- State-level tensions defused to invite large-scale investment
- Cross-border agreements and international finance adaptive measures favoured
- Investment unequally distributed given uneven regional stability

Small scale tech

Big scale tech

EVERY VILLAGE FOR ITSELF

- Though small-scale technology is available, fragmentation means little institutional support for dissemination
- Some adaptation happening at local community levels
- Political fragmentation means distribution of tech is negatively influenced by powerful groups in a beggar-thy-neighbour approach

BIG TECH BUT NO VILLAGES

- Enabling environment favours large-scale technology but cooperation to deploy is lacking
- Small scale conflicts erupt without high level legitimacy
- Local populations lack technology and resources to adapt
- Government instability stands in the way of basic service provision, decreasing legitimacy

Local fragmentation / self help

Taking a closer look: Scenarios in detail

Scenario 1: It takes a lot of villages

In this scenario, inexpensive adaptive technologies like cheap solar panels are widely available. Regional tensions have subsided or been set aside, and governments, private sector actors, NGOs, and local groups are able to cooperate in efforts to deploy new technologies and policies to cope with adverse climate impacts. Local farm cooperatives switch to greenhouses and recycled water in place of traditional open-field, irrigated agriculture, for example, with support and subsidies from national regimes and multilateral agencies. Ready availability of adaptive technologies, with high levels of cooperation, create a supportive environment for rapid adoption of coping strategies. This looks like the most optimistic and inclusive scenario, but many panellists doubted its political/social feasibility and its technical plausibility.

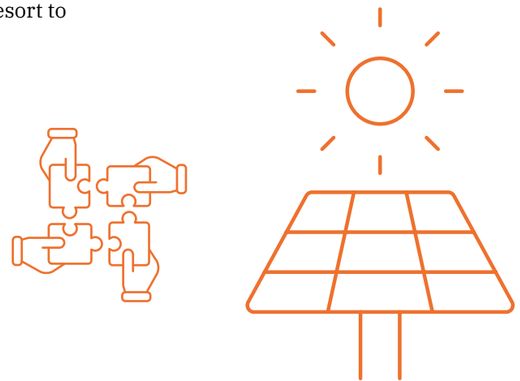
DETAILS

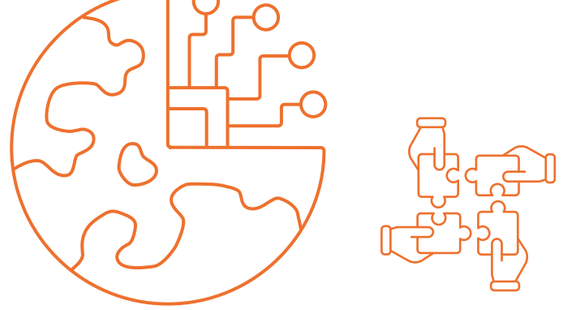
Climate-stressed societies begin to subordinate political, sectarian, and other divides to enable populations to deploy inexpensive, readily available technology to cope with drought, heatwaves, and prospective food shortages. International aid organisations and NGOs are able to leverage government cooperation to provide local solutions like greenhouse-based farming, newly available water-from-atmosphere technology, and small solar and wind power installations. In Israel and Jordan, such local solutions become an increasing part of the energy and water supply mix alongside large, centralised utilities. In Syria and Lebanon, economic collapse and lingering political divides inhibit large-scale development but the need for power and water encourages a broad resort to small-scale technology.

An unintended effect is that these adaptations decentralise traditional government services like electric power and water, with hard to predict social and political effects. Private businesses, informal local cooperatives, NGOs, local warlords, and extremist groups all gain potential to emerge as local providers of small-scale adaptive technologies.

In this scenario, government involvement, NGO programs, and international support are important in ensuring adaptive technologies and the knowledge to deploy them are equitably distributed. In areas affected by conflict and economic collapse, providing knowledge and training becomes a means for non-state and state actors to gain legitimacy. Overall, equitable distribution helps reduce local conflict and prevent hoarding or predatory strategies from derailing adaptive efforts.

