



MAKING ADAPTATION WORK

Addressing the compounding impacts of
climate change, environmental degradation
and conflict in the Near and Middle East

Making adaptation work

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This report is a joint publication by the International Committee of the Red Cross (ICRC) and the Norwegian Red Cross.

Understanding the humanitarian consequences and scope for action at the intersection of environmental degradation, climate change and conflict requires expertise from multiple fields.

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The maps featured in this report were made by Marie Bouffard at the Climate Centre, while the illustrations were made by Carolina Pereira Marghidan and Rebeka Ryvola. The report was designed by Renate Jensen at Wittusen & Jensen.

The frontpage photo is taken in near Baghdad, Iraq. A drip irrigation system was donated to a widow who benefits from an ICRC livelihood support project. She is planting tomatoes, accompanied by her youngest son. The photo was taken by Pawel Krzysiek for the ICRC.

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■ *A drip irrigation system helps a woman supported by ICRC to grow tomatoes in Madain, near Baghdad. Reduced availability of water is a major climate risk in the Near and Middle East.*

Foreword

In our work with communities in conflict-affected areas of the Near and Middle East, Red Cross Red Crescent volunteers and staff experience first-hand the compound impacts of climate change, environmental degradation, and protracted armed conflict. These are mutually reinforcing crises that exacerbate humanitarian needs.

High temperatures and scarce fresh water supply, drought, and intense rainfall are increasingly common. Protracted conflicts undermine institutional capacity in environmental governance and have taken a toll on natural resources in this region. Access to clean water is becoming more difficult every day and livelihoods systems are disrupted. Health impacts such as malnutrition, water-borne diseases and respiratory illnesses are worryingly on the rise.

In this report, two findings impact the scale of the crises and the room to maneuver for the humanitarian community: Climate action remains extremely weak in areas affected by armed conflict. And: Current climate finance distributions almost entirely exclude the most fragile and unstable places.

Humanitarian actors have a small but important role to play in enabling climate action. There is scope for contributing to adaptation through humanitarian interventions, from livelihood diversification and natural resource management, to reinforcing health systems and mobility-based strategies.

However, solutions to the multitude of problems cannot be found by one humanitarian or development actor alone. Thus, we underline the imperative of working in a complementary manner among different actors. There is urgent need to do more, to work together, and to scale-up action across sectors in order to sufficiently address the growing humanitarian needs.

A common understanding of the problem is the first step needed. This report aims to contribute to that understanding, prepared through a successful partnership between the International Committee of the Red Cross and Norwegian Red Cross, with technical assistance from the Red Cross Red Crescent Climate Center.

The report presents regional trends with examples from Iraq, Syria and Yemen. The findings identify some of the major dynamics impacting vulnerable communities, including displaced people, as well as opportunities and barriers to support climate adaptation and community resilience in areas affected by armed conflict.

The Near and Middle East region is currently under-represented in international discussions on climate, armed conflicts and humanitarian needs. It is our hope that the findings and recommendations in this report will help promote further interest and intersectoral engagement in sustainable and lasting climate action.



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Glossary

Adaptation:

As defined by the Intergovernmental Panel on Climate Change (IPCC¹), adaptation in human systems is the process of adjustment to the actual or expected climate and its effects, in order to moderate harm or exploit beneficial opportunities. Human intervention may facilitate adjustment to the expected climate and its effects.

Compound risks:

As defined by the IPCC, compound risks emerge from the inter of different hazards, including, but not limited to, climate-related hazards in a single extreme event or in multiple coincident or sequential events, which amplifies the overall impact of the combined hazards.

Environmental degradation:

According to the General Multilingual Environmental Thesaurus², environmental degradation is a process through which the natural environment is compromised in some way, reducing biological diversity and the general health of the environment. This process can be entirely natural in origin, or it can be accelerated or caused by human activities.

Human security:

As defined by the IPCC, human security is the condition that is met when the vital core of human lives is protected, and when people have the freedom and capacity to live with dignity. In the context of climate change, the vital core of human lives includes the universal and culturally specific material and non-material elements necessary for people to act on behalf of their interests.

Internal displacement:

As defined by the United Nations Guiding Principles on Internal Displacement³, internal displacement refers to the forced movement of people within the country they live in. Internally displaced persons are “persons or groups of persons who have been forced or obliged to flee or to leave their homes or places of habitual residence, in particular as a result of or in order to avoid the effects of armed conflict, situations of generalized violence, violations of human rights or natural or human-made disasters, and who have not crossed an internationally recognized state border.”

Migrants:

The Red Cross and Red Crescent Movement defines migrants as persons who leave or flee their habitual residence to go to new places – usually abroad – to seek opportunities or safer and better prospects. This description includes all types of migrants regardless of their legal status, while recognizing the special protection of refugees and asylum seekers.

Mobility:

For the purposes of this research, mobility encompasses internal displacement and migration as well as other forms of movement, such as pastoralist transhumance along with internal and cross-border population movements related to civilians’ coping mechanisms and resilience strategies.

Refugee:

A person who meets the criteria under the applicable refugee definition, as per the 1951 Refugee Convention and 1967 Protocol Relating

1 IPCC, 2022a

2 General Multilingual Environmental Thesaurus, version 4.2. Available at [About GEMET \(europa.eu\)](https://www.europa.europa.eu/press-communication/infocus/2018/07/18072018_gemet_en).

3 OCHA, 2004.

to the Status of Refugees⁴, any person who, “owing to well-founded fear of being persecuted for reasons of race, religion, nationality, membership of a particular social group or political opinion, is outside the country of his nationality and is unable or, owing to such fear, is unwilling to avail himself of the protection of that country; or who, not having a nationality and being outside the country of his former habitual residence as a result of such events, is unable or, owing to such fear, is unwilling to return to it.”

Resilience:

As defined by the IPCC, resilience is the capacity of social, economic and environmental systems to cope with a hazardous event or trend or disturbance, responding or reorganizing in ways that maintain their essential function, identity and structure while also maintaining the capacity for adaptation, learning and transformation.

Vulnerability:

As defined by the IPCC, vulnerability is the propensity or predisposition to be adversely affected. Vulnerability encompasses a variety of concepts and elements including sensitivity or susceptibility to harm and lack of capacity to cope and adapt.

┐ *The aftermath of flood in an informal settlement for internally displaced people in Taiz, Yemen.*



4 UNHCR, 2011.

List of abbreviations and acronyms

CEOBS	Conflict and Environment Observatory
CFU	Climate Funds Update
FAO	Food and Agriculture Organization of the United Nations
GCF	Green Climate Fund
GEF	Global Environment Facility
GOSM	General Organization for Seed Multiplication
ICRC	International Committee of the Red Cross
IDMC	Internal Displacement Monitoring Centre
IFAD	International Fund for Agricultural Development
IFRC	International Federation of Red Cross and Red Crescent Societies
IIED	International Institute for Environment and Development
IISD	International Institute for Sustainable Development
IMF	International Monetary Fund
IOM	International Organization for Migration
IPCC	Intergovernmental Panel on Climate Change
ISPI	Institute for International Political Studies
ND-GAIN	Notre Dame Global Adaptation Initiative
OCHA	United Nations Office for the Coordination of Humanitarian Affairs
SPARC	Supporting Pastoralism and Agriculture in Recurrent and Protracted Crises
UN	United Nations
UNCCD	United Nations Convention to Combat Desertification
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCWA	United Nations Economic and Social Commission for Western Asia
UNFCCC	United Nations Framework Convention on Climate Change
UNHCR	United Nations High Commissioner for Refugees
WFP	World Food Programme
WHO	World Health Organization

Executive summary

The combination of environmental degradation, climate change and armed conflict severely undermines all aspects of human security and exacerbates humanitarian needs.

This report explores how the humanitarian consequences of environmental degradation and climate change are aggravated by armed conflict in the Near and Middle East, using examples from Iraq, Syria and Yemen, and building on the ongoing efforts of the International Committee of the Red Cross (ICRC) and Norwegian Red Cross.⁵ The report's overarching goal is to give humanitarian actors greater insight into the main risks faced by communities in the region and how to better respond to their needs. It also aims to identify opportunities for and barriers to strengthening community resilience to growing climate and environmental risks in areas affected by armed conflict, and determine their lasting impact.

Environmental degradation affects people's lives and security in many ways. Soil and land degradation, for instance, can hamper agricultural productivity and food security. Nearly half of all the agricultural land in the Middle East and North Africa region is affected by high levels of salinity, soil nutrient depletion and wind-water erosion. The increasing scarcity of fresh water is a major public health challenge, with half of the region's population living in water-stressed areas. In addition, air quality has declined as a result of both natural and anthropogenic factors, and residents in cities and urban areas now breathe air containing a level of pollutants ten times higher than what is considered safe.

Climate change impacts vary across the region

but are broadly expected to include a decrease in water availability, intensification of heavy rainfall events, rising temperatures and an increase in the frequency of storms. The Middle East and neighbouring Central Asia have already seen an increase in temperature of 1.5°C since the 1990s.

Armed conflicts not only disrupt development and the economy, weaken institutions and governance and erode social cohesion, they also cause damage to both the built and natural environments. The weakened environmental and risk governance and societal disruption caused by conflicts also create and sustain the conditions in which environmental degradation is more likely. In the Middle East, the consequences of armed conflict include agricultural land degradation, damage to water infrastructure, pollution, deterioration of protective infrastructure and deforestation.

The compounding impacts of environmental degradation, climate change and armed conflict have far-reaching implications for human security. They can limit access to the resources needed for people's survival, hinder the capacity of health systems, disrupt livelihoods and reduce adaptive capacity at the individual and community levels. In addition, the convergence of environmental degradation and climate risks with armed conflict can trigger a significant increase in internal and cross-border displacement. People who are displaced by armed conflict, including those in camps and in informal settlements, are often also particularly vulnerable to climate related shocks and disasters.

As climate change intensifies, the risks for conflict-affected populations are likely to be exacerbated. Adaptation strategies that take

⁵ Norwegian Red Cross, 2019; ICRC, 2020 and 2020a.

account of the social, political, economic and environmental factors driving vulnerability and compounding risks can help to build overall community resilience.

Gaining access to multilateral climate finance for state-led adaptation projects, including via mechanisms established under the United Nations Framework Convention on Climate Change (UNFCCC), is challenging in conflict settings because of the strong governance requirements and an aversion to investing in highly volatile contexts. As of January 2022, the Climate Funds Update database, which collates information from 27 multilateral climate funds, listed only 19 single-country projects in Iraq, Syria and Yemen that have been approved for funding, with the amount disbursed totalling just 20.6 million US dollars – less than 0.5% of the money disbursed to climate projects worldwide. Most of this funding is allocated to structural projects that focus on infrastructure development and the use of new technologies in the agriculture and water sectors.

At the local level, adapting to climate change and environmental degradation often involves changing or diversifying livelihoods and altering ways of life. Pursuing these strategies can be more challenging in situations of conflict, as patterns of violence often limit livelihood opportunities, complicate access to resources and exacerbate displacement. Local, small-scale initiatives usually focus on building individual and community resilience, rather than specifically engaging in climate adaptation. In the region, such initiatives likewise tend to focus on livelihood diversification and food security.

Three key challenges emerge from the analysis of adaptation strategies in conflict-affected countries, all of which will need to be addressed to improve the adaptive capacity of countries and communities. First, there is a lack of high-resolution climate data and empirical information on successful adaptation strategies in conflict-affected areas. Second, accessing multilateral climate finance remains a challenge

for conflict-affected countries and is nearly impossible for local, small-scale initiatives in conflict settings. Third, conflicts create practical challenges in effectively addressing the needs of at-risk populations.

Humanitarian, development, climate, environmental and peacebuilding actors need to work together to help lay the foundations for long-term sustainability and community resilience before, during and after a crisis. We call upon these actors to advocate for urgent action to reduce greenhouse gas emissions and work together to strengthen climate action in countries and communities affected by armed conflict by:

- **Making it easier for conflict-affected countries and communities to access financing for climate adaptation**, by approaching risk differently, supporting action at multiple scales and with diverse actors, enhancing cooperation across the international aid structure, and addressing silos that hinder action.
- **Investing in adaptation programmes that address needs across sectors**, to enable conflict-affected countries and populations to bear the combined impacts of environmental degradation, climate change and conflict on human health. This includes investment in health system strengthening and resilience.
- **Providing humanitarian and adaptation support to displaced people and people at risk of displacement**, with a particular emphasis on those facing repeated or protracted displacement.
- **Supporting locally led adaptation, tailored to conflict-affected contexts**, by enabling devolved decision-making, ensuring direct access for legitimate community-led structures without reference to central governments, addressing structural inequalities and investing in local capabilities and flexible programming.

- Collaborating across sectors to strengthen the adaptive capacity of people and communities and the evidence base concerning successful adaptation work in conflict-affected contexts**, including strengthening environmental and climate information services. Taking account of traditional and historic knowledge of climate patterns when systematizing climate information will also be necessary in places where hostilities and resource constraints have rendered climate data infrastructure inoperable.

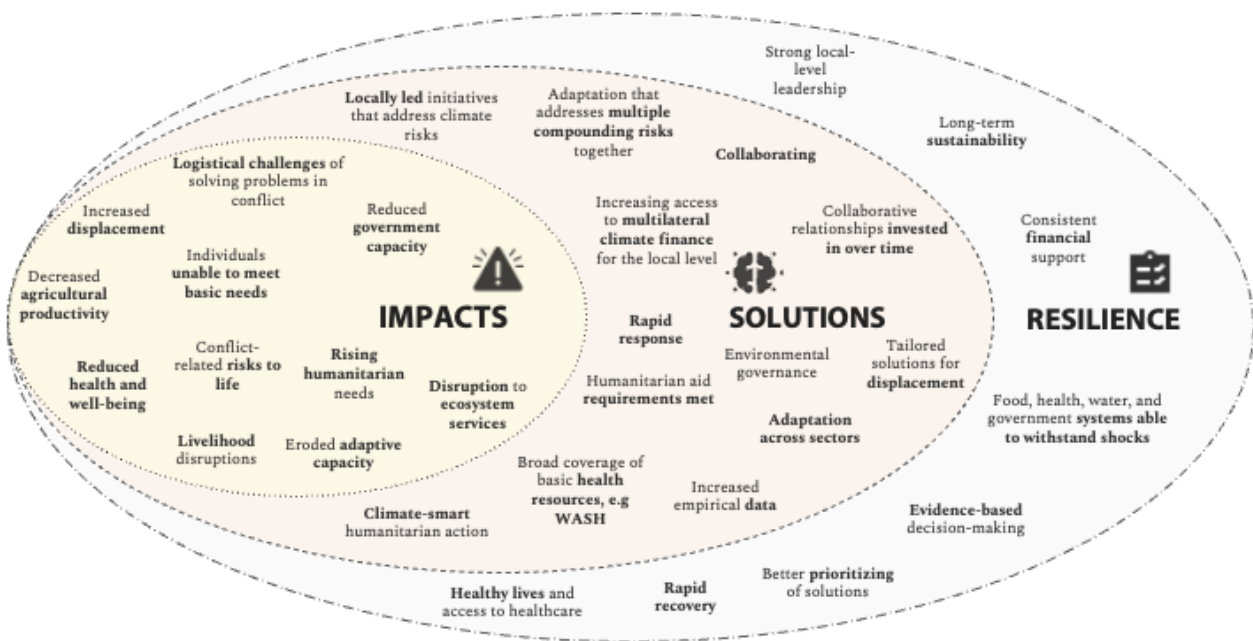


Figure 1. Environmental degradation, climate change and conflict in the Near and Middle East: humanitarian impacts, solutions and resilience' as per the figure on p. 26.

1 Introduction

For humanitarian organizations, the compounding impacts of environmental degradation and climate change on human security are starkly visible in the populations they serve. In the Middle East, the consequences of armed conflict are exacerbating these impacts, with severe repercussions on health, safety and well-being.

Given the challenges affecting the Near and Middle East and previous research findings concerning the humanitarian impacts of climate change,⁶ the ICRC and the Norwegian Red Cross carried out a desk review to further strengthen understanding of these interlinked phenomena and look at how mobility, be it internal or cross-border, affects the living conditions and livelihoods of communities in the region. Another aim of the research was to identify opportunities for and barriers to enhancing climate adaptation and community resilience in conflict-affected areas and to drive a more climate-sensitive approach to humanitarian and development programming.

