



# Regional Assessment Report on disaster risk reduction in the Arab region 2021

# R V R



**UNDRR**

UN Office for Disaster Risk Reduction

Regional Office for Arab States

# RVR

*Regional Assessment Report on disaster  
risk reduction in the Arab region  
2021*

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# Foreword



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Arab countries face a growing array of complex risks, interacting in a hyperconnected, rapidly transforming region with many opportunities for further growth and development but at the same time subject to challenges presented by drought, conflict, rapid urbanization, and internal displacement and migration. Climate-related hazards are increasing in both frequency and intensity. Non-sustainable consumption and production patterns increase the complexity of these risks. The COVID-19 crisis continues to unfold, demonstrating the global nature of systemic risks in all their multidimensional manifestations. This calls for novel risk governance arrangements to reduce these risks in an integrated and coherent manner.

Along with all United Nations Member States, the 22 Arab countries in 2015 adopted the Sendai Framework for Disaster Risk Reduction. It anticipated the rapidly changing and increasingly interconnected nature of risk, and the growing threat of natural and human-made hazards and related biological, environmental and technological hazards and risks. In making the logical connection between reducing risk and building resilience, the Sendai Framework provides the connective tissue for addressing region-specific challenges related to conflict, displacement, poverty, sustainable production and consumption patterns, climate change, rapid urbanism and financing sustainable development.

This edition of the Regional Assessment Report on Disaster Risk Reduction (RAR) is the first punctuation mark in the implementation of the Sendai Framework in the Arab region. It is influenced by the Global Assessment Report on Disaster Risk Reduction 2019 (GAR19), and offers an update on progress made in implementing the Sendai Framework's goal, targets and priorities, while identifying entry points for improving coherence with climate change adaptation and sustainable development. It also provides an analysis of region-specific systemic risk drivers, including a contextualized discussion on vulnerability, rapid urbanization, conflict and food security.

This report represents a major step towards a twenty-first century regional view of disaster risk and its reduction. The region is fast approaching the point where it may not be able to mitigate impacts from realized cascading and systemic risk, including the COVID-19 pandemic, superimposed on climate change, conflict, water scarcity, non-sustainable production and consumption patterns, and social vulnerability.

The urgency is self-evident. It demands a proportionate and immediate response from the Arab, and global, community.

I trust this RAR becomes a “go-to guide” for governments, policy experts, disaster risk reduction practitioners and all stakeholders in the Arab region, and proves helpful in supporting your efforts to reduce and prevent risk while strengthening resilience.

Our peace and prosperity depend on it.

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# Abbreviations and acronyms

<b>AAAA</b>	Addis Ababa Action Agenda
<b>AFED</b>	Arab Forum for Environment and Development
<b>AGIR</b>	Arab Geographical Information Room
<b>ANND</b>	Arab NGO Network for Development
<b>AWC</b>	Arab Water Council
<b>BBB</b>	build back better
<b>CCA</b>	climate change adaptation
<b>CRED</b>	Centre for Research on the Epidemiology of Disasters
<b>DRM</b>	disaster risk management
<b>DRR</b>	disaster risk reduction
<b>EM-DAT</b>	international emergency events database
<b>EWS</b>	early warning system
<b>FAO</b>	Food and Agricultural Organization of the United Nations
<b>GAR</b>	United Nations Global Assessment Report on Disaster Risk Reduction
<b>GBV</b>	gender-based violence
<b>GDP</b>	gross domestic product
<b>GIS</b>	geographic information system
<b>GRAF</b>	Global Risk Assessment Framework
<b>HFA</b>	Hyogo Framework for Action 2005–2015: Building the Resilience of Nations and Communities to Disasters
<b>IDP</b>	internally displaced person
<b>ILO</b>	International Labour Organization
<b>IOM</b>	International Organization for Migration
<b>IPCC</b>	Intergovernmental Panel on Climate Change
<b>ISDR</b>	International Strategy for Disaster Reduction
<b>ITU</b>	International Telecommunications Union
<b>NAP</b>	national adaptation plan
<b>NGO</b>	non-governmental organization
<b>NUA</b>	New Urban Agenda
<b>OCHA</b>	United Nations Office for the Coordination of Humanitarian Affairs
<b>ODA</b>	official development assistance
<b>OECD</b>	Organisation for Economic Co-operation and Development
<b>RICCAR</b>	Regional Initiative for the Assessment of Climate Change Impacts on Water Resources and Socio-Economic Vulnerability in the Arab Region