Such a scenario requires rapid commercialisation of technologies such as greenhouse farming with recycled water, atmospheric water capture, or inexpensive small-scale solar power installation. However, the political and social issues are much more problematic. Such a broadly cooperative scenario would require a sea-change in social and political behaviour across a region dominated by inter-group conflict and mistrust.





Scenario 2: It takes big tech, big money, big organisation

In this scenario, both the political environment and technological developments favour large-scale adaptive projects. Cross-border agreements and international finance are important for achieving the desired scale.

This scenario distinctly favours those states that have the right policy and regulatory environment and are able and willing to sustain cross-border agreements. Jordan and Israel would appear to be the major beneficiaries; the Palestinians might struggle for attention while Syria and Lebanon are unable to benefit.

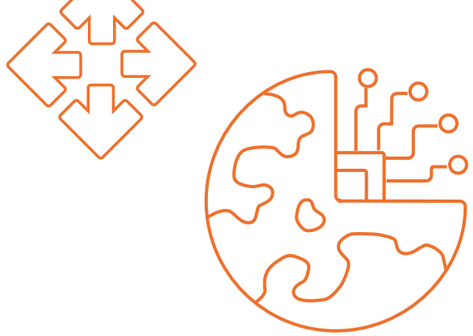
DETAILS

In this scenario, governments, financiers, corporations and international actors see cooperation against climate stress as a means to advance agendas of state influence, centralisation, and corporate profit, providing benefits to major constituents and excluding "bad actors." Projects like the proposed Jordan-Israel water-for-solar power deal move ahead, despite resistance from factions opposed to greater regional cooperation. Large-scale projects could encounter delays, however, because the need to line up permits, financing, and political support create obstruction or veto points for political opponents.

Because international lenders remain wary of financing projects in prospective war zones, regional leaders work to defuse regional tensions and conflicts. State-level tensions diminish but potential investors avoid Syria and Lebanon, given the lingering effects of war and economic meltdown and worries about political instability and severe corruption. Most projects by default are thus designed to begin with Israel and Jordan, with other regional parties being included "when circumstances allow."

The Palestinians find themselves subject to an effective Israeli veto over whether the West Bank or Gaza will benefit from any large-scale climate-related projects, but in this more cooperative scenario Israel seeks to alleviate climate stress on Palestinian populations as part of a program to better manage relations and avoid conflict, and Palestinians are willing to accept whatever benefits this entails.

Jordan and Israel find several major projects to cooperate on; developing cooperative projects with Syria and Lebanon proves much more difficult, contributing to a widening gap between well-ordered states that can benefit from large-scale climate adaptive projects and "disordered" states that cannot. A presumption of this scenario is that the region's many violent conflicts remain dormant. Refugee and other humanitarian issues remain salient, difficult problems.



Scenario 3:
Big tech but no village

In this scenario, financial and technical trends favour large-scale projects while low levels of cooperation in local societies inhibit small-scale solutions. Adaptation across the region to climate threats is very much a function of state capacity; the lack of cross-border cooperation means regional projects fail to launch. States attempt their own solutions but high levels of mistrust and low cooperation must be overcome to deploy them, hindering their ability to cope with increasing political, social, and climate-induced stresses.

Even Israel would be challenged in this scenario, without willing regional partners and with neighbours facing high levels of internal and climate stress. Jordan would become even more reliant, perhaps, on its international donors. Palestine, Syria, and Lebanon, beset by high factionalism, find it very difficult to cope with worsening climate impacts on top of internal frictions.

DETAILS

In this scenario, technical and financial considerations strongly favour large-scale technology, but political fragmentation leads to relations breaking down at regional and local levels. Thus, big technological, cross-border projects requiring international financing and cooperation become impractical. Climate-stressed populations have fewer ways of coping or adapting because large-scale solutions, with their high costs and long timelines, are out of reach for families or villages, while fragmentation and communal hostility makes the deployment of even small-scale systems difficult.