The report focuses on three countries in the region – Iraq, Syria and Yemen – that are not only highly vulnerable to climate change and affected by current or past armed conflicts but also hosts to the largest humanitarian operations in the world in terms of the number of agencies, humanitarian programmes and humanitarian funding volumes.

1.1 Methodology


This desk review is based on both academic and non-academic literature (such as that produced by United Nations entities and other multilateral organizations), recent reports by the media and non-governmental organizations, as well as publicly available environmental and climate data.

The literature was reviewed between January and August 2022. Data and findings from the fields of environmental, climate and conflict studies were reviewed through a humanitarian lens, with a focus on the discrete and compounding impacts of environmental degradation, climate change and armed conflict. The geographical scope of the data and literature review was the Near and Middle East, which includes Egypt, Iran, Iraq, Israel and the occupied territories, Jordan, Lebanon, Syria, Yemen and the Gulf Cooperation Council countries. Material related to surrounding countries and neighbouring regions was also reviewed where relevant (e.g. studies covering both the Middle East and North Africa).

The analysis is based on the concept of human security, defined by the Intergovernmental Panel on Climate Change (IPCC) as the “condition that is met when the vital core of human lives is protected, and when people have the freedom and capacity to live with dignity. In the context of climate change, the vital core of human lives includes the universal and culturally specific material and non-material elements necessary for people to act on behalf of their interests”.⁷ Human security is thus influenced by a range of economic, social, environmental and political

6 Norwegian Red Cross, 2019; ICRC, 2020.

7 IPCC, 2014a.



■ *The drying up of the marshlands in southern Iraq do not only threaten local biodiversity, but human health and livelihoods as well.*

Photo: Hassan Ali/CRC

factors that interact in complex, dynamic and situation-specific ways. In this study, armed conflict, climate change and environmental degradation have been identified as key threats to human security and adaptive capacity, defined by the IPCC as a system's ability to adjust to climate change (including climate variability and extremes) in order to moderate potential damage, take advantage of opportunities and cope with the consequences.⁸

As defined by the IPCC, adaptation in human systems is the process of adjustment to the actual or expected climate and its effects, in order to moderate harm or exploit beneficial opportunities. The research draws on evidence of climate adaptation at the central and local levels, focusing on the opportunities for and barriers to climate adaptation strategies as pathways to building overall community resilience, including resilience to challenges related to environmental degradation and armed conflict.

The question of internal and cross-border mobility as a potential driver of insecurity or as a survival and adaptation strategy is included in the analysis, with empirical examples from Iraq, Syria and Yemen.

1.2 Report structure

The first part of this report (chapters 2–4) describes how environmental degradation and climate change intersect with armed conflict, causing and exacerbating humanitarian needs in the Near and Middle East. Chapter 5 of the report provides a review of the adaptation data available, with examples of both nationally led and local, small-scale adaptation efforts in Iraq, Yemen and Syria. It also explores the challenges to designing and implementing effective adaptation strategies in conflict-affected settings. The report concludes with a set of recommendations for humanitarian, climate and development actors.

2 Overview of environmental degradation and climate change in the Near and Middle East

This chapter provides an overview of the major environmental degradation issues affecting the region, and of the documented and projected consequences of climate change and their impacts on human health.

2.1 Environmental degradation

A multitude of drivers – including population growth, rapid urbanization, unsustainable agricultural practices, governance shortcomings, mismanagement of resources, and conflict – continue to drive environmental degradation in the Near and Middle East. While the consequences of environmental degradation play out differently in different ecosystems, three broad manifestations are of particular concern to humanitarian organizations. These are outlined here, while their impacts and how they compound with climate change and armed conflict are discussed in depth in subsequent sections and chapters.

Soil and land degradation

Soil and land degradation is multidimensional and widespread in the region, significantly affecting agricultural resources and access to arable land. Nearly half of the region's agricultural land is already reported to be exposed to salinity, soil nutrient depletion and wind–water erosion.⁹ Both anthropogenic factors – such as unsustainable agricultural practices and deforestation – and weather conditions contribute to this decline in soil and land quality.

Dust and wind often displace topsoil, increasing soil erosion and resulting in further land degradation and desertification.¹⁰

Scarcity of freshwater

Water scarcity is a long-standing challenge in the Middle East and North Africa. Half of the region's population currently lives in water-stressed areas,¹¹ and population growth will further increase the pressure on diminishing water resources. Water scarcity is further exacerbated by factors affecting the quality of water resources, such as the intensive use of fertilizers, untreated wastewater discharge, changes in precipitation, and urbanization.¹² The region's river deltas – important for agriculture – are increasingly at risk from subsidence and seawater intrusion due to a combination of upstream activities, over-abstraction and sea level rise.¹³

Deteriorating air quality

Air pollution in the region's urban centres is among the highest in the world and is up to ten times higher than the level considered to be safe.¹⁴ Both natural and anthropogenic factors have led to the deterioration in the region's air quality. More frequent dust storms release fine sand and dust particles into the air and may carry pollutants, while anthropogenic factors include industrial emissions, household power generation and the burning of waste.¹⁵

9 FAO, 2019.

10 Stefanski & Sivakumar, 2009.

11 World Bank, 2018

12 Stockholm International Water Institute et al., 2006.

13 Syvitski et al., 2009.

14 World Bank, 2018.

15 UNEP, 2019.

2.2 Climate change

While much of the Middle East and North Africa has an arid or semi-arid climate, with relatively high annual mean temperatures and low rainfall, coastal and high-altitude areas experience slightly cooler temperatures year-round. The region's dry desert areas are expected to continue to have low annual rainfall throughout the 21st century, while annual precipitation, including snowfall, is expected to decrease in non-desert areas. This will have a profound impact on surface water availability and groundwater recharge.¹⁶

Changes in precipitation patterns and water-related hazards

It is difficult to quantify observed precipitation trends across the Middle East and North Africa due to variability and a lack of reliable data, and little is known about how precipitation will change in the future.¹⁷ Looking at the broader Middle East and Central Asia region, however, the International Monetary Fund (IMF) has observed that precipitation has become more erratic than in any other region globally.¹⁸

In terms of water-related hazards, there is some evidence that rainfall events will intensify in the future, while coastal areas are expected to be affected by both sea level rise and more frequent and intense coastal storms.¹⁹ Figure 2 shows observed cyclone tracks and areas currently experiencing desertification, overlaid with points of extreme sea level rise risk and projected changes to precipitation.

Changes in temperature patterns

The Middle East and North Africa region has already seen increases in temperatures (see Figure 3, with average temperatures having

increased by 1–1.5°C since the 1990s.²⁰ Looking ahead, climate projections foresee average temperatures reaching unprecedented levels of 56°C under 'business as usual' climate models.²¹ Calculations of the corresponding heat index suggest that several areas across the region may reach temperature levels that threaten human survival.²²

Changes to climate-related hazards

Extreme weather events, such as heavy rains and floods, heatwaves, dust storms and droughts, are expected to become more frequent. In addition to the increased flood risk associated with more intense rainfall, both drought and dust storms are of particular concern for the region. Indirect evidence indicates that climate change could increase the occurrence of dust storms,²³ with a steady increase in dust storms already observed in recent decades in Iraq.²⁴

Variations within the region

The Sahara Desert and the bodies of water surrounding the region mean that the Middle East and North Africa has a diverse climate.²⁵ While climate change projections for the region indicate a general trend of increasing temperatures and decreasing precipitation, the region's diverse climate means that climate change impacts will be felt in different ways in different areas, particularly with regards to water scarcity and its consequences for agricultural production. Table 1 summarizes the expected impacts in Iraq, Syria and Yemen. Climate vulnerability will also vary within the region, depending on countries' exposure and sensitivity to climate-related hazards and other factors, and their adaptive capacities. Figure 4 shows the Notre Dame Global Adaptation Initiative (ND-GAIN) vulnerability index scores for some of the countries in the region.

16 Met Office, 2021.

17 Met Office, 2021.

18 IMF, 2022.

19 Met Office, 2021.

20 IMF, 2022.

21 Zittis et al., 2021.

22 Ntoumos et al., 2022.

23 Met Office, 2021.

24 Attiya & Jones, 2020.

25 Met Office, 2021.

Climate projections	Iraq	Syria	Yemen
Precipitation (annual average)	Some indication that northern highlands will become drier. Annual rainfall unlikely to change in the lowlands, but more intense downpours.	Little change expected, heavy downpours will continue and may be more intense.	Projections uncertain due to microclimates.
Sea level rise and storms	Sea level rise expected in the Persian Gulf.	Sea level rise expected to continue in the Mediterranean, with more intense storms.	Sea level rise expected in the Gulfs of Aden and Oman, as well as in the Arabian Sea, with more intense storms.
Temperatures	Average annual temperatures expected to be 2–3°C higher in the highlands and 2–4°C higher in the lowlands by 2050s. In the highlands, maximum daily temperatures exceeding 35°C will become a common occurrence in the summer months. In the lowlands, maximum temperatures could exceed 40°C during most summers.	Significant warming has taken place already. Annual average temperatures expected to be 2–4°C higher by the 2050s. Maximum temperatures will exceed 35°C for a longer period, beginning earlier in spring and lasting longer into autumn. Daily maximum temperatures of 40°C may become more frequent.	Significant warming has taken place already. Annual average temperatures expected to be 2–4°C higher by the 2050s. Maximum temperatures could exceed 40°C during most summers. Daily maximum temperatures exceeding 35°C will start earlier in spring and continue into autumn.
Main expected impacts on water resources			
Secondary impacts	Reduced discharge in the Euphrates and Tigris rivers. Water shortages likely due to increasing demand.	Reduced discharge in the Euphrates, with impacts on water security.	Water stress, food insecurity and impacts on marine ecosystems and fisheries.

Table 1. Summary of projected climate changes in Iraq, Syria and Yemen, adapted from information provided by the UK Met Office, the UK Foreign, Commonwealth and Development Office and ODI (2021).

Extreme precipitation trends

in selected countries of interest.

Precipitation trends (IPCC)

- Decreasing
- Increasing

Cyclones

- Historic cyclone tracks 1984-2021

Sea level rise

- Points of extreme sea level rise risk

Desertification

- Areas experiencing land degradation

Generalized population density

- Low
- Medium
- High
- Not evaluated

Countries in which the ICRC operates

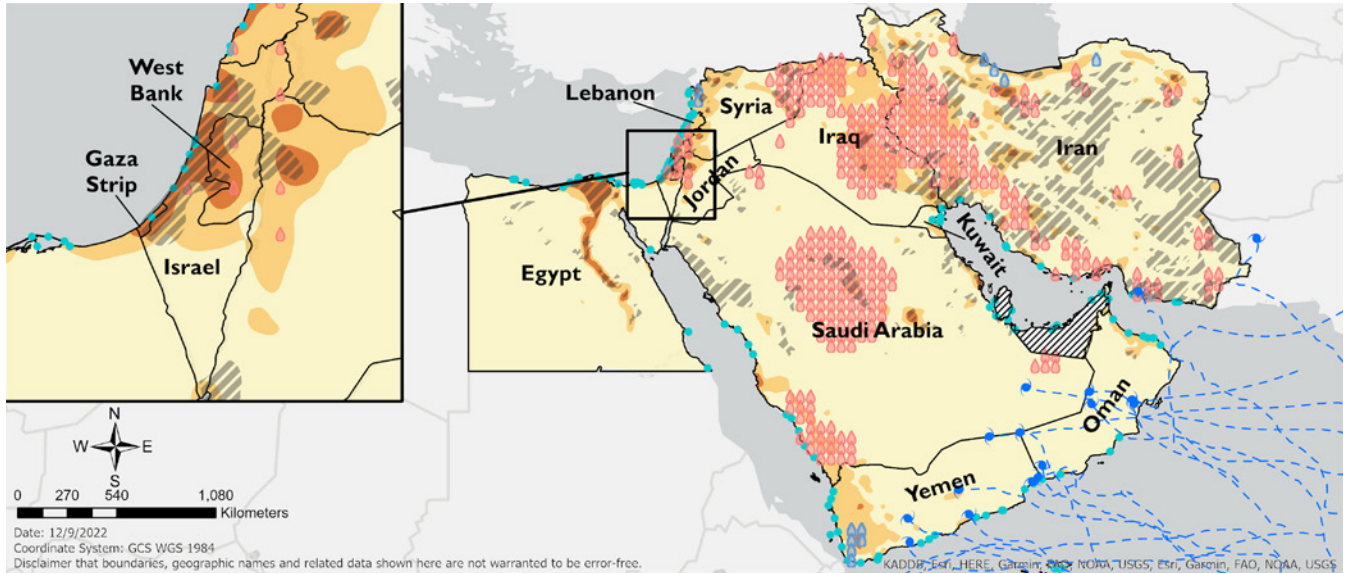


Figure 2. Extreme precipitation trends. See section “About the maps” at the end of the report for sources.

Extreme temperature trends

in selected countries of interest.

Temperature recorded at HadISD weather stations

Number of days recorded with a heat index above 54°C between 2000 and 2021

- 1–18 days
- 51.1–266 days
- 391.1–468 days
- 18.1–51 days
- 266.1–391 days

- ◇ Wet bulb temperatures exceeding 35°C

Generalized population density

- Low
- Medium
- High
- Not evaluated

Countries in which the ICRC operates



Figure 3. Extreme temperature trends. See section “About the maps” at the end of the report for sources.

Climate vulnerability

in selected countries of interest.

Country score on the Notre Dame Global Adaptation Initiative's Vulnerability Index

vulnerable Most vulnerable Not evaluated No Data

Egypt = 0.44, Israel = 0.31, Lebanon = 0.42, Syria = 0.46, Jordan = 0.38, Saudi Arabia = 0.41, Iraq = 0.44, Kuwait = 0.38, Yemen = 0.56, Oman = 0.41, Iran = 0.39

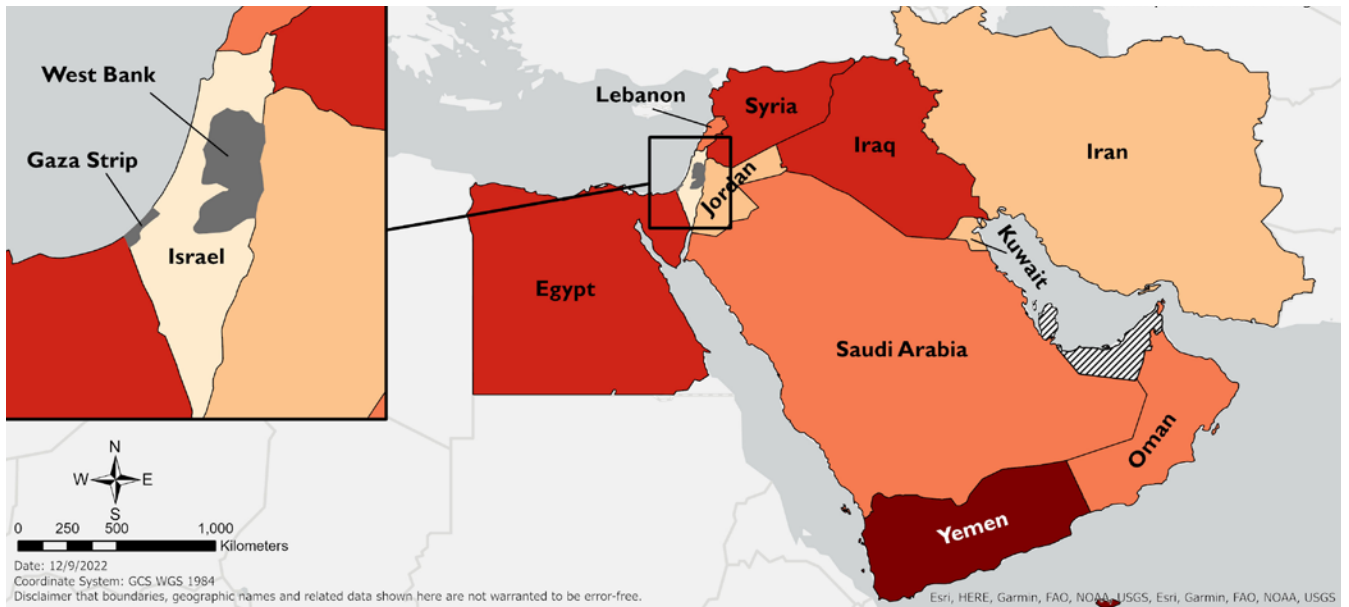


Figure 4. ND-GAIN country vulnerability score in selected countries of interest. See section “About the maps” at the end of the report for sources.