<b>ROAS</b>	Regional Office for Arab States
<b>SDG</b>	Sustainable Development Goal
<b>Sendai Framework</b>	Sendai Framework for Disaster Risk Reduction 2015–2030
<b>SFM</b>	Sendai Framework monitor
<b>SIDS</b>	Small Island Developing States
<b>2030 Agenda</b>	Transforming our World: The 2030 Agenda for Sustainable Development
<b>UN DESA</b>	United Nations, Department of Economic and Social Affairs
<b>UNDP</b>	United Nations Development Programme
<b>UNEP</b>	United Nations Environment Programme
<b>UNESCO</b>	United Nations Educational, Scientific and Cultural Organization
<b>UNESCWA</b>	United Nations Economic and Social Commission for Western Asia
<b>UNFCCC</b>	United Nations Framework Convention on Climate Change
<b>UN-Habitat</b>	United Nations Human Settlements Programme
<b>UNHCR</b>	Office of the United Nations High Commissioner for Refugees
<b>UNICEF</b>	United Nations Children’s Fund
<b>UNDRR</b>	United Nations Office for Disaster Risk Reduction (formerly UNISDR)
<b>WHO</b>	World Health Organization
<b>\$</b>	United States dollar

# RAR-Arab States

## A guided tour

In adopting the 2030 Agenda for Sustainable Development (2030 Agenda), the Paris Agreement of 2015, the Sendai Framework for Disaster Risk Reduction 2015–2030 (Sendai Framework, or SFDRR) and the New Urban Agenda (NUA) of 2016, Arab States identified preventing new risk, reducing existing risk and strengthening resilience as central to regional efforts to realize sustainable development pathways in the twenty-first century.

Inspired by recent developments in the risk and development agendas, including growing uncertainty in estimating vulnerability and risk – partly due to complex, cascading and emerging systemic risks – and against increasing regional conflict, fragility, displacement and climate change, the Regional Office for Arab States (ROAS) of the United Nations Office for Disaster Risk Reduction (UNDRR) embarked on an ambitious endeavour to develop a Regional Assessment Report in 2021 (RAR-Arab States). This sought to provide an understanding of the risks and progress in risk reduction in the region, and highlight the key issues and challenges. Such an understanding is essential to Arab States’ efforts to meet the 2030 Agenda target of achieving sustainable development and building inclusive resilient cities, in part, by adapting to climate change and reducing disaster risk, while leaving no one behind and reaching the furthest behind first. A risk-informed approach to development is essential to ensure the sustainability of investments and efficient resource use. This is particularly pertinent during the COVID-19 pandemic, when countries, including Arab States, are suffering from fiscal constraints due to the slowdown in the global economy, coupled with rising unemployment and increased demand on public revenues due to the increased need for social protection.

This is a first attempt to bring together disaster risk reduction (DRR), climate change adaptation (CCA), urbanism and Sustainable Development Goal (SDG) topics in a coherent manner in the region, albeit from a DRR perspective. It accounts for emergent approaches and risks, recognizing the large degree of uncertainty characterizing the period we live in, and the associated cascading and systemic risks within and across natural, health, financial, environmental, economic and social systems. It is envisaged this will signal the beginning of a process of RAR reports, with those in the future focusing on priority region-specific areas identified in this RAR. While this work has a regional scope, the RAR-Arab States recognizes that risk management requires global cooperation and risk governance mechanisms, given the interdependency of systems.

### **Prime audience**

The Sendai Framework emphasizes that risk is everyone’s business, identifying the need to engage all society, all State institutions. Risk must be understood in broad terms: contextually, geographically and temporally. The framework recognizes that the private sector is key to unlocking the scale of investment required to build resilience; and that the scientific and technological communities have a crucial role in this process. In particular, it puts the onus on all of us to understand the nature of risk; that death, loss or damage (impacts that ARE the disaster) are a function of the context of hazard, vulnerability and exposure.

RAR-Arab States recognizes that DRR, particularly a coherent approach that links with the SDGs and the Paris Agreement, is more efficiently and safely realized by adopting a whole-of-society approach. Hence, RAR-Arab States showcases DRR practices from local and national governments, the private sector and planners, local communities, non-governmental organizations (NGOs), United Nations agencies, and women and youth organizations.

Further, RAR-Arab States provides guidance and recommendations that may be used by all stakeholders with a role in developing, implementing and monitoring DRR strategies, policies and programmes. By stressing an integrated approach for DRR, partly by identifying entry points with other important frameworks, including the NUA, the SDGs and the Paris Agreement, RAR-Arab States can be also used by those working on sustainable development, CCA, inclusive urbanism and conflict mitigation. These actors include local and national governments, the private sector and planners, United Nations agencies and donors, NGOs, civil society organizations (CSOs), women, youth, old people, persons with disabilities, and internally displaced persons (IDPs) and refugee organizations.