Regional tensions, continuing suspicions and a fear of depending on former enemies for essentials like water and electricity prevent the fruition of cross-border projects. Projects like the Jordan-Israel water-for-solar power deal fall apart amid mutual recriminations. This situation leaves Israel as the only regional state able to finance and deploy large-scale adaptive technologies. Other states and their peoples suffer acute climate impacts with little ability to cope and no relief in sight. Israel becomes increasingly concerned about potential security implications as climate stress adds to regional discord.

Water shortages and heat waves contribute to ongoing crises in Syria and Lebanon, and increasingly threaten stability in Jordan. Government capability to provide relief to heat-stressed, water-deprived constituents becomes an increasingly important test of legitimacy.

The Palestinians struggle to have their climate issues addressed. Prevented from generating large-scale adaptations on their own, they remain dependent on Israel's willingness to accommodate their concerns. This heightens tensions between the Palestinians and Israel, with access to water and technology becoming critical points of contention. Israel, to the extent it is seen as unwilling to accommodate Palestinian needs, comes under increased international pressure as well.

The exodus of refugees from Syria and Lebanon swells as climate effects compound with war and economic collapse. The refugee increase has broader reverberations, affecting Europe, Turkey, and the Gulf states — all of which currently seem increasingly disinclined to accept Syrian and Lebanese migrants.

Without high-level cooperation or coordination, local self-help leads to proliferating small-scale conflicts as communities in Syria, Lebanon, and Jordan struggle over access to water, power, and even food. Declining state effectiveness across Lebanon and Syria especially feeds the emergence of local alternatives, and this process becomes a vicious cycle, strengthening a process of state disintegration.

Scenario 4:
Every village for itself

In this scenario, the region is beset with continuing tensions and little cooperation at any level, but with inexpensive adaptive technologies widely available. Small groups (factions, villages, clans, some NGOs) are able to deploy small-scale adaptive technologies and strategies in a regulatory/governance environment that is absent or weak. Smuggling and black markets become adaptive enablers; corrupt or predatory actors benefit but populations are able to obtain the means to adapt to their increasingly harsh and precarious environment.

DETAILS

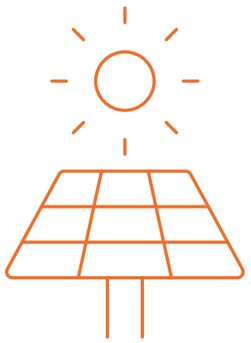
This scenario illustrates how a lack of state capacity could encourage the emergence of local coping strategies, enabled by the widespread availability of low-cost adaptive systems. Like Scenario One, this scenario posits the widespread availability of inexpensive, small-scale technology that can potentially enable climate-stressed populations to adapt. At the same time, political and economic fragmentation means there is little national or international support to facilitate technology deployments – each village or local group must fend for itself.

We see this tendency at its most extreme in Lebanon and Syria, which are already undergoing state disintegration. Here, populations have experienced the loss of centralised state services, and the process of adapting to these conditions is under way. In northern Syria, for example, communities and refugees cut off from Syria's national grid have resorted to privately-owned solar power.

As adaptive technologies become cheaper and more widely available, however, they could enable populations to cope despite continuing political disorder. Self-help solutions would be especially important for water, as water shortages and drought characterise this future and are a ready source of local conflict.

Small-scale solutions combined with fragmentation would lead to local self-help deployments that favour wealthier, better organized, or more powerful groups. Deployments would be haphazard, partial, and probably exclude poorer or marginal communities like refugees. Different factions might seek to monopolise the distribution of such technologies to increase their control over populations. Contending sectarian factions in Lebanon or Syria might seek to monopolise the trade in such technologies or prevent their rivals from acquiring them.

Beggar-thy-neighbour policies might lead to more powerful groups denying access to adaptive technologies to less powerful rivals. Israel, for example, might use its control of the West Bank and Gaza borders to make the availability of solar energy and water solutions to the Palestinians contingent on their cooperation on other issues. Such struggles also scale down to the level of village and neighbourhood, where those with access or the ability to deploy adaptive technologies for electric power and water use that as leverage and for personal gain.