Soil and land degradation is multidimensional and widespread in the region.

Health impacts of environmental degradation and climate change

The environmental degradation and climate-sensitive hazards identified in the Near and Middle East have had a number of health impacts.

Soil and land degradation has led to regional land loss, widened the food gap for the population and exacerbated food insecurity. This, in turn, impacts health by potentially causing malnutrition, vitamin deficiencies, iron deficiency anaemia, and stunting.²⁶

Scarcity of freshwater is a key driver in the spread of water-borne diseases, including large outbreaks. In Yemen, environmental factors, such as shrinking water sources and wastewater pollution, were likely contributors to the cholera outbreaks in 2016–2019.²⁷ The same factors seem to have caused the cholera outbreak in Syria in September 2022.²⁸

Air pollution is a significant threat to health, with risks including heart disease, stroke and lung cancer; it can also worsen existing respiratory diseases and cause the onset of others. Mortality has been seen to increase during acute air pollution events as well.²⁹ In the Middle East and North Africa specifically, ambient air pollution causes approximately 60 days of illness for the average person over their lifespan. In 2019, air pollution resulted in an estimated 270,000 premature deaths alone.³⁰

Flooding, associated with storms, cyclones and intense rainfall, can have serious, direct impacts on human health, including immediate death from drowning, trauma and injury, communicable and water-borne disease outbreaks,

gastrointestinal and diarrhoeal diseases, vector-borne diseases and impacts on mental health.³¹ Indirect impacts of flooding on human health include worsening non-communicable diseases, such as diabetes, cancer and cardiovascular disease, due to the disrupted access to healthcare services.

Drought and its impacts on agricultural productivity and access to drinking water have profound impacts on human health, including malnutrition, communicable and vector-borne diseases, changes in disease pathogens, diarrhoeal disease, cardiovascular and respiratory disease, and impacts on mental health.

Heatwaves can cause a range of human health impacts associated with thermal stress, including morbidity and mortality from acute heatstroke, hyperthermia and dehydration. There is increasing evidence that rising temperature can exacerbate certain non-communicable diseases, including cardiovascular disease and diabetes.³² While the public health impacts of heatwaves are not always immediately obvious,³³ they are predicted to become significantly worse in this region due to climate change.³⁴ The extreme heat is most acutely felt in cities.³⁵

Dust storms exacerbate air pollution and can cause skin, eye and throat infections and irritation; they can also aggravate existing respiratory conditions, leading to increased hospital admissions. Dust particles can also transport other particles, including bacterial and viral pathogens, over large distances.³⁶

26 FAO, IFAD, UNICEF, WFP, WHO and ESCWA, 2021.

27 Simpson et al., 2022.

28 UN, 2022.

29 WHO, 2021.

30 World Bank et al., 2022.

31 Paterson et al., 2018.

32 Song et al., 2021.

33 WHO, 2017.

34 Met Office, 2021.

35 IFRC and Red Cross Red Crescent Climate Centre, 2021.

36 Al-Delaimy, 2020.

■ *The Joubar water facility outside Damascus. After ten years of war, only half of the water infrastructure in Syria functions properly.*





Photo: Norwegian Red Cross/Olav A. Saltbones

3 Environmental damage as a legacy of conflict

Armed conflicts contribute both directly and indirectly to environmental damage, with significant adverse impacts on human well-being. They weaken environmental governance and disrupt societies, thereby creating and sustaining the conditions that make environmental degradation more likely. And as direct conflict-related environmental damage and wider system degradation undermine the natural resources that communities rely on, people are left more vulnerable to the impacts of climate change and public health crises.

International humanitarian law contains a range of general and specific provisions that protect the natural environment in armed conflict. These include obligations to employ methods and means of warfare with due regard to the protection and preservation of the natural environment; that prohibit disproportionate damage to the environment and pillage; and that require all feasible precautions to be taken during attacks to avoid, and in any event to minimize, incidental damage to civilian objects, including the natural environment.³⁷

The following section discusses evidence of conflict-related environmental damage in Iraq, Syria and Yemen.

3.1 Loss of trees and deforestation

Conflict often contributes both to the loss of trees cultivated for agricultural and productive purposes and to deforestation. In north-west

Syria, for instance, more than 500,000 olive trees have been destroyed as a direct result of the ongoing conflict.³⁸ Deforestation during times of conflict is primarily driven by intentional and socio-economic factors, such as the deliberate burning of forests by armed groups for access and control and by local populations reliant on charcoal as an alternative to more expensive fuel sources.³⁹ Such actions can deprive people of their livelihoods, dramatically reduce already-scarce vegetation, increase soil erosion and desertification, and destroy biodiversity. As woodlands and forests perform vital ecosystem services, such as regulating the water cycle and local climate, their loss can have a direct impact on the viability of land for human use.

3.2 Pollution and contamination

Armed conflict generates and exacerbates pollution. In the Near and Middle East, industrial and petrochemical facilities have been targeted during fighting, which often pollutes farmland as well as surface- and groundwater with oil residues, combustion products and heavy metals.⁴⁰ Such pollution can impact human health, including by causing respiratory diseases and cancer. While there is a lack of reliable statistics, since the early 1990s, physicians and communities in parts of Iraq have linked toxic exposures from armed conflict to cancers and congenital birth defects.⁴¹ This has included exposure to sites and scrap contaminated by depleted uranium weapons, whose legacy has never been fully addressed.⁴²

37 ICRC, 2020a; Obregon & Murphy, 2021.

38 Schwartzstein, 2019.

39 Mohamed, 2021.

40 PAX for Peace, 2017.

41 Surdyk et al., 2021.

42 PAX for Peace and ICBUW, 2016.

Conflict-related damage affecting oil pipelines is particularly common. In Syria and Iraq, the loss of formalized oil production and refining capacity created cascading health and environmental consequences as communities seeking fuel and income turned to highly polluting artisanal oil production.⁴³ In some cases, settlements for internally displaced people have been established on or near these contaminated sites.⁴⁴ Damage to petrochemical installations can generate toxic hotspots, leaving communities with a legacy of toxic exposures⁴⁵ or facing acute health risks during incidents.⁴⁶ Fires and spills have also prevented displaced people from returning to their homes.⁴⁷

The components of most conventional weapons – heavy metals and energy-related materials – are toxic, and seepage can contaminate soil and crops.⁴⁸ Soil pollution can also occur from landmines and improvised explosive devices, both *in situ* and if they are disposed of through open-air detonation. Agricultural land can also be contaminated with planted mines, unexploded ordnance and improvised explosive devices. Clearing explosive remnants of war is a slow and difficult process and, until they are removed, these remnants pose a risk to crop cultivation and restrict access to land.⁴⁹ Without care, mechanical mine clearance using heavy machinery can also contribute to land degradation.⁵⁰

The use of explosive weapons in populated areas can create staggering volumes of debris, often cross-contaminated with materials such

as asbestos, heavy metals and combustion products.⁵¹

In Syria, significant damage to cities generated millions of tons of debris,⁵² creating a lasting environmental legacy. Disruption to disposal and waste management infrastructure encourages informal dumping and burning, which has attendant public health risks and can exacerbate existing environmental crises, particularly in relation to air pollution.⁵³ In addition, debris impedes explosive ordnance clearance, and managing and disposing of rubble generates emissions and can damage habitats and waterways. Debris recycling projects that support returnee livelihoods and reduce dumping have been piloted in some places,⁵⁴ but they remain the exception rather than the norm.

3.3 Damage to and destruction of infrastructure

International humanitarian law prohibits deliberate attacks against civilian infrastructure and the natural environment. As such, damage to drinking- and wastewater infrastructure can constitute a violation of international humanitarian law if, for example, it is intentional and did not constitute a military objective,⁵⁵ or if the damage was incidental but disproportionate to the military advantage gained in the attack.⁵⁶ International humanitarian law also prohibits attacks against objects considered indispensable to the survival of the civilian population. Such

43 Ahmed, 2020.

44 Syria Untold, 2018.

45 UNEP, 2005.

46 TRT World, 2016.

47 UNHCR, 2016.

48 FAO and UNEP, 2021; UNEP and Weir, 2018.

49 Voice of America, 2019.

50 Lodhammer & Wilkinson, 2021

51 ICRC, 2022; UNEP, 2021.

52 REACH, 2019.

53 Noufal et al., 2020.

54 UNEP, 2020.

55 ICRC, Henckaerts and Doswald-Beck, 2009, Rule 1.

56 ICRC, Henckaerts and Doswald-Beck, 2009, Rule 14.

objects include agricultural areas and livestock, as well as water infrastructure and works.⁵⁷ There are further rules calling for particular care to be taken when it comes to infrastructure such as dams and dykes,⁵⁸ which pose significant risk to the civilian population downstream.

The importance of complying with these rules was highlighted when Iraq's Mosul Dam was captured in 2014.⁵⁹ The human and environmental risks that such dams pose is significant for communities in the immediate vicinity and to other communities and ecosystems downstream. It was estimated that a collapse of the Mosul Dam would directly affect 500,000 people, with large-scale loss of life, loss of livelihoods and displacement. Even without the prospect of direct destruction due to armed conflict, there are serious concerns about the stability of the Mosul Dam.⁶⁰ Iraq's ability to manage this risk has been impacted by the armed conflict.

Over the past two decades, there have been instances in which the deliberate degradation of the environment has seemingly been used as a method of warfare in the Near and Middle East. Natural resources such as water and the related infrastructure, are, for instance, often seen as a strategic asset during armed conflict.⁶¹ Control of access to water infrastructure, including dams and hydropower stations, can significantly affect local communities, particularly as climate change and population growth make water scarce and more valuable.⁶²

Armed conflict in agricultural areas can cause damage and destruction to agricultural and residential lands. Damage to infrastructure such as grain silos, cold stores and expensive agricultural equipment disrupts crop production and disables the water and electricity infrastructure on which farmers depend.⁶³

3.4 Weakened governance and institutional capacity

In addition to these more direct forms of pollution and environmental degradation, armed conflicts and instability impede regulatory oversight. This means oil and industrial sites operate under weaker regulations, which increases pollution risks. Similarly, sanctions and restrictive measures, or a lack of inward investment can also lock countries into polluting technologies and practices. An example is methane flaring by the oil industry – a widespread practice in Iraq. Flaring contributes to climate change, creating air pollution that affects the health of communities in oil-producing areas.⁶⁴

As local and national governance capacities decrease, so do those of solid-waste management and disposal systems,⁶⁵ leading to the build-up of waste and increasing the risk of communicable diseases, as well as soil and water pollution. Armed conflicts also impede domestic programmes to improve solid-waste

57 ICRC, Henckaerts and Doswald-Beck, 2009, Rule 54.

58 ICRC, Henckaerts and Doswald-Beck, 2009, Rule 42.

59 Milner, 2014.

60 Al-Ansari et al., 2020.

61 ISPI, 2020.

62 OCHA, 2021.

63 Geneva Call, 2021.

64 Rubin and Krauss, 2022.

65 ICRC, 2015.



Over 10,000 internally displaced people live in Areesha camp in northeastern Syria. The camp is located on the site of an old oil refinery, and regularly floods during the rainy season.

Photo: Ingy Sedky/ICRC

management, typically resulting in the prolonged use of unsanitary landfills, open-air burning and the mixed disposal of domestic, medical and industrial waste. This has consequences for both public and environmental health, with some of the most vulnerable members of communities the most at risk of exposure.⁶⁶

Most notably, integrated water resource management practices have been adopted only to a limited extent in the region, reflecting the limited capacities of authorities. Such practices are urgently needed to address water scarcity in the region, manage the increasing demand for water and overcome climate and degradation challenges.⁶⁷ There is also a need for greater cross-border cooperation in managing shared water resources.

Looking specifically at climate services, the collection of climate-related data is often hindered during conflicts by damage to weather stations, insufficient resources and a lack of qualified technical staff. This, in turn, affects countries' capacity to generate high-resolution weather forecasts and climate projections.⁶⁸ Furthermore, armed conflict disrupts governance and means that action on and funding for climate change and environmental degradation may no longer be considered a priority – this is the case both at the national level and in relation to multilateral environmental agreements.⁶⁹

International financing and programmes are also affected, and projects on climate change, biodiversity loss or pollution have been paused or curtailed in many conflict-affected countries in the region.

66 CEOPS, 2019.

67 FAO and World Bank, 2018.

68 IISD, 2015.

69 CEOPS, 2017.

An illustration of compound risks in the Near and Middle East region

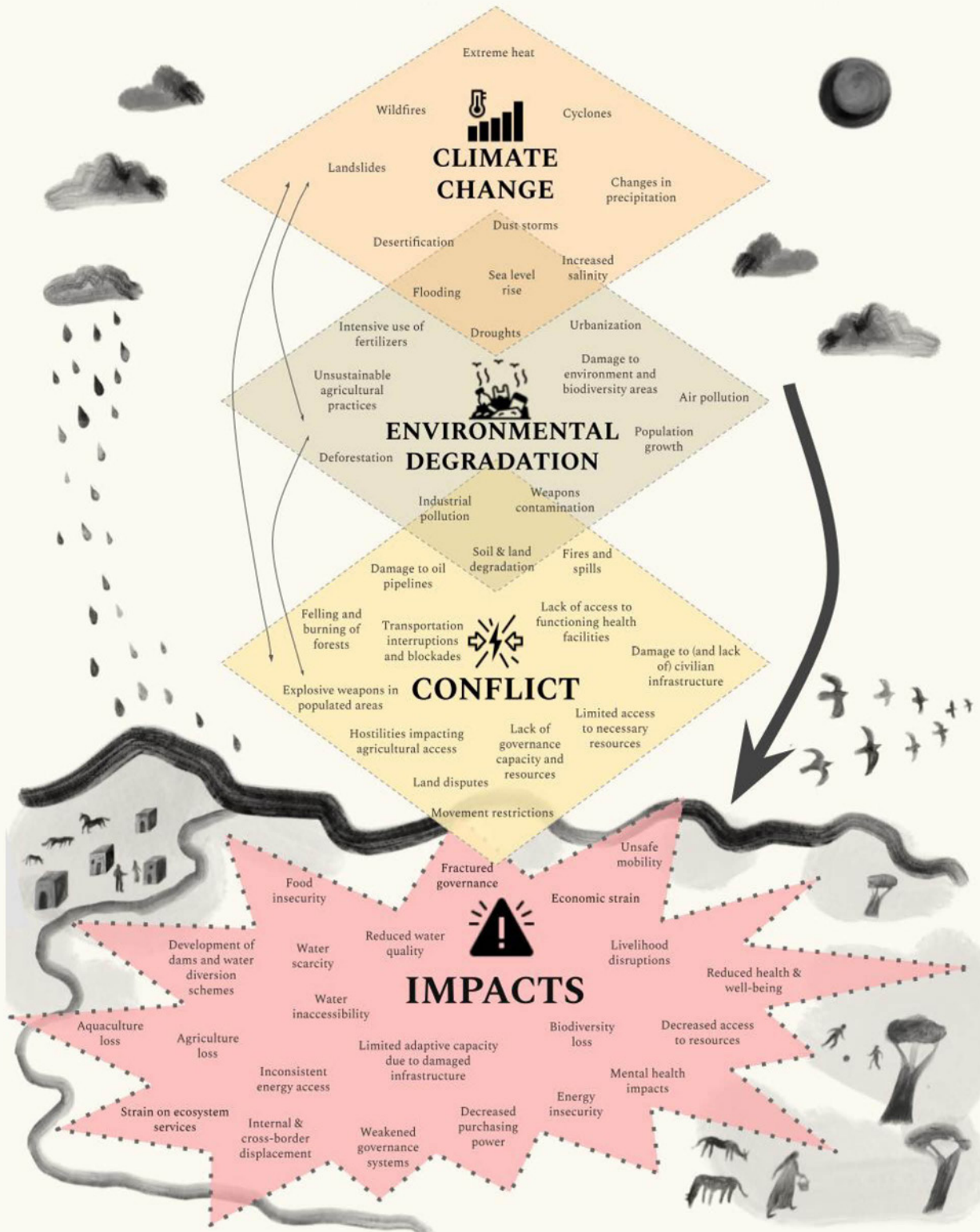


Figure 5. Compounding impacts of environmental degradation, climate change and armed conflict in the Near and Middle East.