### **Baseline of risk reduction practices in 2020**

RAR-Arab States provides a baseline on regional knowledge regarding: (a) trends and patterns of disaster risks, including emerging systemic risks; (b) regional progress in DRR; (c) contextualization of the importance of coherence between the three international agendas on climate change, DRR and sustainable development; (d) vulnerabilities to and capacities in DRR; (e) urbanization trends and urban resilience; (f) disaster preparedness and risk reduction in Arab countries affected by conflict and displacement; (g) food security risks under growing water scarcity; and (h) creating an enabling environment for risk reduction. It does so while identifying the main gaps and opportunities in DRR practices in the region.

### **Complex, cascading and emerging systemic risks**

Traditionally, risk assessments and disaster risk management (DRM) have adopted a siloed hazard-by-hazard approach, with individual actions proposed and executed. Today's interconnectivity and interdependence at social, economic, health, environmental, natural and financial levels necessitates a multidimensional view to assess disaster risk. More importantly, interactive relationships within and between these systems must be accounted for. In this sense, RAR-Arab States aims to go beyond the direct impacts an event can cause on a component, to explore its cascading systemic effects at local, national and regional levels – while also recognizing the global impact of certain hazards (for example, climate change, pandemics) and the need for global risk governance mechanisms.

The Sendai Framework expanded the list of hazards that need to be considered, from natural ones to those with biological, technological and anthropogenic causes. To support comprehensive implementation, the Global Risk Assessment Framework (GRAF) aims to promote a systems-based approach to DRR, integrating the expertise from multiple disciplines and helping develop risk-informed decision-making – one whose pillars are the consideration and understanding of the multidimensional nature and dynamic interactions of disaster risk. Inspired by this innovative approach to emerging cascading and systemic risks, RAR-Arab States references the complex and dynamic nature of systemic risk, and the COVID-19 crisis and emerging responses to it at local, national and regional levels.

To this end, chapter 1 identifies seven systemic risks, some of which are discussed in detail in later chapters, namely: rural/agricultural risk with rising food insecurity; systemic risk in a rapidly urbanizing region; overdependence on natural resource extraction and non-sustainable consumption and production patterns; the COVID-19 pandemic; cyber risk in cities with advanced infrastructure systems; emerging nuclear energy risks; and the climate change-disasters-conflict-migration nexus.

### **Identifying progress and challenges in effecting shift from disaster management to disaster risk management**

DRM practices in the Arab region have traditionally focused on disaster management, with emergency response agencies acting as the focal point for DRM and risk reduction. While this began to change due to increasing capacity and awareness during implementation of the Hyogo Framework for Action (HFA) 2005–2015, challenges remain, related to cross-sectoral and multi-stakeholder coordination, mainstreaming of DRR considerations at sectoral and local levels, collating disaggregated data for hazards, vulnerabilities, risks and losses, and developing people-centred multi-hazard early warning systems (MHEWS), among others. RAR-Arab States reviews the main progress in implementing the HFA and the Sendai Framework, and identifies areas where future effort should be directed to effect the shift from a siloed hazard-by-hazard approach to DRM towards the development, adoption and implementation of coherent, multi-hazard, systemic risk reduction strategies.

Chapter 2 introduces the wider context of the Sendai Framework as one of a group of key international agreements adopted by United Nations Member States in 2015 and 2016 to achieve sustainable development that leaves no one behind and endeavours to reach the furthest behind first. Regional progress in DRR is reviewed at regional, national, sectoral and local levels; and areas where future effort should be directed to effect the desired change in DRR practices identified.

### **Impetus for regional coherence between disaster risk reduction, sustainable development and climate change mitigation and adaptation efforts**

The fragility in the region is shaped by the unique situation of linked challenges of water scarcity, drought, food insecurity, population growth, social vulnerability, rapid urbanism, low resilience levels and conflict, all of which are being exacerbated by climate change. An integrated coherent approach is required in implementing the three primary documents of the post-2015 development agenda, namely the Sendai Framework, the 2030 Agenda and the Paris Agreement, in order to address the myriad problems, particularly in a region with a large financing gap for sustainable development and related challenges. The Sendai Framework emphasizes risk-informed decision-making through open disaggregated data sharing for gender, age, displacement status and disability. Disaggregated data along socioeconomic considerations are also important for ensuring coherence with sustainable development, CCA, inclusive urbanism and other international agendas. RAR-Arab States reviews regional opportunities for strengthening the alignment of the three global agendas by examining their common objectives and identifying synergies and entry points for integration of their activities. This will help regional efforts for coherent resilience building to achieve sustainable development.