Looking ahead: Scenario implications

Common implications of different futures

The strong relationship between social and political conditions and adaptive capacity for climate and security challenges emerged as a common element in all of the scenarios. The panel's discussion repeatedly returned to the themes of effective governance, regulatory environments, and incentives for private sector and non-state actors such as NGOs or cooperatives. The discussion suggested that technological adaptations, no matter how inexpensive or available, will work only to the extent that there is a supportive (or at least non-obstructive) socio-political environment. That said, one observation from the scenario discussion was that, at least for small-scale technologies, a state that is absent can be preferable to one that is present but predatory or obstructive, at least in so far as climate adaptation is concerned. The worst condition is a state that is just strong enough to obstruct small-scale adaptive measures through corrupt or predatory behaviour.

Large-scale projects like the Jordan-Israel-UAE water-for-solar power deal are highly dependent on the regulatory and broader political framework. They require agreement within governments and between governments, and with private sector participants. Their timelines for implementation are long enough to make them vulnerable to a change in the political or security environment.

Panel participants observed that the different states of the region seemed likely to end up in very different places in our matrix of futures. Israel seems poised to develop a mix of large-scale and small-scale adaptive technologies, to engage in cooperative projects with some neighbours but not others, while facing a more unpredictable region with fragile neighbours. Jordan, though highly stressed, is seen as a key state for regional security and can thus usually obtain financial support from multilateral donors and Gulf State regimes. Powerful rural landowners, however, are inhibiting the development of better water management policies, in an example of a self-interested elite influencing a state to persist in maladaptive policies.

Discussants highlighted that there are solutions for many of the problems they identified, but, again, the politics are not supportive. They saw the absence of political will as the greater problem, as even where solutions exist, regional actors lack the will to deploy them.

Identifying indicators

A number of potential indicators emerged from the discussion of our scenarios. The ones we identified are mostly matters of degree and interpretation, which makes them difficult to use in forecasting. They can be diagnostic, however, if used in combination, indicating whether we are moving towards more cooperation and resilience or more conflict and disaster. For example, diminishing social cohesion and decreasing state capacity, combined with a lack of solutions to chronic water deficits, can help predict serious tensions over water issues. We have grouped our indicators to reflect the two axes that shaped the scenarios and the panel discussions: political/ social and technological.

POLITICAL AND SOCIAL

- Social cohesion and cooperation within states
- Increasing/decreasing state capacity
- Degree of consensus/disputation around climate-adaptive measures
- Success/failure of conflict resolution efforts
- Regional cooperative agreements
- Climate adaptive reforms in regulatory and investment regimes

TECHNOLOGICAL

- Cost and availability of climate-adaptive technologies at different scales
- Deployment of cost-effective solutions to address water deficits
- Adaptive packages that combine technologies, e.g., using solar power to recycle/extract water for greenhouse systems

Conclusion and points of entry

State capacity emerged as perhaps the key variable in assessing regional responses to climate stress and efforts to adapt and cope. States and societies that are barely coping with existing political and economic challenges, like Lebanon and Syria, will be more heavily stressed than better-governed societies. Large-scale adaptations, like the Israeli-Jordan-UAE water-for-power deal, seem likely to remain out of reach for states incapacitated by bankruptcy and civil conflict. Even in these states, however, there is real possibility that societies will cope and adapt despite the failures of their governments, if the means to do so are readily available. Our discussants highlighted the following as priorities:

- Getting the right policy and regulatory frameworks in place is critical for large-scale adaptive efforts that require cross-border cooperation.

- Strategies and technologies that at-risk populations are adopting to cope with war, displacement, and economic collapse can also help cope with climate risk. Donors should seek potential synergies in approaches that improve resilience against a range of climatic, political, and economic hazards.

- The transfer of knowledge and training is necessary to support adaptive strategies and technologies. In states lacking a supportive policy framework, social media, NGOs, private sector actors, even the black market, may provide alternative pathways for distributing technologies and knowledge.

- The Jordan-Israel-UAE water-for-solar power deal illustrates the potential for cooperative regional climate adaptation efforts but highlights the limitations as well. The Palestinians were excluded, while Syria and Lebanon show no desire and little capacity for similar deals.