"We are used to seeing the mountains and the greenery of our city, but our waste is the dark and hidden side of it." As in many other cities across the region, a lack of solid waste management poses a a threat to public health in Sulaymaniyah, Iraq.



4 The compounding impacts of climate change and environmental degradation in armed conflicts

The previous sections of this report outlined how environmental degradation, climate change and armed conflict drive the lack of human security in the Near and Middle East. Each of these factors generates its own, specific consequences, but when combined, they can have consequences that interact and potentially reinforce each other, causing longer-term and compounding impacts (figure 5). For example, there is significant evidence that climate change exacerbates humanitarian crises when climate hazards intersect with pre-existing vulnerabilities, such as those created by armed conflict.⁷⁰ This section describes the key humanitarian implications of these compounding impacts, including implications for mobility.

4.1 Inadequate access to resources necessary for survival

The ability to obtain access to basic resources, such as food and water, is essential to ensuring human security. Armed conflict often limits this access, with further challenges caused by environmental degradation and climate change.

Water availability

Reduced availability of water is recognized as a major climate risk in the Near and Middle East. Water availability in the region has already decreased by 75% since the middle of the 20th century and is expected to decrease by another 40% by 2030.⁷¹ Rising temperatures throughout

the year, increased evapotranspiration, and in some places more variable rainfall, are expected to lead to increased exposure to water stress, drought risk and harvest failure.⁷² The impact of drought is compounded by other vulnerabilities, such as the population's health status, access to basic sanitary facilities, food insecurity, displacement, armed conflicts and political instability.⁷³

During armed conflicts, access to water and sanitary facilities is often disrupted as a result of infrastructure damage. This can make it hard to distribute drinking water, forcing people to buy water from unregulated and potentially unsafe and costly sources. The disruption of wastewater management can lead to the discharge of untreated or inadequately treated wastewater, which may result in environmental pollution and affect agricultural productivity and human health.⁷⁴

In Yemen, for instance, millions of people were left without access to clean water in 2017 as a result of conflict-related damage to water infrastructure and sewage systems, and a lack of maintenance due to restrictions on the import of critical goods, such as spare parts.⁷⁵ This exacerbated the ongoing water stress and extreme water scarcity caused by environmental degradation and climate change.⁷⁶ Without access to clean water resources, communities and individuals cannot meet their basic needs and lead a dignified life.

70 IPCC, 2022.

71 Middle East Institute, 2017.

72 Met Office, 2021.

73 Bellizzi et al., 2020.

74 FAO, 2019a; Schillinger, 2022.

75 ICRC, 2017.

76 Red Cross Red Crescent Climate Centre, 2021.

Reduced water availability can affect other vital services as well. In Syria, the historically low Euphrates River levels in 2021 restricted drinking water access, leading to high rates of water-borne diseases, and also affected hydroelectric power generation and irrigation for agriculture.⁷⁷

Food insecurity

Food insecurity can be caused or reinforced by a number of factors linked to environmental degradation, climate change and armed conflict, as well as by their compounding impacts. Regional land loss due to degradation has increased the food gap in the region and further exacerbated food insecurity,⁷⁸ particularly in countries affected by armed conflicts.

In 2021, Iraq faced a severe drought after unseasonably low rainfall in the second half of 2020 across the entire Eastern Mediterranean, contributing to decreased water levels in the Tigris and Euphrates rivers. The situation in Iraq was compounded by high temperatures and low spring rainfall. By September 2021, two million people were experiencing food insecurity, with internally displaced people particularly badly affected. Wheat harvests reportedly declined from 5 million metric tonnes in 2020 to 3.7 million tonnes in 2021 and 1.34 million tonnes in 2022.⁷⁹

Climate change is expected to increasingly affect local food production and increase reliance on food imports.⁸⁰ Despite having a large agricultural sector, Yemen already imported 90% of its staple foods before the conflict.⁸¹ While imports have continued during the armed conflict, food has quickly become unaffordable for many owing to economic decline, fuel price spikes and currency collapse. This, combined with the decline of domestic agricultural productivity linked to the armed conflict and environmental stresses, meant that 16.2 million Yemenis faced acute food insecurity by late 2021 – a total expected to

increase to 19 million by the end of 2022,⁸² with tens of thousands of people facing starvation.

4.2 Decreased health system capacity

Health services are an integral component of human security and can be significantly hampered by the combination of armed conflict, climate change and environmental degradation. Health systems are typically already under stress during times of armed conflict, as war-related injuries and deaths place greater demands on those facilities. Moreover, destruction of health facilities and attacks on health workers can hinder the provision of both basic and preventive services. Acute injuries from climate hazards and disasters can further exacerbate the pressure on overburdened health systems.

Overall, armed conflicts diminish countries' capacity to provide healthcare services, maintain social safety nets and support the most vulnerable groups, thus negatively impacting household- and community-level resilience to shocks. The cumulative impacts on health systems are both direct and indirect, and include infrastructure damage, injury to medical staff, and disruption to healthcare procurement, supplies and human resources. Security concerns in conflict areas can also place healthcare workers in significant danger.

Climate events, such as floods and landslides, pose further risks to health services and related infrastructure, including roads, bridges and healthcare facilities. Health systems are also dependent on reliable access to clean drinking water and electricity and are put at risk if those services are disrupted.⁸³

77 REACH, 2022.

78 FAO, IFAD, UNICEF, WFP, WHO and ESCWA, 2021.

79 Hasan, 2022.

80 Met Office, 2021.

81 World Bank, 2018a.

82 Integrated Food Security Phase Classification, 2022.

83 ICRC, 2015.

Health impacts at the intersection of climate change, environmental degradation, and conflict in the Near and Middle East

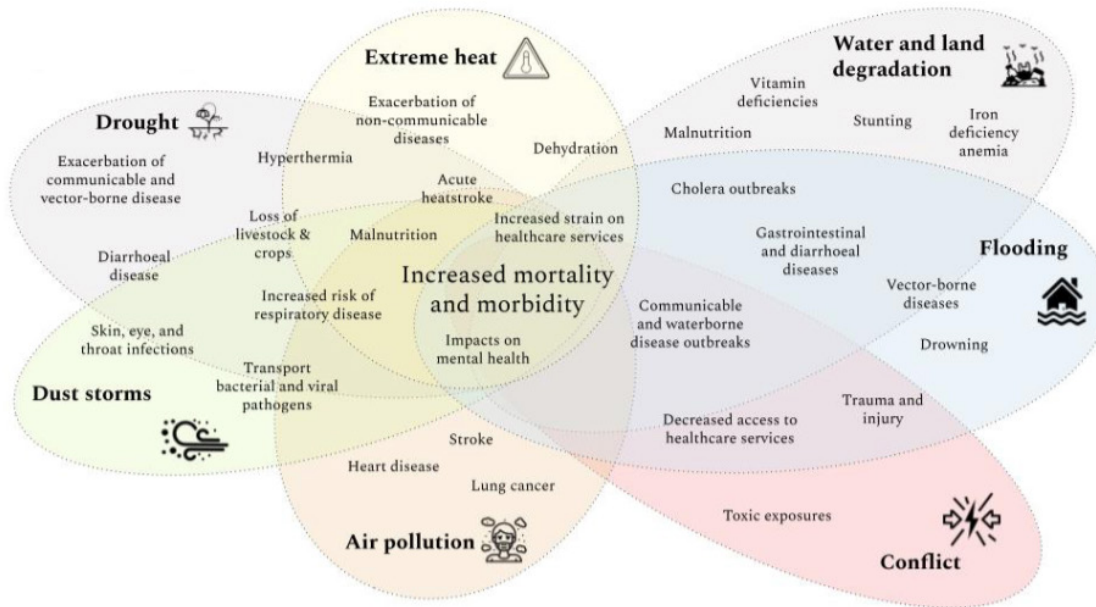


Figure 6. Overview of the compounding impacts of environmental degradation, climate change and armed conflict on human health.

Extreme weather events may also affect pharmaceutical supply chains, as was the case during the floods in Yemen in 2019.⁸⁴ Health systems already struggling under the weight of armed conflict also have a reduced capacity to deal with additional health needs and risks to health facilities caused by compounding impacts.

The reduced access to mental health services is likewise of concern, with both armed conflict and climate change exacerbating mental health issues. It is estimated that three times as many people are affected by mental health issues in situations of armed conflict than in peaceful settings.⁸⁵ Similarly, evidence suggests that climate change has an adverse impact on mental

health, with these challenges expected to increase as global warming intensifies.⁸⁶ Despite this increasing double burden, access to mental health services is often limited or unavailable in conflict areas. In Syria, for example, young people have said that mental health services are among the top three resources they have most difficulty getting access to.⁸⁷

Figure 6 illustrates how the compounding impacts of environmental degradation, climate change and armed conflict contribute to increased mortality and morbidity.

84 UNHCR, 2019.

85 ICRC, 2021.

86 IPCC, 2022.

87 ICRC, 2021a.

4.3 Livelihood disruption

The economic and livelihood related aspects of human security can be disrupted or undermined by armed conflict. The ICRC notes that armed conflicts “profoundly disrupt social, political and economic arrangements, causing ‘development in reverse’ and exacerbating poverty and inequalities”.⁸⁸ Environmental degradation and climate change have an additional impact on economic security and livelihoods by reducing natural resource availability and ecosystem services. With multiple pressures on individuals and communities, peoples’ ability to live with dignity is diminished.

Agricultural livelihoods are at particular risk of disruption from the compounding impacts of environmental degradation, climate change and armed conflict. Common drivers of agricultural decline include land degradation, desertification and water scarcity, but also conflict-related damage to farms and agricultural infrastructure, increases in fuel prices, the rising cost and limited availability of agricultural inputs such as fertilizers or pesticides, and limited access to markets and extension services.

In the Middle East and North Africa, water management challenges are exacerbated by the impact of climate change on water resources. Agriculture accounts for 80% of countries’ water demand on average, leaving limited resources for household consumption and other uses.⁸⁹ Higher temperatures also have a negative impact on both livestock and crops. Livestock, like humans, are vulnerable to heat stress, which leads to a decline in their productivity, while increased temperatures impact crop development, with energy being spent managing heat stress rather than propagation, which diminishes crop yields.⁹⁰

There has been disruption to agricultural livelihoods in all conflict-affected countries in the Near and Middle East, with severe implications for food security and income generation. In Yemen, at least 70% of households were reliant on agriculture for their income before the conflict escalated in 2015.⁹¹ This high dependency on agriculture, alongside other pre-existing vulnerabilities, left millions of Yemenis acutely exposed to the economic, social and environmental stresses caused by the armed conflict.⁹²

Other natural resource-dependent livelihoods can be affected as well. In northeastern Syria, pastoralists have faced difficulties in gaining access to grazing land due to the worsening security situation,⁹³ while recurring droughts have reduced the volume of scrub vegetation.⁹⁴ This has rendered these pastoralists more dependent on supplementary fodder, which is in scarcer supply due to falling agricultural yields and the prohibitive cost of imports. In Yemen, the fisheries industry has struggled with the combined impacts of armed conflict and climate change: the conflict has pushed up fuel prices, making fishing unaffordable to many,⁹⁵ and rising water temperatures and the deterioration of coastal ecosystems have pushed down yields.⁹⁶

Rural areas are particularly affected by these compounding impacts, as livelihoods there are more dependent on agriculture. In Iraq, for instance, poverty rates are significantly higher in rural areas than in urban areas, and the combination of environmental and economic pressures in rural communities is thought to be increasing pre-existing patterns of rural-to-urban migration.⁹⁷

88 ICRC, 2020.

89 Met Office, 2021.

90 Met Office, 2021.

91 FAO, 2021.

92 Integrated Food Security Phase Classification, 2022.

93 PAX for Peace, 2022.

94 International Crisis Group, 2021.

95 UNDP and Lootsma, 2022

96 World Bank, 2010.

97 Social Inquiry and IOM, 2021.

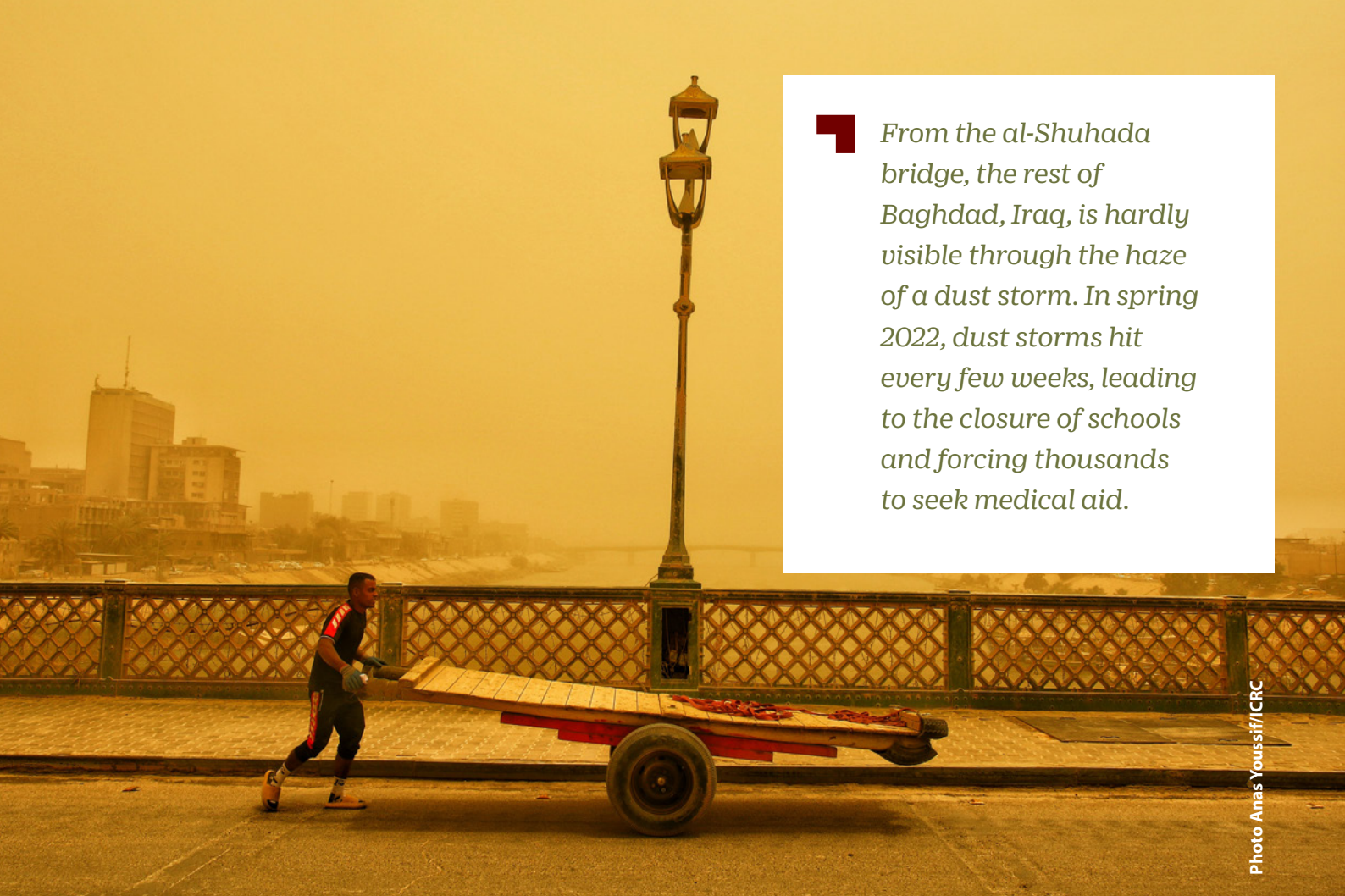


Photo: Anas Youssif/ICRC

From the al-Shuhada bridge, the rest of Baghdad, Iraq, is hardly visible through the haze of a dust storm. In spring 2022, dust storms hit every few weeks, leading to the closure of schools and forcing thousands to seek medical aid.