Adequate, sustainable financial support for efforts from multi-sources, public and private, international and national, is crucial for efficient and successful implementation of DRR strategies. RAR-Arab States assesses innovative, emerging financing strategies at national and international levels, from public and private sources. RAR-Arab States recognizes that adopting such schemes is both a tool for successful implementation and an entry point to ensure coherence with other initiatives and frameworks, including CCA, sustainable development and inclusive urbanism. It calls for strengthening technology development and transfer and capacity-building support that is frequently critical for effecting innovative financing schemes.

Chapter 3 identifies entry points for building coherence among the three agendas, together with national and local examples, including ecosystem protection and management that engages vulnerable people, addressing gaps in disaggregated data and risk information, climate change national adaptation plans that incorporate sustainable development and DRR considerations, innovative financing for building coherence, and capacity-building for coherence and financing.

### **Addressing the differentiated vulnerabilities and capacities in climate change mitigation and adaptation and disaster risk reduction**

The region has among the highest levels of wealth concentration and income inequality worldwide. Further, it has recently recorded the only increase in extreme poverty globally. Despite periods of positive economic growth, incomes of the poor have not improved much. The regional unemployment rate is among the highest globally, and almost double the world average. Informal employment is also high. The Arab population is diverse, triggering a differentiated experience of inequality, poverty, climate change, disaster risks and migration. RAR-Arab States reviews the structural drivers and impacts of climate change and disaster risks in the region with respect to vulnerable population groups. These groups, rural or urban, consist of women, children, informal workers, youth, older and indigenous persons, those with disabilities, migrants and refugees. RAR-Arab States examines the capacities of these vulnerable groups in building community resilience.

Chapter 4 reviews vulnerability to climate change and disaster risk, including the relationship with distress migration, within the sustainable development paradigm. Recognizing the heterogeneity of populations, both the drivers of vulnerability and impacts in relation to different population segments, sectors, occupations and geographies are analysed. Drawing on an analysis of progress and lessons from good practices at regional, national and community levels, the chapter identifies areas for sustainable reduction in vulnerabilities, resilience building and enhancement of capacities of different population groups to climate change, disaster risks and distress migration. Throughout, the analysis is underscored by a nexus approach that addresses the connectivity between issues and bridges the humanitarian and development agendas.

## **Urban resilience and urban infrastructure**

Cities in the region face a multitude of challenges and increasing vulnerabilities associated with patterns of urbanization and unprecedented rates of population growth. Understanding and addressing urban vulnerabilities and building effective resilience strategies to reduce disaster risks is recognized as an important step to achieve sustainable development and build inclusive cities that leave no one behind. RAR-Arab States identifies developing urban risk disaggregated information and improving coordination across partnerships and multiple stakeholders and sectors as two main opportunities for advancing risk-informed sustainable urban development in an efficient yet safe manner. Other enabling factors include: improved participatory and inclusive urban governance that engages and accounts for the differentiated needs, vulnerabilities and capacities of women, youth, the elderly, persons with disabilities and migrants, refugees and IDPs; strengthened local support from multiple public and private stakeholders at national and local levels; and strengthened capacity at local level. Securing finance for city resilience building remains a significant challenge, where stronger engagement from cities and international actors with the private sector is much needed.

Chapter 5 reviews the drivers of urbanization and their interaction with other disaster risk factors, including weak governance, poverty, environmental degradation, conflict, displacement and migration, and unchecked urban expansion, with emphasis on the urban informal settlement growth rates that are a clear manifestation of inequalities in cities. It discusses the pressures that conflict and climate change are exerting on existing urban infrastructure already overburdened due to rapid urbanization rates. The wider context of the New Urban Agenda is introduced, and its linkages and interactions with the other post-2015 sustainable development, climate change and DRR agendas. Examples are provided of Arab cities' efforts to build urban resilience through developing various enabling environments.