The regional water deficit is the critical challenge in the near to medium term as temperatures rise, rainfall patterns shift, and droughts and heat waves become more frequent, prolonged, or intense. Climate-induced crop failures can destabilise societies, contributing to sharp increases in basic food prices or rural-urban migration. The availability of low-cost, widely deployable systems for recycling, desalination, atmospheric harvesting, and water-efficient greenhouses, plus the knowledge to use them, may be a critical variable for Syria, Lebanon, the Palestinian Territories, and Jordan. We identified support for water technology research and for adapting agricultural systems as two critical areas.

- Support for further research and development, and subsidies for early adopters, may help bring down the cost and complexity of water recycling and water harvesting technologies.

- Large-scale commercial greenhouse agriculture with solar-powered recycling relies on a stable, supportive policy environment. Small-scale, household-sized solar/water/greenhouse packages require interconnecting the technologies and providing the knowledge and training to use and maintain the systems.

Appendix 1

Climate Snapshot: The Levant (IPCC 2021)

The Levant—comprising Israel, Jordan, Lebanon, Palestine, and Syria—experiences a wide range of microclimates arising from its position between longitudinal temperate and tropical zones, the Mediterranean Sea to the west and the Arabian Desert to the east. Major population centres have historically enjoyed warm Mediterranean climates, particularly on the coasts. Climate change, however, is nudging these regions towards the warm desert conditions currently dominant to the south and east.

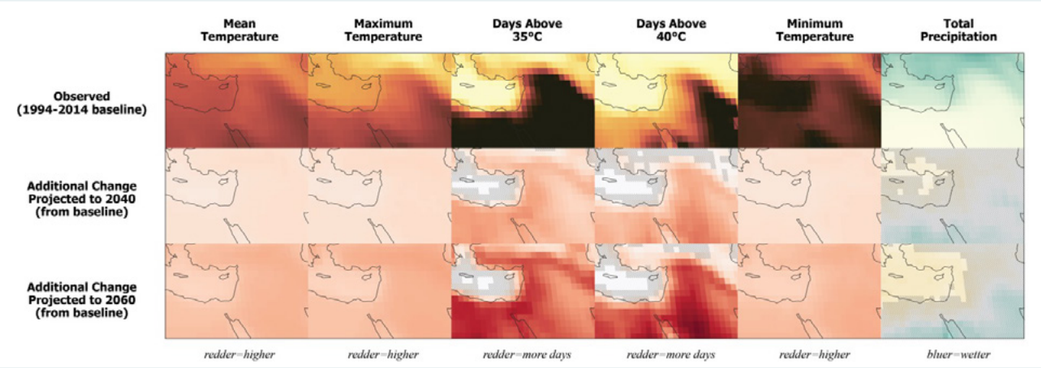
Climate hazards for the region include the direct impacts on people and human systems from increasing temperatures, extreme heat, and precipitation shortfalls and indirect impacts from pressures on freshwater, agriculture, and health. Israel, Lebanon, and Gaza are also subject to the effects of sea-level rise, particularly saltwater intrusion into groundwater, and threats to fisheries from warming waters.

Climate change will also add pressure to already-tense hydro politics in the Levant. Disputes over rights to surface water and aquifers in the Jordan River basin have been central in regional tensions, including the Arab-Israeli conflict, the Syrian civil war, and the ongoing Israel-Palestine conflict. Syria is also affected by pressures on the Euphrates River.

Observed and Projected Changes in Select Climate Variables for the Levant (IPCC 2021)

Earth system models demonstrate that climate change has already had a profound impact on the Levant, as illustrated by the observed baseline in the graphic above. Near- and middle-term projections indicate significant increases in warm days and reductions in precipitation. These shifts in climatic patterns will produce impacts on agriculture and on regional rainfall and snowpacks that sustain the flow of the Euphrates River.

Information for the Climate Snapshot was retrieved from the IPCC AR6 WGI Interactive Atlas and IPCC AR6 WGI report.



Appendix 2

Attendee list Levant expert consultations

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