It is predicted that 70% of the population in the Middle East and North Africa will live in urban areas by 2050.⁹⁸ Rural-to-urban migration caused by failing agricultural livelihoods thus places further pressure on urban housing stock and infrastructure.

With multiple threats to their livelihoods and no alternative options, households and communities have to adopt coping strategies, some of which exacerbate environmental degradation and human insecurity. Such harmful coping strategies include skipping meals, which has nutritional and health impacts on the people themselves, and the sale of productive assets such as livestock, which has long-term economic impacts. In response to the disruption of agricultural livelihoods in Yemen, livestock numbers have indeed fallen as rural communities have sold their livestock to

provide short-term income.⁹⁹ Many farmers have also stepped up their production of the cash crop qat, which requires significant amounts of water to grow, exacerbating water scarcity issues.¹⁰⁰

Harmful coping strategies often drive further environmental degradation. Deforestation is a common consequence of coping strategies, such as the harvesting of firewood to counter increasing fuel costs¹⁰¹ and intentional fires to produce charcoal as an alternative source of income.¹⁰² The loss of tree cover in such areas is expected to have long-term implications for rural livelihoods, water tables and land degradation, as well as for biodiversity.¹⁰³

98 UN Habitat and Islamic Development Bank Group, 2020.

99 CEOS, 2020.

100 CEOS, 2021.

101 Al Jazeera, 2021.

102 CEOS, 2021a.

103 CEOS, 2021b.

Climate and armed conflict create a water and health crisis in Syria

Northeastern Syria – which produced 70% of domestic wheat requirements¹⁰⁴ and plays host to the largest number of camps for internally displaced people in the country – has seen multiple consequences of environmental degradation and climate change, including changing precipitation patterns and increasing temperatures. This has been exacerbated by the ongoing armed conflicts in the area. In 2021, the humanitarian situation in northeastern Syria was made worse by the compounding effects of multiple climate-related disasters, the failure of a key water-pumping station and the cumulative infrastructure and livelihood impacts of a decade of war.¹⁰⁵

While the beginning of 2021 saw periods of heavy rainfall leading to widespread flooding,¹⁰⁶ an intense period of drought followed. Throughout May, rainfall was more than 80% below the long-term average,¹⁰⁷ and temperatures in the north-east were up to 6.1°C higher than in most previous years.¹⁰⁸ At the same time, the flow of the Euphrates River entering Syria from neighbouring Turkey halved between January and June, due to the lack of rainfall and the operation of dams in the upstream area.¹⁰⁹ This reduced hydroelectric power generation and created secondary impacts on infrastructure, incomes and standards of living. The Syrian Minister of Agriculture warned that the country was facing its worst drought in 70 years.¹¹⁰

In July 2021, United Nations agencies sounded the alarm over the repeated conflict-related disruptions at the Alouk water station – the primary source of drinking water for 460,000 people in the north-east.¹¹¹ While there had been periodic disruptions since 2019, the situation was compounded by the drought and conflict-related access challenges for technicians. Protection needs surged, and humanitarian organizations had to supply hundreds of thousands of people with trucked water.¹¹² Many people turned to unsafe water sources, such as makeshift wells.

The lack of water for drinking and hygiene created both acute and chronic health problems, exacerbated by the poor state of health infrastructure in many areas. Health impacts of poor water sources can include diarrhoeal diseases and cholera. Women's health was disproportionately impacted, and people were spending up to half their income on water, causing further impoverishment. By August 2021, agricultural production had become severely impacted, with some districts reporting harvest losses of more than 80%, exacerbating food insecurity and malnutrition.¹¹³

104 REACH, 2022a.

105 ICRC, 2021b.

106 UN, 2021.

107 FAO, 2022.

108 OCHA, 2021b.

109 OCHA, 2021b.

110 Syria Direct, 2021.

111 OCHA and UNICEF, 2021.

112 OCHA, 2021a.

113 OCHA, 2021a.

4.4 Impacts on mobility and displacement

Environmental degradation, climate change and armed conflict, as well as their compounding impacts, influence mobility and population displacement in various ways. Contemporary mobility patterns in the Near and Middle East are shaped by both internal and cross-border movements, with temporary, seasonal and long-term relocation and movements towards a range of locations, including urban and peri-urban settings, camps and informal settlements. Decisions to move are often conceptualized on a forced–voluntary continuum,¹¹⁴ based on the level of choice that people have in their decision-making.

When human security is negatively impacted by environmental degradation or climate change, people may decide to move in search of more secure livelihoods in, for instance, urban areas. At the same time, armed conflicts and the impacts of climate change hamper voluntary mobility by restricting the choices and resources available to people; this can even ‘trap’ populations without the resources to move.¹¹⁵

The individual and compounding impacts of environmental degradation, climate change and armed conflict are also major drivers of population displacement. While mobility patterns are often multi-causal¹¹⁶ and the factors leading to internal or cross-border displacement

intertwined,¹¹⁷ there are some broad trends concerning the primary drivers of displacement.

Data collected by the Internal Displacement Monitoring Centre (IDMC) indicate that in 2021 armed conflict was the primary driver of internal displacement in the region. It was responsible for 81% of the 1.2 million new internal displacements, largely due to the conflicts in Syria and Yemen (Figure 7).¹¹⁸ The statistics are similar for 2020, when 86% of new internal displacements in the region were due to conflict.¹¹⁹ These numbers are very different from global statistics: worldwide, armed conflict accounted for 38% of new internal displacements in 2021 and 24% in 2020, with the remaining internal displacements caused by natural disasters and climate change. In armed conflicts, the multi-causal drivers affecting displacement include displacement-specific considerations, such as an acute need to find safety,¹²⁰ and factors related to the larger socio-economic impacts of conflict.¹²¹

The increase in displacement numbers as a result of a combination of environmental degradation, climate change and armed conflict has significant implications for human security. People facing protracted displacement, especially those in informal settlements and camps, are often particularly vulnerable to climate-related shocks and disasters, as explained opposite. In addition, mobility has gendered aspects, both in terms of the ability or propensity to move and in terms of the outcomes for those that do.¹²²

114 Hugo, 1996.

115 Abel et al., 2019.

116 IOM, 2021, UNHCR et al., 2019.

117 IOM and UNCCD, 2019.

118 IDMC, 2022.

119 IDMC, 2021.

120 ICRC, 2019.

121 World Bank, 2017.

122 IDMC, 2021.

Conflict and disaster as drivers of displacement

in selected countries of interest

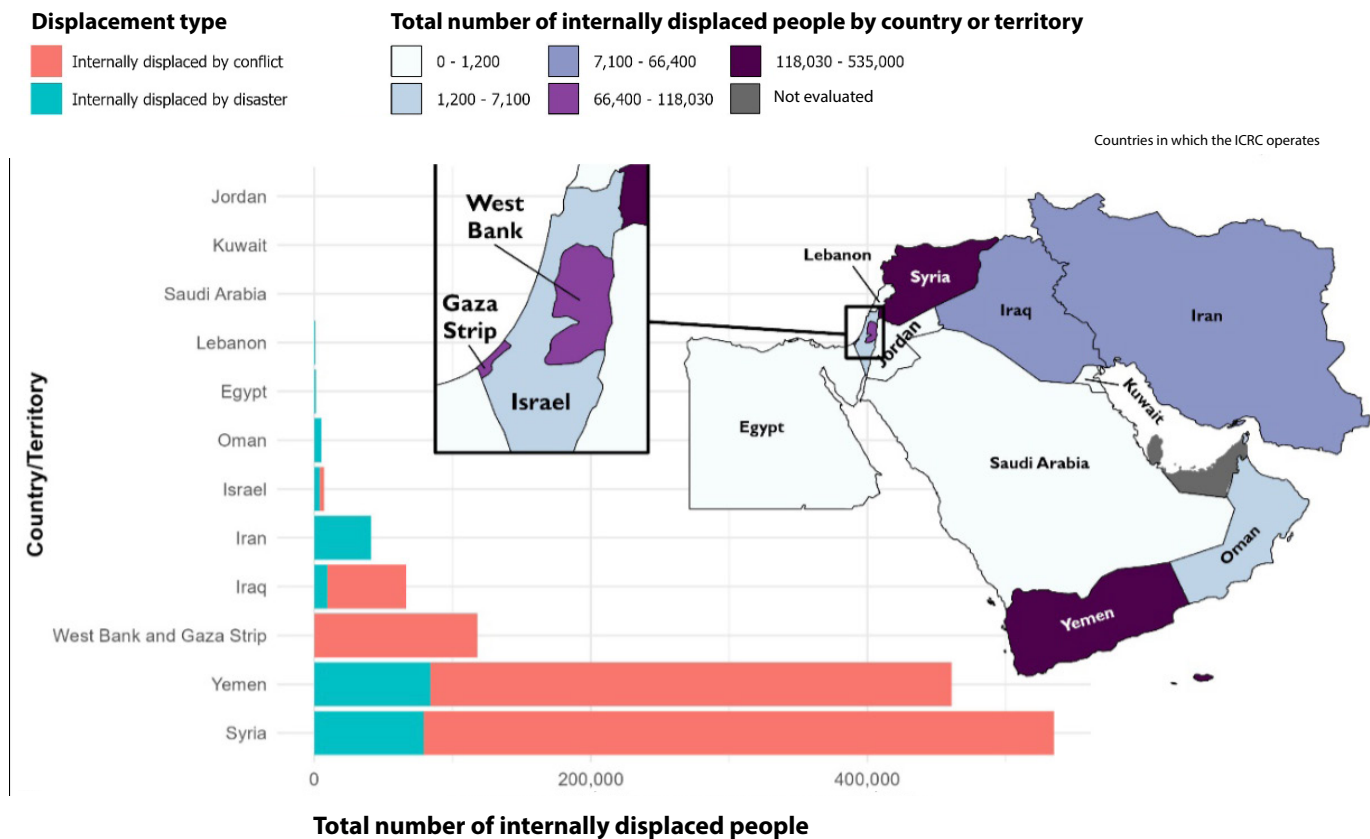


Figure 7. Internal displacement drivers. See section “About the maps” at the end of the report for sources.

Vulnerability of displaced persons to climate-related disasters

The disproportionate impact on displaced people is another recurring element in humanitarian needs assessments and appeals issued for climate-related disasters in conflict-affected countries in the Middle East and North Africa.

As environmental degradation, climate change and armed conflict accelerate displacement, they place an increasing number of people in situations that adversely affect human security and make them highly vulnerable to climate-related disasters and extreme weather events. Although the majority of internally displaced people live in urban settings, settlements primarily hosting displaced people are disproportionately located in regions with high climate risks, such as increasing temperatures, drought and flooding.¹²³

At the same time, displaced people have very limited adaptive capacity, especially those who have been displaced more than once.¹²⁴

Climate-related disasters can also exacerbate existing vulnerabilities to seasonal weather changes. Camps for internally displaced people and refugees in many parts of the region remain vulnerable to harsh winter conditions, requiring extensive winterization programmes to protect them from the cold.¹²⁵ In northwestern Syria, winter storms with heavy rainfall in 2021 worsened the situation for displaced populations, with their camps disproportionately affected by the subsequent floods. Flooding affected an estimated 122,953 internally displaced people at more than 300 camps and sites throughout the governorates of Idlib and Aleppo, and destroyed 8,400 shelters, damaging a further 13,800. Thousands of displaced households were forced

123 IPCC, 2022b.

124 Red Cross Red Crescent Climate Centre, 2022.

125 UNHCR, 2022.

to seek shelter in schools, mosques and open spaces as winter temperatures dipped below freezing.¹²⁶

Flooding driven by an increase in extreme rainfall events has also disproportionately affected displaced populations in Iraq¹²⁷ and Yemen,¹²⁸ with the increasing frequency of cyclones over the past decade of particular concern in Yemen.¹²⁹ The case study on page 38 zooms in on the issue of flooding in Yemen to demonstrate the heightened vulnerability of people displaced by a protracted armed conflict to extreme weather events and the associated human health impacts.

4.5 Concurrent shocks

In addition to the compounding impacts described, populations exposed to the impacts of climate change, environmental degradation and conflict are also at greater risk of concurrent shocks. The ways in which these shocks are created vary depending on location, the impacts of the armed conflict, climate risks, natural hazards and environmental issues.

The combination of environmental degradation and climate change can lead to a heightened risk of disaster. For example, the loss of vegetation cover associated with land degradation and desertification can increase risks related to flood intensity¹³⁰ and accelerate erosion due to loss of water retention and reduced infiltration capacity.

Furthermore, the growing frequency of extreme weather events associated with climate change also increases the likelihood that people and communities already affected by armed conflict or acute environmental degradation are hit by

a second, simultaneous crisis caused by the impacts of extreme heat, precipitation, storms or floods. Climate shocks and disasters may also occur simultaneously – heatwaves and drought, for example. The compounding impacts of these simultaneous events can have major socio-economic consequences for individuals and communities.¹³¹

Multiple climate shocks and disasters in a short period of time can result in multiple displacements, as people may have their livelihoods and homes destroyed repeatedly or may no longer be able to get access to resources like water and food.

Multiple concurrent shocks significantly reduce affected people's ability to cope and adapt, and contribute to an increase in humanitarian needs. For instance, there has been a global increase of 800% in United Nations appeals relating to disasters caused by extreme weather events over the last 20 years. The countries with the highest number of appeals were already in the midst of significant crises, including armed conflict.¹³² This trend can be observed in the Near and Middle East, where the International Federation of Red Cross and Red Crescent Societies (IFRC) issued humanitarian appeals for flooding in Yemen in 2022¹³³ and drought in Syria in 2021.¹³⁴ Similarly there were appeals issued in relation to cholera outbreaks in both Syria¹³⁵ and Iraq¹³⁶ in 2022.

126 REACH, CCCM Cluster, UNITAR and UNOSAT, 2021.

127 OCHA, 2015.

128 OCHA, 2021c.

129 CEOBS, 2020a.

130 IPCC, 2019.

131 de Brito, 2021.

132 Oxfam, 2022.

133 UN, 2021.

134 Information on the IFRC Syria drought appeal 2021 is available at: <https://go.ifrc.org/emergencies/5627>.

135 Information on the IFRC Syria appeal is available at: <https://go.ifrc.org/appeals/all/?country=206>.

136 Information on the IFRC Iraq appeals is available at: <https://go.ifrc.org/emergencies/6037>.

Multiple drivers of protracted displacement in Iraq

The example of Iraq shows how multi-causal drivers related to the compounding impacts of environmental degradation, climate change and armed conflict can trigger and prolong displacement. The armed conflict with the Islamic State group between 2014 and 2017 displaced 6.1 million people, with about 1.2 million still internally displaced in March 2022.¹³⁷ The majority of these people had moved to urban areas. A 2021 study on protracted urban displacement in ten Iraqi cities found that around three-quarters of internally displaced people had been displaced for more than five years, around 38% had experienced multiple displacements, and around 20% had made at least one failed attempt to return home.¹³⁸ Many of those affected by protracted displacement and a lack of economic self-sufficiency reported having experienced marginalization, stigma and a reliance on informal labour. The slow pace of reconstruction, lack of livelihood opportunities (as a consequence of both armed conflict and environmental degradation) and the security situation were all cited as barriers to returning home.¹³⁹ Some people who were internally displaced by the conflict have been unable to return to their places of origin because their land has been rendered agriculturally unproductive by desertification.¹⁴⁰

In addition to the millions of people displaced by armed conflict, data collection on climate-induced displacement in central and southern Iraq began in 2018. In March 2022, 3,358 families remained displaced because of water scarcity and other climatic factors across ten governorates.¹⁴¹ The level of displacement attributed to environmental factors in Iraq is still just a fraction

of the displacement caused by armed conflict.¹⁴² However, data collection remains incomplete and the lines between environment-linked internal displacement and voluntary mobility patterns are sometimes blurred.