## **Strengthening the case for disaster risk reduction in fragile and conflict settings**

Traditional arguments focused on the value of DRR and resilience-building investments fail to appeal to stakeholders in environments with significant resource constraints or where resources are allocated to conflict mitigation or responding to conflict fallout. RAR-Arab States identifies strategic opportunities to make the link between DRR and conflict over key regional issues such as water scarcity, flooding, rising sea levels and unsustainable temperatures. It aims to effect change in the mindset of stakeholders to recognize DRR as central to safe, effective and efficient use of investment resources, rather than an add-on considered after policies have been developed. RAR-Arab States calls for revitalizing arguments for DRR interventions by linking them to operational realities across all stages of the DRR cycle, including prevention, mitigation, response preparedness, and response and recovery based on build back better (BBB) principles; for example, leveraging information provided by peacebuilding actors, the DRR community can better position their interventions to reduce drivers of conflict in the region, thereby increasing its appeal. RAR-Arab States also seeks the development of evidence to strengthen the case for DRR in conflict contexts and the return on investment through the creation of case studies and key advocacy messages for use with governments and donors. Finally, RAR-Arab States calls for developing context-specific arguments for settings where non-traditional actors are major powerbrokers and where governance systems are ruptured or non-responsive to community needs. This necessitates exploration of processes to decentralize DRR in non-permissive environments away from national stakeholders, while also generating localized DRR responses.

Chapter 6 analyses the interface between disaster, conflicts and fragility, outlining overlaps in drivers and consequences, and the compound and mutually reinforcing effects when disasters and conflicts unfold concurrently. Examples and experiences are presented from across the region highlighting the complex relationship between fragility, conflict, and disasters at regional and national levels. Specific thematic areas related to disaster, conflict and fragility relevant to the region are discussed, namely the identification of regionally and nationally relevant policy hooks between DRR and conflict policy architecture, the opportunities and constraints in strengthening the traction of traditional DRR with national stakeholders, ways to increase collaboration between peacebuilding and DRR actors, the importance of understanding typologies of conflict in the identification of strategic opportunities, and the centrality of data in ensuring an evidence-based approach.

## **Building food security in the age of water scarcity**

The number of poor people suffering from hunger has continued to increase in recent years, with natural hazards and human-made disasters considered among the main reasons behind the trend. Water scarcity, a structural prevailing condition in the region that due to climate change is expected to get worse, presents a critical risk multiplier that exacerbates vulnerabilities and adversely impacts food security. RAR-Arab States identifies and discusses the systemic nature of the hazards and risks related to food security, and calls for strong coordination among different sectors to ensure policy coherence. RAR-Arab States seeks development of reliable information on aspects linked to disaster risk

and food security, and investment in food security and nutrition information systems, as a key for informing anticipatory actions. RAR-Arab States also calls for the design of multi-hazard, people-centred early warning systems to account for multiple risks, capitalize on science, technology and innovation, build on and complement existing systems and involve all relevant stakeholders.

Chapter 7 introduces the four elements of food security, namely availability, access, utilization and stability, and discusses their main trends in the region. It presents the impact of the main hazards related to food security – drought, floods and flash floods, land degradation, transboundary animal and plant pests and diseases, and economic shocks – on the pathways of these four food security elements. Specific recommendations to address each main hazard are put forward.

## **Towards a contextualized enabling environment in the Arab region**

The Sendai Framework calls on governments to adopt and implement national and local DRR strategies that meet its essential elements and are aligned with its goals and principles (Target E). Fulfilment of Target E is a fundamental step for governments to achieve all the other targets of the Sendai Framework by 2030 and move towards good governance of systemic risks that incorporates the framework's broadened risk scope. This requires integration across different sectors and levels of government, engagement with civil society and the private sector, and contemplation of different time frames to address current and emerging risks. RAR-Arab States identifies and discusses challenges and requirements for an environment that enables Arab Member States to develop and effectively implement national and local DRR strategies and plans, including requirements for technical support systems and resources.

Chapter 8 reviews regional practices and challenges encountered in creating an enabling environment for coherent and integrated risk governance at national and local levels. Regional efforts for supporting enabling environments, including institutions and initiatives for risk information, technology and data sharing, are considered. The chapter evaluates the main practices for creating national enabling environments, namely through legal and institutional frameworks, people-centred approaches, technology and data sharing, incentives for investment, and mainstreaming with sustainable development and climate change planning. It then presents challenges and opportunities for creating enabling environments at local level, and discusses entry points for an enabling environment in conflict settings.

## **Collaborative methodology**

RAR-Arab States was developed through an extensive set of partnerships with international organizations, governments, and academic and research institutions. The RAR aims to become an ongoing process of evidence generation and policy engagement, and a product – in the form of a report series published by the UNDRR ROAS. The process contributes directly to better access to risk information for decision-making, and identifies practices that can be employed at local, national, and regional levels.