How national authorities respond to such mobility trends is critical. An ICRC study on the impact of climate change in Iraq noted concerns at the Government level that the number of people compelled to move as a result of environmental degradation and climate change would keep growing. While there is no evidence of a national plan to facilitate relocation, it seems that authorities “fear that large-scale movements could threaten short-term stability, especially in areas that are already unstable”.¹⁴³ It should be noted that plans to facilitate relocations tend to focus on longer term support for those who are displaced due to environmental degradation and climate change,¹⁴⁴ which is different from planned relocation. Planned relocation is defined as a state measure to physically resettle a community in another location.¹⁴⁵

137 OCHA, 2022a.

138 IOM, 2021a.

139 OCHA, 2022a.

140 ICRC, 2020.

141 IOM, 2022.

142 IDMC, 2021.

143 ICRC, 2020.

144 IFRC, 2019.

145 UNHCR and Weerasinghe, 2014.

Vulnerability of internally displaced people to flooding in Marib Governorate, Yemen

By 2021, Yemen's armed conflict had displaced around 4 million people – well over 10% of the population.¹⁴⁶ The armed conflict has led to successive waves of displacement; in March 2021, most new displacements in Marib Governorate involved people who were being displaced for the second or third time.¹⁴⁷ Each round of displacement left people more economically and physically vulnerable, with conditions becoming progressively worse. Problems included a lack of shelter, security and livelihood options; gender-based violence; loss of documentation; food insecurity; and limited access to healthcare, education, water and sanitary facilities.¹⁴⁸

The housing arrangements of displaced people in Yemen vary, with some living with host families, some in rented accommodation and some in formal camps. However, the vast majority of displaced people live in makeshift settlements and more than one-third live in vulnerable shelters.¹⁴⁹ Many of these informal settlements are located on public land close to *wadis* – water channels that are dry except in the rainy season. These areas are seemingly attractive locations for such settlements, as Yemen's waterways are public lands so nobody can be forced to move.¹⁵⁰

In recent years, and in a trend set to continue in the future, Yemen has seen an increase in the frequency and intensity of summertime rainfall. This is being caused by climate change acting on atmospheric circulation in the Indian Ocean, which is likely to have driven the increase in the frequency and intensity of tropical cyclones.¹⁵¹ In the past six years, Yemen has been hit by six

cyclones, compared with four in the preceding 25 years.¹⁵² Flood risk is also increased by recent land use changes along waterways, including new buildings, roads and other infrastructure that interfere with rainfall absorption and run-off rates.

As a result of these changes, Yemen experienced heavy flooding in 2019, 2020 and 2021. In 2020, natural disasters triggered 223,000 new displacements, many of which were attributed to floods and storms.¹⁵³ In Marib Governorate alone, 35,000 people lost their homes to flooding, largely due to the number of informal settlements in waterways.¹⁵⁴

During the floods in 2019, shelters made of tents and tarpaulin were damaged, increasing the risk of homelessness and secondary displacement. Floodwater also fuelled the spread of diseases such as cholera, dengue fever, malaria and diphtheria. At the same time, healthcare facilities were disrupted by the disaster, which affected the pharmaceutical supplies needed to treat the spreading diseases.¹⁵⁵ Flooding was also reported to have moved landmines and other explosive devices into previously uncontaminated areas, putting displaced populations settled along the waterways at an increased risk of encountering explosive remnants of war.

As a result of this increased vulnerability to flooding and the associated health and protection risks, flood preparedness is now being built into the humanitarian response in Yemen.¹⁵⁶

146 IOM, 2021b.

147 IOM, 2021c.

148 IDMC, 2022a.

149 IDMC, 2022a.

150 Norwegian Refugee Council, 2019.

151 IPCC, 2022.

152 Based on analysis of the dataset of satellite monitored cyclone activity: NOAA's International Best Track Archive for Climate Stewardship (IBTrACS) data, accessed on 31 January 2022.

153 IDMC, 2021.

154 Figures from unpublished research as at January 2022, obtained in an interview with Aklan, M. from the IHE Delft Institute for Water Education on 12 January 2022. See also OCHA, 2022.

155 UNHCR, 2019.

156 Information on the Yemen flood response is available at: <https://reliefweb.int/disaster/fl-2021-000110-yem>.

■ *Teswahan and her family left Hatra when their herd of 400 sheep died due to drought and desertification. The family and their one remaining animal now live in an informal settlement outside Mosul, Iraq.*



5 Local coping mechanisms and adaptation approaches

The previous chapters introduced the various impacts of environmental degradation, climate change and armed conflict affecting livelihoods and human security in the Near and Middle East. To manage this broad spectrum of interconnected risks, people develop individual and collective coping mechanisms and often need to balance priorities and trade-offs when deciding which risks to respond to first. As climate change intensifies over the coming decades, the risks related to extreme weather events and environmental degradation will most likely be exacerbated, increasing the need for adaptive measures.

According to the IPCC, adaptation to climate change is “the process of adjustment to actual or expected climate and its effects, in order to moderate harm or exploit beneficial opportunities”.¹⁵⁷ Such adjustments do not happen in isolation: climate change combines with other social, political, economic and environmental factors. Adaptation strategies can therefore also serve as pathways to building overall community resilience, including greater resilience to challenges related to environmental degradation and armed conflict. Increased resilience as an outcome of adaptive strategies is achieved if a community becomes less likely to be harmed by the direct and indirect impacts of climate change.

Supporting adaptation also provides ways for humanitarian actors to help conflict-affected communities to build their resilience. This section therefore provides an overview and examples of possible adaptation and coping strategies at

different levels, and summarizes challenges to adaptation in conflict-affected settings.

5.1 Overview of climate adaptation approaches

There is a wide variety of approaches to climate adaptation, ranging from technical and engineering solutions to adjustments to communities’ social, institutional or governance systems. Table 2 provides an overview of these approaches and examples of their implementation in vulnerable settings. Effective adaptation strategies combine various approaches, each applied at the most suitable level and in consultation with relevant stakeholders.¹⁵⁸ For example, to strengthen urban climate resilience, city-wide land use planning can be combined with small-scale resilient infrastructure projects and with policy measures that incentivize citizen action.

A single adaptation intervention is unlikely to achieve a long-term increase in community resilience. Instead, adaptation should be considered as an iterative process in which adaptation approaches build on previous successes – or rectify previous failures – and are accompanied by continuous monitoring, evaluation and learning processes.¹⁵⁹ The coordination of different interventions in line with a broader adaptation strategy requires significant institutional capacity, often provided by government agencies on various administrative levels.

157 IPCC, 2022a.

158 IPCC, 2022c.

159 IPCC, 2022c.

Category	Adaptation focus	Examples
Structural / physical	Engineering and built environment	Coastal protection structures, flood levees, water storage, drainage infrastructure, cyclone shelters
	Land use planning	Urban planning, managing infrastructure development in high-risk areas
	Technology	New crop varieties, irrigation efficiency, building insulation, water- and energy-saving technology
	Ecosystem-based adaptation	Ecological restoration, soil conservation, afforestation / reforestation, assisted species migration, seed banks
	Services	Social safety nets, food banks, enhanced basic services and public health services
Institutional	Economy	Insurance, payment for ecosystem services, financial incentives, disaster contingency funds
	Laws and regulations	Land zoning laws, building standards, property rights, land tenure security
	Government policies and programmes	National and regional adaptation plans, economic diversification, disaster preparedness, natural resource management strategies
	Information	Hazard and vulnerability mapping, early warning systems, climate services

Table 2. Examples of different adaptation approaches, adapted from IPCC¹⁶⁰

In addition to considering current and expected climate conditions, adaptation efforts need to factor in the larger societal context. Adaptation strategies that do not address pre-existing systemic inequalities or that marginalize certain groups may lead to adverse outcomes for society or to maladaptation.¹⁶¹ In extreme cases, where institutional capacity is low and conflict resolution mechanisms ineffective, maladaptation can aggravate existing social conflicts or create new conflicts between advantaged and disadvantaged groups.¹⁶² Limited awareness of and access to information can also lead to the wrong choices being made, and to

maladaptation. Inclusive planning processes and participatory implementation have been shown to reduce the risk of maladaptation where they are built on knowledge-sharing, informed by cultural values, as well as by local and indigenous knowledge, and offer opportunities for the meaningful involvement of marginalized groups.¹⁶³

In addition to the various adaptation approaches outlined above and in Table 2 – which focus on strengthening the resilience of communities in their current location – adaptive outcomes may also be achieved through mobility. Research

160 IPCC, 2014.

161 Schipper et al., 2021.

162 IPCC, 2014a; Wilson Center, 2013.

163 Eriksen et al., 2021; IPCC, 2022.

reviewed by the IPCC indicates that voluntary migration, i.e. migration as a conscious choice, can be an adaptation strategy for those who have access to sufficient resources and information to move to an area where they are less vulnerable to climate hazards. However, climate-related mobility patterns mainly take the form of the involuntary displacement of people whose vulnerability has already been exacerbated by climate risks, limiting their adaptive capacity in their new location and decreasing the chance that their migration will have an adaptive outcome. The chances of success of mobility-related adaptation strategies can be increased through the adoption of policies and practices that facilitate regular internal and cross-border population movements and through the provision of support to vulnerable communities before they exhaust alternative adaptation approaches or are displaced by extreme events. Populations already on the move or in host areas need to be supported as well.¹⁶⁴

5.2 Adaptation and resilience initiatives in conflict-affected settings in the Near and Middle East

This section provides an overview of adaptation and resilience initiatives in conflict-affected settings in the Near and Middle East. It is based on the review of national-level climate documentation and project information available from international climate funds, implementing organizations and civil society networks, as well as information on various humanitarian operations within the International Red Cross and Red Crescent Movement, focusing on initiatives in Iraq, Syria and Yemen.

Examples of spontaneous and unassisted local adaptation – i.e. adaptation initiatives that are independent of international funding agencies or implementing organizations – are difficult to

identify, as their primary focus is usually not climate change.

Adaptive actions do not happen in isolation, but rather as part of a response to an often-complex series of factors in any given community. The response is influenced by conflict-related impacts, environmental, economic and market conditions, the social and political context, and the interplay between these factors. When armed conflict creates acute needs, people are likely to prioritize responses that address these short-term needs. Some of these responses may help to build resilience to the impacts of climate change. The examples cited in this section are therefore often classified as resilience-building responses.

State-led adaptation in countries affected by armed conflict

The effectiveness of state-led adaptation processes crucially depends on the capacity of the national government.¹⁶⁵ In conflict-affected settings, this capacity can be reduced by a range of factors, such as a lack of resources and brain drain, as well as the broader political instability that might come with frequent changes in government and the focus on immediate needs rather than long-term adaptation.¹⁶⁶

An important component of state-led climate action is the engagement with UNFCCC-related international climate processes. Table 3 indicates the progress made in Iraq, Syria and Yemen in relation to UNFCCC-mandated documentation on climate mitigation and adaptation. The table shows significant gaps for Iraq and Syria, particularly related to the development of national adaptation plans, which are also key reference points for financing.¹⁶⁷ This indicates shortcomings in institutional capacity and, consequentially, adaptation progress.

164 IPCC, 2022d.

165 Berrang-Ford et al., 2014.

166 FAO and World Bank, 2018.

167 ODI, ICRC and Red Cross Red Crescent Climate Centre, 2019.

Documents	Iraq	Syria	Yemen
Nationally determined contribution	2021	2018	2015 (intended contribution)
National adaptation plan	Started in 2020	n/a	n/a
National communication to UNFCCC	2015 (revised 2017)	2010	2001, 2013, 2018 (revised 2018)
Biennial update reports to UNFCCC	n/a	n/a	2018

Table 3. Status of UNFCCC-mandated climate documentation for Iraq, Syria and Yemen, based on UNFCCC records (<https://unfccc.int>)

Fragile and conflict-affected countries may also struggle to meet the eligibility criteria for climate finance mechanisms, which often require strong governance structures.¹⁶⁸ Given that authorities face challenges in obtaining access to climate finance, capacity-building programmes can play an important role in reducing the funding gap in conflict-affected countries. The Green Climate Fund (GCF) Readiness Programme is one such programme, focusing on enhancing the capacity of national agencies to engage with the GCF and strengthen overall climate-related governance mechanisms.¹⁶⁹ Between 2018 and 2020, the GCF Readiness Programme was implemented in Iraq to strengthen national capacities. In 2019, two GCF readiness initiatives were also approved for Syria.¹⁷⁰

A recent policy report identified risk aversion on the part of climate actors, inflexible application and fiduciary requirements, disjointed responses, and institutional silos in both donor institutions and recipient states as obstacles preventing conflict-affected countries from accessing financing for climate adaptation, particularly from multilateral climate funds.¹⁷¹

Information on state-led adaptation projects in conflict-affected countries is sparse. Research for this report found a lack of databases on adaptation projects within the countries, making it difficult to track domestically funded projects. Information on internationally funded adaptation projects, on the other hand, can often be obtained from the relevant climate finance mechanism, funding agency or implementing organization. However, the number of projects is low, because of the challenges highlighted previously.

As at January 2022, the Climate Funds Update (CFU) database, which collects information from 27 different multilateral climate funds, listed 19 single-country adaptation and mitigation projects in Iraq, Syria and Yemen that had been approved for multilateral funding. The total amount disbursed to these projects was just 20.6 million US dollars – less than 0.5% of all of the funds disbursed worldwide – and five projects had received no money at all.¹⁷² The CFU database does not provide information on bilateral funding, making those adaptation projects harder to track.

168 IDMC, 2021.

169 GCF, 2020.

170 GCF, 2019 and 2019a.

171 ICRC, ODI, ICVA, Mercy Corps, RCCC, UNHCR and WFP, 2022.

172 See the GCF data dashboard available at: <https://climatefundsupdate.org/data-dashboard>.

In some cases, conflict escalation has led to the cancellation of projects that had been approved for multilateral funding. An evaluation of the Global Environment Facility (GEF) support provided to fragile and conflict-affected countries found that five key issues affected projects in these settings and frequently led to cancellations: a lack of physical security; social conflict; economic drivers; political fragility and weak governance; and coping strategies. Out of these five, the lack of physical security appears to be the most common in the Near and Middle East, with the report citing two climate mitigation projects, in Syria and Yemen, that were cancelled because of the deteriorating security situation.

¹⁷³ A large-scale project on rural growth in Yemen co-funded by the Adaptation for Smallholder Agriculture Programme was suspended in 2015 due to the escalating conflict there.¹⁷⁴

In response to the lack or cancellation of multilaterally funded adaptation projects in Iraq, Syria and Yemen in the 2010s, a new wave of projects has been approved and initiated since 2018. Some of these projects are introduced here as examples of the adaptation approaches taken in conflict-affected settings in the Near and Middle East. Adaptation projects that take a technical or structural approach (see Table 2) commonly focus on agricultural livelihoods or water and sanitary facilities. Examples of this type of project include a project financed by the Adaptation Fund in Iraq that aims to build the resilience of the agricultural sector by promoting efficient irrigation systems ¹⁷⁵, and another in Syria, which aims to improve integrated water resource management in eastern Ghouta¹⁷⁶. The majority of the funding allocated to these projects is spent on infrastructure development and the diffusion of new technologies, such as more efficient irrigation technologies or drought-tolerant crops. They often also include smaller capacity-building measures for both government agencies and communities, aiming to enable local

populations to address future climate challenges by themselves.

In addition to institutional capacity-building projects that specifically focus on enhancing the national government's ability to access climate funding and engage with international climate processes, there are projects that approach adaptation from a broader angle (see Table 2). The ICRC's work with the Syrian General Organization for Seed Multiplication is an example of targeted capacity-building on new climate change risks, in this case where changes in crop diseases could threaten agricultural livelihoods. It shows that while structural adaptation approaches are needed and frequently used to strengthen agricultural resilience and food security, it is important to build authorities' capacity to address novel risks as well.