The collaborative methodology was achieved through the RAR Editorial Committee (RAR-EC) comprising lead authors, co-authors and editors from the regional offices of the Food and Agriculture Organization of the United Nations (FAO), the International Organization for Migration (IOM), the International Telecommunication Union (ITU), the United Nations Development Programme (UNDP), the United Nations Environment Programme (UNEP), the United Nations Educational, Scientific and Cultural Organization (UNESCO), the United Nations Economic and Social Commission for Western Asia (UNESCWA), the United Nations Human Settlements Programme (UN-Habitat), the United Nations Entity for Gender Equality and the Empowerment of Women (UN WOMEN), the World Health Organization (WHO) and the World Food Programme (WFP). The regional organizations ARAB-STAG, the Arab Network for Environment and Development (RAED), the Arab Major Children and Youth Group for DRR, and the Arab Water Council (AWC) were also represented.

The RAR-EC, chaired by UNDRR ROAS, was responsible for conceptualizing the scope and content of the RAR, and contributing to its drafting, finalization, launch and wider dissemination as agreed under the action plan. It also provided technical advice and edits, and reviewed the chapters and sections. The final report was subject to an UNDRR review and peer review processes.



# Overview of disaster risk in the Arab region

## 1.



## A. Introduction

Understanding disaster risk has been acknowledged by decision-makers and policymakers as a key priority. Over the past two decades, countries in the Arab region have improved their knowledge on the frequency and severity of natural hazards, and the current exposure captured by the number of people living in certain areas, the total constructed area of a region and the economic value of the built infrastructure within a given city or country. To a lesser extent, countries also performed vulnerability analyses (for one or more dimensions) yielding qualitative and/or quantitative results of the damage susceptibility to an individual external shock, natural or human-made, of a community, a system or the built environment. However, with the increasing complexity and interaction of human, economic and political systems (for example, the international financial system, communications and information technology, trade and supply chains, megacities and urbanization) and natural systems (marine, land and air), risk becomes increasingly systemic.<sup>1</sup> While the era of hazard-by-hazard risk reduction is over, few countries are directing attention to understanding and addressing the large-scale dynamic risks that cut across the economic, social and environmental dimensions of sustainable development.

This chapter presents a regional context of disaster risk, with an analysis of the risk trends, based on available data from global and national disaster loss databases. The emerging regional systemic risks are also reviewed.

<sup>1</sup> UNDRR, 2019a.

## 1. From disaster management to disaster risk management

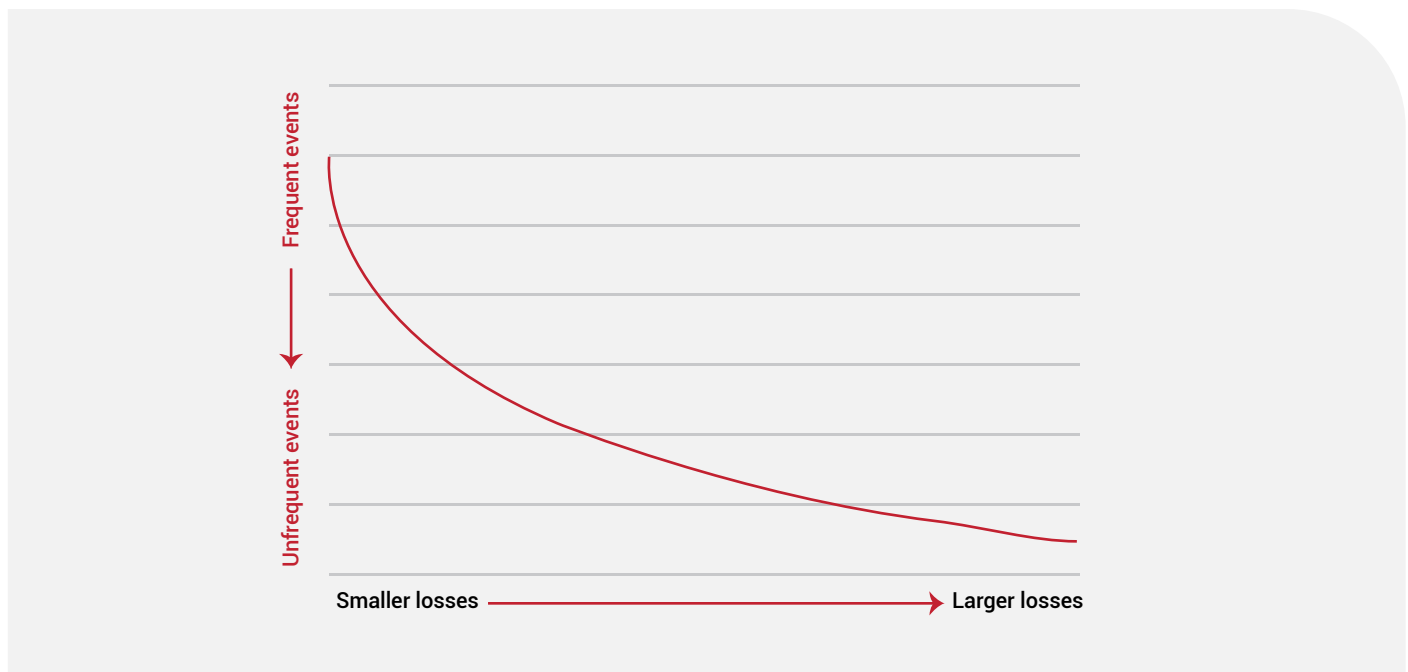
A balanced portfolio of DRM consists of: (i) prospective risk management strategies to prevent risk from accumulating during new investment and development projects, including through land use and urban planning, and to build codes for new structures, networks and systems; (ii) corrective risk management strategies to reduce existing risk, including through resilience building and retrofitting for existing structures, networks and systems; and (iii) compensatory risk management strategies to secure the funds necessary for the recovery and reconstruction phases, as in the case of the insurance instruments. The three approaches face considerable challenges in the region.

In the past two decades, a paradigm shift in DRM has occurred at global level, from managing disasters to managing disaster risk using balanced DRM portfolios. Through the design and implementation of interventions, retrofitting plans and financial disaster planning, certain types of losses have been avoided, and the costs of residual ones reduced. While the region has fallen behind in effecting this shift, it now faces the additional challenge of managing increasingly complex system risks,<sup>2</sup> which require a stepped-up effort to reduce risk before disasters occur.

## 2. Hazard by hazard disaster loss functions

Stakeholders recognize that new investments have better rates of return if they account for climate and disaster risks; existing investments, however, did not necessarily do this. For these to be effectively managed, disaster losses need to be quantified to contribute to the prioritization of DRR efforts.<sup>3</sup> Determining the consequences in terms of fatalities, internally displaced people and/or economic loss, is not sufficient for managing disaster risk. The outcomes of probabilistic comprehensive risk assessments are usually loss exceedance curves that relate expected losses in one or more dimensions, such as economic losses, fatalities or affected people, with their likelihood (for example, in terms of the return period) in order to inform stakeholders and decision-makers (see figure 1.1 for a schematic representation for one such relationship). These types of analyses are yet to be carried out in the region.

Figure 1.1 Example of a loss exceedance curve



2 UNDRR defines a complex system as one exhibiting emergent properties that arise from interactions among its constituent parts in which relational information is of critical importance to integrate the system. To understand a complex system, it is necessary to understand the dynamic nature of the relationships between each of the parts. In a complex system, it is impossible to know all the parts at any point in time. See UNDRR, 2019a.

3 Ordaz, 2000; Velásquez, and others, 2014; UNDRR, 2017a.

The above models that describe single system vulnerabilities on a hazard-by-hazard basis do not help decision-makers understand and prepare for systemic risks. Indeed, across the world, policymakers face this with the COVID-19 pandemic.<sup>4</sup> By contrast, we do not have models that are able to describe the degree of risk expansion within interrelated complex systems, even at global level.<sup>5</sup>

### 3. Disaster risk reduction and acceptable risk

Acceptable risk levels are defined in a range of sectors, such as the nuclear and oil industries, and air and terrestrial transport networks. However, whether there should be an explicit acceptable risk threshold is a question that still has no answer. If a threshold is to be set, a multidisciplinary approach is required, one that addresses social, economic and moral issues. Most decisions about risk thresholds are made implicitly by, for instance, choosing a return period for the earthquake design forces in building codes, or defining the height of a defence wall based on the return period of the wave height. While there is consensus that current risk levels are unsustainable, acceptable risk thresholds are not universally agreed. The emergence of complex systems further complicates risk governance, due to: (i) difficulty in attributing accountability; (ii) deep uncertainty surrounding triggers and cascading consequences; and (iii) limited understanding of the systemic nature of many risk contexts.<sup>6</sup>

### 4. Disasters as a development failure

Disasters are socially constructed and represent a development failure. According to the Intergovernmental Panel on Climate Change (IPCC),<sup>7</sup> the frequency and intensity of climatic events is set to increase, and hence, consideration of climate change in development and DRM agendas is mandatory. An intersecting point between current and future risk is that mitigation of existing vulnerability can be considered an effective CCA measure. Addressing the increased severity and frequency of weather-related events is now believed to be a political responsibility. This highlights the need for risk-informed development, based on transparent assessment of trade-offs, that considers the costs and benefits of preventing, reducing and managing disaster risks.