Institution-based adaptation approaches can also help to strengthen conflict resolution capabilities. As environmental degradation and climate change affect the availability of natural resources like water, grazing lands and fertile soil for agriculture, competition for those resources can turn into conflict in the absence of strong conflict resolution mechanisms. The case study opposite provides an example from Yemen, where local conflicts over water are no rarity, showing the adaptive outcomes of a project that primarily focused on conflict resolution and peacebuilding.

173 GEF, 2020.

174 Adaptation for Smallholder Agriculture Programme, 2015.

175 Adaptation Fund, 2019.

176 Adaptation Fund, 2021.

Capacity-building to manage crop diseases in Syria (2020)

Wheat is the main cereal crop in Syria and is central to the livelihoods and nutritional needs of millions of people, from farmers to bakers to the public. However, climatic changes in Syria's key wheat-growing areas are expected to increase the spread of crop diseases, like wheat leaf rust, which can have a severe effect on cereal production – a yield reduction of 10–25% was recorded in affected crops in northeastern Syria.¹⁷⁷ To limit the spread of wheat leaf rust, minimize risks and respond to outbreaks, agricultural agencies and farmers need to have a strong understanding of the disease.

The General Organization for Seed Multiplication (GOSM) is the Syrian government agency responsible for securing the national seed supply. In response to the risk of an increase in wheat leaf rust outbreaks, the ICRC facilitated training sessions for key GOSM staff as part of its economic security operations in Syria in 2020. The training introduced 15 GOSM staff (seven women and eight men) to disease management strategies that are responsive to the climate change impacts expected in the country. The ICRC is also helping GOSM to build its laboratory capacities, so that it can resume work on cereal varieties that are better suited to the changing climatic conditions, including threats posed by crop diseases.

Strengthening the role of women in water-related conflict resolution in Yemen (2018–2020)

Wadi Hadramaut, one of the major valleys of Yemen, has been the site of numerous local water conflicts as a result of the severe water scarcity induced by historical shifts in water management practices, war and socio-economic factors. The increasing scarcity of water due to climate change is expected to create additional challenges. The 'Water for Peace in Yemen: Strengthening the Role of Women in Water Conflict Resolution' project, funded by the United Nations Secretary-General's Peacebuilding Fund and jointly implemented in 2018–2020 by the Food and Agriculture Organization (FAO), International Organization for Migration (IOM), the Hadhramaut Governorate's Ministry of Water and Environment and the Women Water Users Groups, was launched with the goal of identifying and addressing drivers of local water conflicts in the area.¹⁷⁸

The project took a two-pronged approach to reducing local conflict potential by strengthening conflict resolution mechanisms and addressing the root causes of local grievances. The project focused on the inclusion of women and increased community participation in the resolution of water conflicts. This involved working with local authorities and traditional conflict resolution mechanisms, and establishing community-based conflict resolution bodies. In order to address the root causes of local grievances that might turn into conflicts, the project also sought to increase access to water for irrigation, improve local food production and identify new economic prospects for vulnerable families and young people. In doing so, the project also generated adaptive outcomes related to more resilient livelihoods in the area.¹⁷⁹

177 iMMAP, 2022.

178 FAO, 2022a.

179 FAO, 2022a.

Local, small-scale adaptation in situations of armed conflict

Given the challenges to state-led adaptation caused by diminished institutional capacity, along with the de-prioritization of climate action in conflict-affected settings, local, small-scale initiatives play an important role in building community resilience. In the evaluation report on a large-scale climate adaptation project in Yemen, implemented between 2010 and 2015, the World Bank stated that while the escalation of armed conflict in the country presented a high risk to the adaptive outcomes of public-sector projects, community-based project outcomes were more robust to the disruption of state institutions.¹⁸⁰

At the same time, however, communities living through armed conflict will be focused primarily on coping with the immediate negative impacts of conflict on their lives and livelihoods. Even though climate adaptation might not be a direct objective, such coping strategies can have adaptive outcomes, particularly when the consequences of armed conflict or environmental degradation are similar to the expected impacts of climate change. Grassroots initiatives such as

the 15th Garden, an urban agriculture network in Syria (see box below), combine short-term coping mechanisms with long-term adaptation, in this case by strengthening household food security while also teaching sustainable agricultural practices and distributing climate-resilient seed varieties with the support of international civil society organizations.

Local, small-scale initiatives often focus on economic security and strengthening livelihoods, particularly in the agricultural sector, and on avoiding maladaptation or harmful coping strategies, like selling livestock. This common focus on agricultural activities opens up opportunities for adaptive outcomes in a variety of related sectors, as well as for climate-resilient income generation. The text box on page 47 gives the example of Food4Humanity in Yemen, a civil society organization which, over the years, has developed a range of initiatives that touch upon various human security issues beyond the initial focus on water and food.

180 World Bank, 2015.



The ICRC and the Syrian Arab Red Crescent contribute to the repair works of the pumping station in order to increase access to water for Al-Hasakah residents.

The 15th Garden, Syria

The armed conflict in Syria has had extensive impacts on agriculture throughout the country, affecting livelihoods and food security.¹⁸¹ The situation has been particularly dire in besieged areas that lack access to fresh food and basic supplies. The 15th Garden, a grassroots urban agriculture initiative supported by an international network of farmers and the Germany-based Heinrich Böll Foundation, was established in 2011 with the goal of building local food sovereignty in besieged cities through urban agriculture. The network has since spread across the country and includes urban family gardens, farmers in rural areas, and agriculture initiatives in refugee camps.¹⁸²

With the support of its international network, spearheaded by the non-governmental organization La Via Campesina, the 15th Garden has also been able to offer training programmes on sustainable agriculture and gardening for smallholder farmers and created opportunities for farmers to swap and reproduce organic pollinated seeds so that they have the basic means to cultivate new seeds and increase agrobiodiversity. The network also seeks to reduce reliance on humanitarian aid and build resilience through farming and crop cultivation.¹⁸³ The cultivation of climate-resilient seeds has been described as “one of the most important [adaptation] actions” available now for smallholders.¹⁸⁴ Seeds and agrobiodiversity will likely play a crucial role in future climate change mitigation and adaptation.¹⁸⁵

Food4Humanity in Yemen

Food4Humanity is a Yemeni civil society organization that sprang from an urgent humanitarian need to deliver water to vulnerable communities in the city of Taiz in 2015. As political and development agencies left the city in the early stages of the armed conflict, founder Muna Luqman negotiated with the parties to the conflict to allow water trucks to reach an orphanage. The organization that she set up has since negotiated local ceasefires in situations where water disputes developed into armed violence; secured water access rights for communities in armed conflict; and rehabilitated and built water infrastructure.¹⁸⁶ It now runs many solar-powered water projects, although it took a number of years to raise the necessary funds. The organization is not able to access funding through the United Nations system because of the size of its turnover, which is not in excess of 200,000 US dollars.¹⁸⁷ Instead, it is funded almost entirely by Yemeni diaspora women, with individual activities supported

by other partners, such as the MADRE global women’s rights group and the International Civil Society Action Network.¹⁸⁸

Food4Humanity also works to prevent and control the spread of diseases, by running sanitation campaigns, training medics and distributing hygiene kits. Other activities include bakeries run by internally displaced people; keeping young people out of the fighting; and education for girls.¹⁸⁹ Food4Humanity is able to take a multi-pronged approach because it is responsive to the needs of communities. In responding to these needs, specifically through the creation of livelihood opportunities for internally displaced people, the organization is focused on sustainable solutions. This kind of community-based resilience building should be recognized in climate change discourse and policy.

While some local, small-scale initiatives may

181 Heinrich Böll Foundation, 2017.

182 Montgomery, 2014.

183 La Via Campesina, 2014.

184 Cacho et al., 2020.

185 Vernooy et al., 2017.

186 CEOBS, 2020b.

187 CEOBS, 2021.

188 Abramian, 2020.

189 Abramian, 2020.

receive important bilateral financial, material and social support from migrant diaspora communities and various organizations in other countries, the access to structured climate finance mechanisms is extremely limited. There are two reasons for this: first, there is an overall lack of international climate finance for local action, which affects community-led climate action in general;¹⁹⁰ and second, where climate finance is available, local action may still be excluded if they are located in areas of high conflict intensity or in areas that are under the control of non-state armed groups, as these are considered high-risk areas by most funding agencies.¹⁹¹

Humanitarian aid can be an alternative source of funding. While the primary objective of humanitarian work is to alleviate immediate suffering, it can, in some cases, be combined with community initiatives to generate adaptive outcomes and build community resilience. The case study opposite describes the example of a locally led flood adaptation project in northern Yemen made possible thanks to the material support provided by the ICRC. The inclusion of adaptive elements in such projects is particularly warranted if damaged infrastructure can be rebuilt to be more climate-resilient, as in this case by replacing dry-stone retaining walls for agricultural terraces with gabion walls.

Close collaboration with local communities also allows humanitarian organizations to be more precise in addressing the needs of the community and to build on ongoing initiatives in the area to improve local ownership as well as local capacities that can translate into broader adaptive outcomes in the long term. The case study on page 50 provides an example of an ICRC project that was implemented with the local community and actively initiated by community members.

Adaptation among displaced populations

Earlier sections of this report have looked at

the high vulnerability of refugees and internally displaced people to climate shocks.

Displaced people living in camps and informal settlements face increased climate risks due to vulnerabilities heightened by the loss of livelihoods and resources, as well as individual exposure to physical security risks and the exposure of camps and informal settlements to climate-sensitive hazards such as flooding or droughts. Including displaced populations and host communities in climate risk assessments and adaptation decision-making is crucial to their safety and well-being, especially in situations of protracted displacement.

The United Nations High Commissioner for Refugees (UNHCR) acknowledges the need for climate change adaptation and to strengthen climate resilience and adaptation, particularly in camps for refugee and internally displaced people.¹⁹² However, there are numerous legal, structural and financial challenges and barriers to implementing climate change adaptation planning and programming among populations living in protracted displacement settings.

For instance, it is often impossible for humanitarian actors to invest funds and implement sustainable projects aimed at making adaptation-related structural improvements to informal settlements, because the settlements are located on privately owned land or land where ownership is contested. This can mean that the settlements are subject to removal orders, with the people living there at constant risk of being evicted and removed, in some cases through the use of force by law enforcement authorities.

Displaced people often end up living in camps for much longer than expected. This means that camp infrastructure needs to last far longer than initially planned and might have to withstand unforeseen climatic changes. Where armed conflict has subsided in the area of origin, but climate change and environmental degradation

190 IIED, 2017 and 2022.

191 SPARC, 2021; Sitati et al., 2021.

192 UNHCR, 2021.

continue to undermine livelihood opportunities, returning refugees and internally displaced people who cannot endure the harsh climate and living conditions in their home areas are likely to engage in secondary internal displacement or remigration as an important adaptation, coping or even survival mechanism.¹⁹³

Humanitarian aid often provides short-term relief and ensures that people can remain where they are for the time being, even in contexts where climate change is expected to lead to environmental degradation that may leave the local area inhospitable or even uninhabitable. Humanitarian planning in such circumstances needs to come hand in hand with up-to-date information on climate trends and adaptation pathways, and allow people to make informed

decisions on possible adaptation strategies, including whether to stay or to leave.¹⁹⁴

A recent Red Cross Red Crescent Climate Centre report highlighted the challenges, opportunities and considerations of incorporating anticipatory action¹⁹⁵ in camps for refugees and internally displaced people. The challenges identified included limitations to freedom of movement, accessibility for humanitarian organizations, and the infrastructure of camps being designed for short-term habitation.¹⁹⁶ Despite such challenges, a few examples are available of how displaced people find innovative ways to adapt to the impacts of climate change (case study overleaf). It is important to note, however, that examples of structural adaptation projects in camp settings are extremely rare.

Adaptation to seasonal floods in northern Yemen (2014–2015)

Wadi Fallah is a seasonal river in Fallah sub-district (Majz District) in northern Yemen, and a crucial source of irrigation water for local farming communities. Local farmers noted that seasonal flooding of the Wadi Fallah had become more frequent and stronger, inundating the fields with sand and destroying dry-stone retaining walls along agricultural terraces. However, the farmers did not have the financial resources to clean the fields or the technical know-how to rebuild the retaining walls so that they would withstand the more frequent floods.

In a fully community-driven project, the ICRC provided local farmers with materials and financial support to enable them to restore their agricultural land and improve the flood protection structures. This included cleaning the farmlands, resuming agricultural activities, increasing local food production and replacing dry-stone retaining walls with stronger gabion walls. While the construction of gabion walls instead of traditional dry-stone walls had already been supported by the Yemeni Ministry of Agriculture and Irrigation in other parts of the country, it was not yet a common practice in northern Yemen, requiring additional capacity-building measures for the community.

193 IDMC, 2021.

194 ICRC, 2020.

195 As defined in the report: "Anticipatory action, commonly known as forecast-based financing within the Red Cross Red Crescent Movement, takes place in the often-short window of time between weather forecasting and a climate event. These short-term interventions can reduce vulnerability before a disaster, increase preparation for disaster response, and have positive long-term impacts."

196 Red Cross Red Crescent Climate Centre, 2022.

Increasing beekeeping capacities in Syria (2020)

Beekeeping is an important income-generating activity for a large number of families in Tartus Governorate. It is widespread in most areas of Tartus, but families have experienced challenges due to environmental degradation, the deteriorating economic conditions following the war in Syria, and a lack of supplies. Beekeepers asked the ICRC to support them in reinforcing their work and increasing their resilience, so that they would be able to cover their basic household expenses.

Through a series of field visits and meetings with representatives of agricultural extension units, experts and beekeepers, it was agreed that the most suitable approach would be to increase the pollination rate. Vulnerable beekeepers with less than 15 hives were provided with six additional hives and the tools needed to look after them. This reduced production costs – and household expenses – for the beekeepers. The type and amount of support provided was determined in close consultation with the beekeepers themselves.

Coping strategies and refugee innovation in the Za’atari refugee camp, Jordan

Za’atari refugee camp was first established as a camp for Syrian refugees in northern Jordan in 2012. After hosting up to 120,000 refugees during its first year, the camp population has since stabilized at around 80,000 people, making it the largest refugee camp in the Near and Middle East. Over the years, the camp has seen several infrastructure upgrades, including the replacement, in 2013, of initial tent structures with more permanent shelters that provide better protection from the elements. However, most of these shelters have already exceeded their lifespan and are now in urgent need of repair or replacement.

As the camp gradually became a place of protracted displacement, it developed into a site of innovation and entrepreneurship. Examples of this include the recycling and upcycling of waste products, camp-specific services such as the relocation of tents and caravans, and the development of new media platforms for Za’atari refugees.¹⁹⁷ In addition, international organizations like Oxfam ran projects related to waste and water management with strong cash-for-work components as well as initiatives to increase the participation of women in the workforce, with a special focus on agriculture inside of the camp.¹⁹⁸ While initiatives specifically related to climate action are scarce – UNHCR only lists the provision of electricity by solar panels as an example of good climate practice¹⁹⁹ – coping strategies focusing on infrastructure improvements, food security and livelihoods can create adaptive outcomes in camp settings as much as they do in other communities.

197 Betts et al., 2015.

198 Oxfam, 2020.

199 UNHCR, 2021a.

5.3 Challenges to adaptation in situations affected by armed conflict

A number of cross-cutting challenges to designing and implementing adaptation strategies in situations of armed conflict have been identified and discussed in varying degrees throughout this report. In the absence of support for comprehensive adaptation, local-level adaptation to climate change and environmental degradation in Iraq, Syria and Yemen often takes the form of livelihood adjustments, livelihood diversification or, without other viable options, mobility and relocation.²⁰⁰ Pursuing these adaptive strategies can become more challenging in situations of armed conflict, with locations and patterns of violence often limiting livelihood opportunities and making them unpredictable.

Where access to vital resources is not only inadequate, but also unequal, compounding impacts may have broader social consequences. In Yemen, the inequality in access to food and water has led to tensions at the local level²⁰¹ and triggered movements to urban areas, increasing the strain on resources there.²⁰² In these situations, the influx of refugees and internally displaced people can also exacerbate tensions between migrants and host communities over scarce resources. The resulting erosion of social cohesion may further undermine the community's adaptive capacity.

Key challenges to climate adaptation include:

- changing, unstable and often unpredictable situations that prevent adaptation activities from being implemented effectively
- a lack of data and evidence to inform adaptation in conflict-affected areas
- practical, legal and institutional barriers to addressing the needs of displaced populations, even though they are more vulnerable to climate-related shocks and stresses
- a gradual erosion of people's adaptive capacity and resilience as a result of recurrent and simultaneous crises.

The contributing causes and consequences of the above challenges, as discussed throughout this report, are summarized in Table 4.

200 ICRC, 2020.

201 Glass, 2010.

202 Lyon, 2009.

Table 4. Summary of cross-cutting challenges to climate adaptation in situations of armed conflict identified in the course of this research

Challenges	Causes	Contributing factors	Outcomes
<p>Changing, unstable and often unpredictable situations that prevent adaptation action from being implemented effectively</p>	<p>Conflict-affected countries and communities are unable to access climate finance for adaptation</p>	<ul style="list-style-type: none"> • Global imbalance between mitigation and adaptation financing • Insufficient funds for adaptation granted and disbursed from bilateral donors and multilateral climate funds • Difficulties meeting eligibility requirements of climate funds due to issues such as lack of eligibility, institutional capacity, and donor risk aversion • General difficulty of accessing climate finance for small-scale, local initiatives 	<ul style="list-style-type: none"> • In the absence of support for adaptation, climate change impacts on people and communities already affected by compounding risks continue to worsen – leading to increasing humanitarian needs • Increased risk of maladaptive outcomes • Missed opportunities for making humanitarian response climate-smart with adaptive outcomes
	<p>Impacts of armed conflict on security situation, the environment and key infrastructure</p>	<ul style="list-style-type: none"> • Disruptions to planned and ongoing projects and loss of key personnel to injury or brain drain • Pressures on environment and ecosystems services accelerating environmental degradation • Damage to and destruction of key agricultural, water and environmental infrastructure 	
	<p>The capacities of the domestic authorities are weak, absent or not robust</p>	<ul style="list-style-type: none"> • Managing impacts of armed conflict prioritized over longer term environmental and adaptation measures • Institutional capacity erosion, and damage or destruction of facilities and equipment • Siloed ways of working in governments, including ministries managing international aid and climate finance 	
	<p>Disjointed responses among international actors</p>	<ul style="list-style-type: none"> • Disjointed approaches between humanitarian and development actors • Lack of coordination and knowledge sharing between organizations • Siloed ways of working in donor institutions and in recipient state structures • Differential access to communities located in areas under the control of non-state armed groups 	

Challenges	Causes	Contributing factors	Outcomes
Lack of data and evidence to inform adaptation in conflict-affected areas	Lack of reliable, high-quality weather and climate information (including historical, current and prospective information) in countries and areas affected by armed conflict	<ul style="list-style-type: none"> • Absence of, or damage to, weather stations in many areas • Insufficient resources • Lack of qualified technical staff • Lack of resources to systematize available data, and absence of mechanisms to incorporate local knowledge and historical data 	Adaptation measures are not evidence-based and may be ineffective or inadvertently contribute to maladaptation
	Lack of information about and learning from successful adaptation measures in areas affected by armed conflict	<ul style="list-style-type: none"> • Lack of information sharing between actors with access and actors without access • General lack of data collection on adaptation strategies and initiatives • Lack of documentation of successful examples 	
	Lack of information about particularly vulnerable people	<ul style="list-style-type: none"> • Lack of disaggregated population data • Lack of information about specific groups, including displaced people 	
Practical, legal and institutional barriers to addressing the needs of displaced populations, even though they are disproportionately vulnerable to climate-related shocks and stresses	Lack of information about climate risks in areas under the control of non-state armed groups	<ul style="list-style-type: none"> • Limited access to communities in areas controlled by non-state armed groups • Absence of, or damage to, weather stations • Lack of information sharing between actors with access and actors without access 	High levels of exposure to hazards and unmitigated vulnerability to climate-related shocks and stresses contribute to making displaced people progressively more impoverished and adversely affects their health
	Limited legal and humanitarian space for meaningful adaptation to address the specific needs of displaced people	<ul style="list-style-type: none"> • Contested ownership of plots on which camps and settlements are located • Short-term humanitarian planning and intervention cycles 	
	Lack of planning for communities and groups at risk of protracted displacement due to climate risks and environmental degradation	<ul style="list-style-type: none"> • Lack of community access to climate information and information on adaptation pathways • Lack of planning to facilitate relocation of worst-affected communities • Disjointed approaches between humanitarian and development actors/organizations • Lack of coordination and knowledge sharing between organizations 	

6 Conclusion and recommendations

The Near and Middle East region is heavily affected by environmental degradation and climate change. It is already one of the most water-stressed regions in the world, with repercussions for productive sectors, such as agriculture and energy, and the livelihoods that depend on them. Agricultural production is further affected by increasing land and soil degradation, high levels of salinity, prolonged droughts and an overall increase in temperature. A decline in crop yields has already been observed – a trend that is expected to continue and further exacerbate regional food security challenges. High temperatures, increased air pollution and reduced water availability and quality will also affect public health.

Previous and ongoing armed conflicts in the region have further exacerbated the situation and increased vulnerabilities, with impacts on three levels:

- **Weakened governance systems** – institutions may lose capacity, resources and organizational knowledge, get cut off from international efforts and be unable to include civil society and private-sector organizations in the management of common resources because security is prioritized over other issues, or because of a lack of trust.
- **Damage to environment and infrastructure** – this can occur as a direct consequence of the conflict or as a result of harmful coping mechanisms or mismanagement, which can undermine the livelihoods and ecosystem services that underpin healthy societies.
- **Detrimental impact on human security** – this is caused by the damage to livelihood systems or to the infrastructure and ecosystems that support them.

The compounding impacts of environmental degradation, climate change and armed conflict can have far-reaching implications for human security by limiting access to the resources necessary for people's survival; reducing health systems' capacities while increasing people's health needs; disrupting livelihoods; and reducing adaptive capacities at the individual and community levels. In addition, when armed conflict is combined with environmental degradation and climate change, it can lead to a significant increase in displacement, threatening human security. People who are displaced due to armed conflict, especially those in informal settlements, are often particularly vulnerable to climate-related shocks and disasters.

Communities living through armed conflict are faced with a multitude of negative impacts on their lives and livelihoods, which require their full attention. Coping strategies can take various forms, depending on the immediate needs and resources available to communities and individual households. Some of them can be considered harmful and lead to a deterioration in welfare and human security in the longer term, if they, for instance, contribute to environmental degradation. Therefore, it is important to support communities in identifying coping strategies that also help them to become more resilient in the face of changing environmental and climate conditions.

Multilateral financing for adaptation efforts in conflict-affected countries is not always available, as governments often struggle to meet the eligibility criteria for climate finance mechanisms and special funds. Moreover, finance mechanisms are often unprepared to deal with the risks specific to conflict-affected settings. As a result, fragile and conflict-affected countries do not receive adequate adaptation funding through the

Paris Agreement financing mechanisms. Access to structured climate finance for local, small-scale initiatives is extremely limited in conflict-affected settings, particularly in areas under the control of non-state armed groups. In these contexts, humanitarian organizations are often the only source of external support.

The combined impacts of armed conflict, climate change and environmental degradation cannot be averted through humanitarian action alone. Humanitarian, development, environmental and peacebuilding actors need to work together to help lay the foundations for long-term sustainability and community resilience before, during and after a crisis.

We call upon these actors to advocate for urgent action to reduce greenhouse gas emissions and work together to strengthen in-country climate action for people affected by armed conflict through:

Making it easier for conflict-affected countries and communities to access financing for climate adaptation. There is a need to ensure that populations affected by the combined impact of conflict, climate change and environmental degradation receive the support they need. The findings in this report support experts' call for policymakers in states, multilateral financial institutions and climate funds to approach risk differently, support action at multiple scales and with diverse actors, improve coordination across the international aid structure, and address silos that hinder action.

Investing in adaptation programmes that address needs across sectors, including by building health system resilience. Alongside adaptation in food and water systems, there is an acute need to invest in health system resilience in conflict-affected countries, so that they can respond to the combined impact of environmental degradation, climate and conflict on lives and health. Health systems should be better equipped to deal with the increased health burden, by enhancing their preparedness to respond to diseases with epidemic potential and the increased burdens of chronic disease

(including mental health) and malnutrition. Taking a holistic approach to health that recognizes the intrinsic links between human, animal and environmental health will help countries to address these compounding impacts.

Providing humanitarian and adaptation support to displaced people and people at risk of displacement in conflict-affected countries. Displacement can be prevented by providing environmental management and climate adaptation support to vulnerable communities already bearing the consequences of armed conflict before they exhaust existing adaptation options or are exposed to extreme weather events; this will help to strengthen their resilience. Similarly, adaptation initiatives geared towards displaced people can help to prevent further displacement, especially for those living for protracted periods in camps or informal settlements originally built for short-term stays and thus particularly vulnerable to climate risks. At the same time, it is essential to recognize that both in-country and cross-border mobility can be an important adaptation, coping and even survival strategy for people facing the combined effects of climate change, environmental degradation and armed conflict. As such, mobility-related considerations should be integrated into adaptation support strategies and approaches, taking into account the priorities and concerns of those affected.

Supporting locally led adaptation, tailored to contexts affected by armed conflict. Including local communities as key agents in adaptation efforts enhances adaptive outcomes and reduces the risk of maladaptation. People and communities on the front lines of climate change – including displaced people – are often in the best position to identify the most pressing risks and issues and to contribute to finding solutions. The priorities for all actors, including humanitarian organizations and donors, should be to enable devolved decision-making; ensure direct access for legitimate community-led structures without reference to central governments; address structural inequalities; and invest in local capabilities and flexible

programming. Accountability towards the people humanitarian organizations seek to assist is a critical component of humanitarian engagement within adaptation and resilience-building processes.

Collaborating across sectors to strengthen the adaptive capacity of people and communities and the evidence base concerning successful adaptation work in conflict-affected settings. Operational collaboration across the humanitarian–development–peacebuilding nexus can help to harness the complementary nature of these organizations’ mandates and expertise with a view to helping the most vulnerable communities adapt to a changing climate and environmental degradation. Humanitarian and peacebuilding actors can help to sharpen the conflict and risk analysis

of development and climate actors in order to ‘de-risk’ and contextualize action in conflict settings, thereby supporting climate adaptation activities that meet the needs of conflict-affected communities. Investment in environmental and climate services, especially in remote areas and informal settlements, will enable anticipatory action and better responses, while empirical studies on successful and unsuccessful adaptation measures in conflict-affected areas are critical to ensure informed decision-making and programming. Drawing on traditional and historic knowledge of climate patterns when systematizing climate information will also be necessary in places where hostilities and resource constraints have rendered climate data infrastructure inoperable.

About the maps

This report contains multiple figures where information about the environment, climate, displacement or vulnerability is shown on maps. Sources for the information shown in these figures are given below.

Figure 2: Extreme precipitation trends in selected countries of interest

The figure «Extreme precipitation trends in selected countries of interest» overlays information about a number of water-related phenomena on a map of the Near and Middle East (i.e. Egypt, Iran, Iraq, Israel and the occupied territories, Jordan, Lebanon, Syria, Yemen and the Gulf Cooperation Council countries). Information is only included on those countries in which ICRC is operationally present, meaning that information on Bahrain, Qatar and the United Arab Emirates has been excluded and these countries are marked “not evaluated”.

The figure shows – for the countries where ICRC is operationally present – to what extent the IPCC expects a future increase or decrease in precipitation; coastal locations with extreme sea level rise risk; which areas in the region are affected by environmental degradation and desertification; and where tropical cyclones have made landfall between 1984 and 2021. The map is also colour-coded to show generalized population density in different areas of the region.

The sources of the information presented are:

Precipitation trends:

Annual rain trend is derived from the IPCC WGI Interactive Atlas²⁰³, which shows the trend 1980–2015 for total precipitation from the bias-adjusted WFDE5 ERA5 reanalysis. The trend is displayed where its magnitude is greater than ± 50 mm year⁻¹.

There is no masking out of locations with high uncertainty, as this data is visible but not available from the IPCC atlas. Trends over the seas are not included for visualization purposes.

Degraded land:

The degraded land visualization was generated using Trends.Earth, a tool to monitor land change using earth observations. It is produced by a partnership of Conservation International, Lund University, and the National Aeronautics and Space Administration (NASA), with the support of the Global Environment Facility (GEF). Trends.Earth calculates the proportion of land area degraded, corresponding to Sustainable Development Goal Target 15.3, and this is visualized by the hatched area in the infographic.

Cyclone tracks:

The data source of the cyclone tracks is the International Best Track Archive for Climate Stewardship project, which compiles cyclone data from multiple agencies and different weather satellites. We include cyclones over the period 2000–2021 using version v04r00 of the dataset.

Extreme sea level rise risk:

Displayed on the infographic are the locations where the historical 100-year return period extreme sea level was above 1.5 m between 1979–2014, based on model data. This is based on data provided in the supplementary information of Kirezci et al., 2020²⁰⁴.

Population density:

The population density map is provided by WorldPop, which estimates population based on an unconstrained top-down modelling using satellite data. These population density estimates

203 Iturbide et al., 2021.

204 Kirezci et al., 2020.

have been adjusted to match the corresponding official UN population estimates. Here, we defined low population as 0–50 people per km², medium as 50–500 people per km², and high as anything above 500 people per km².

Figure 3: Extreme temperature trends in selected countries of interest

The figure 'Extreme temperature trends in selected countries of interest' overlays information about a number of temperature-related phenomena on a map of the Near and Middle East (i.e. Egypt, Iran, Iraq, Israel and the occupied territories, Jordan, Lebanon, Syria, Yemen and the Gulf Cooperation Council countries). Information is only included on those countries in which ICRC is operationally present, meaning that information on Bahrain, Qatar and the United Arab Emirates has been excluded and these countries are marked “not evaluated”.

Extreme temperature visualization is based on data from HadISD, a global sub-daily dataset based on meteorological station measurements (the Integrated Surface Database dataset from the National Centers for Environmental Information). Established methods were used to calculate wet-bulb temperature from the HadISD data. Where daily maximum values were above thresholds deemed threatening to human survival, even of healthy adults, we flagged an extreme heat episode. The thresholds were 35°C for the wet-bulb temperature, and 54°C for the heat index, following the level 4 classification in Schwingshackl et al., 2021²⁰⁵ and references therein. The heat index combines temperature and humidity data to provide a ‘feels like’ temperature. A heat index of 54°C is considered extremely dangerous to human health.

This figure also includes population density. The population density map is provided by WorldPop, which estimates population based on an unconstrained top-down modelling using satellite data. These population density estimates have been adjusted to match the corresponding official

UN population estimates. As above, we defined low population as 0–50 people per km², medium as 50–500 people per km², and high as anything above 500 people per km².

Figure 4: Climate vulnerability

The figure 'ND-GAIN country vulnerability score in selected countries of interest' shows vulnerability to climate change in the countries in the region where ICRC operates. Bahrain, Qatar and the United Arab Emirates have been excluded because they are not countries in which ICRC is operationally present, while data is not available for the Gaza Strip and the West Bank. They are all marked “not evaluated”

Compiled by researchers at the University of Notre Dame, the ND-GAIN Index ranks both countries' vulnerability to climate change and their readiness to improve resilience based on 45 indicators. In this figure, the countries have been colour-coded according to their vulnerability score, with darker shades of red indicating more vulnerability.

Figure 7: Internal displacement by conflict and disaster in selected countries of interest

The figure 'Internal displacement by conflict and disaster in selected countries of interest' shows the number of internally displaced people in those countries in the region where ICRC is operationally present, as well as the numbers displaced by conflict and disaster respectively. The number of displaced people in each country – Bahrain, Qatar and the United Arab Emirates excluded – is represented by colour-coding per country, with darker colours indicating higher numbers. The cause of displacement is shown as bar graphs. The source of data is the Internal Displacement Monitoring Centre's Global Internal Displacement Database as of 2022.

205 Schwingshackl et al., 2021.

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