### 5. Emerging systemic risks

In our hyperconnected world, triggering events can simultaneously affect multiple, complex systems and geographical regions. The breakdown of entire systems, not only their individual components, must now be considered. The COVID-19 pandemic has provided strong evidence of how a biological hazard, in a short time, may affect, directly and indirectly, all countries around the world. From health to transport, and agriculture to tourism sectors, the virus has had a significant impact in the Arab region, with more than 8 million people potentially pushed back into poverty and food insecurity.<sup>8</sup>

Against this background, the Sendai Framework has expanded the list of hazards that need to be considered, from natural ones to those with biological, technological and anthropogenic causes. The GRAF<sup>9</sup> aims to provide for a systems-based approach to DRR, integrating expertise from multiple disciplines and contributing to the development of risk-informed decision-making based on an understanding of the multidimensional nature and dynamic interactions of disaster risk.

### 6. Systemic risk and the global development agendas

Global development agendas now explicitly incorporate DRM and disaster reduction considerations. Further, these agendas recognize that services that come from nature are neither free, nor infinite, and that scientific and technological progress, without the political will to bring about a paradigm change, will not achieve sustainable development.<sup>10</sup> Achieving the SDGs requires a transparent and inclusive assessment of the risks, costs and benefits of the development choices to be made. Progress in the Arab Region varies; countries like the United Arab Emirates, Algeria and Morocco

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4 UNDRR, 2019a.

5 Ibid.

6 Ibid.

7 Seneviratne and others, 2012.

8 ESCWA, "New ESCWA brief: 8.3 million people will fall into poverty in the Arab region due to COVID-19", 1 April 2020.

9 <https://www.preventionweb.net/disaster-risk/graf#tab-1>.

10 IDB and Acclimatise, 2020.

report a good performance, achieving up to two thirds of the SDGs, but less developed countries affected by conflict, such as Yemen, Iraq and the Syrian Arab Republic, lag behind.<sup>11</sup>

Eradicating poverty and promoting resilience are common goals across the three main global agendas, with direct links with disaster risk. The urban and rural poor form the group disproportionately affected by disaster losses, especially for small and medium scale disasters that are proven to have, cumulatively, the same – or a larger – impact as extreme events.<sup>12</sup> In the Arab region, these types of events also act as main intensive risk drivers. While development gains have been made at regional level in terms of health, education and poverty eradication, these have not always been risk-informed and hence remain fragile. A single external shock can cause a setback affecting a large share of the population as the COVID-19 pandemic has shown.

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## **B. Natural, environmental, biological, chemical and technological hazards in the Arab region**

### **1. Introduction**

The region is prone to natural hazards,<sup>13</sup> some amplified and affected by climate variability and change. Small and medium impact localized events such as flash floods and landslides are seldom recorded in a systematic manner despite having mid- to long-term adverse impacts on affected populations. Other events, including earthquakes, sand and dust storms, droughts, locust infestations and tropical cyclones, affect larger, often transnational regions. The high-impact events tend to remain in the collective memory for a couple of generations.

### **2. Hydrometeorological and climatic hazards**

In the Middle East, less than 15 per cent of the population is exposed to medium and high levels of flood hazard;<sup>14</sup> however, the large concentration of people and assets within limited areas makes it a risk that requires attention. From 1970 to date, the total exposed value to floods has increased by a factor of three, while residential buildings, transport and communications infrastructure have accumulated.<sup>15</sup> Continuous urban expansion has required rapid changes in land use. More areas are covered with concrete and pavements, thereby reducing the natural absorption capacity of rainfall in many locations. This is reflected in an increasing number of flash floods in urban areas. A typical example is the 2009 Jeddah flooding, where accumulated precipitation exceeding 90 mm was recorded in less than four hours, equivalent to twice the annual average. This resulted in approximately 150 fatalities, and more than 8,000 houses damaged or affected in a southern zone of the city where most inhabitants were poor immigrant workers.<sup>16</sup>

Tropical cyclones generated in the North Indian Ocean basin can also make landfall in Arab countries such as Oman, Yemen, Somalia and Djibouti, with strong winds, storm surges and floods of varying degree. The 2007 Tropical Cyclone Gonu, for instance, affected some 20,000 people in Oman, causing more than \$4 billion in losses.<sup>17</sup> In 2018, Cyclone Sagar made landfall in Somalia, causing large economic losses, with damage to crops and livestock and the displacement of thousands of people.<sup>18</sup> Cyclone Kyarr in 2019 was the most intense storm recorded in the past 12 years. High waves and the storm surge disrupted road networks in the United Arab Emirates, highlighting the need to account for damages and disruptions in infrastructure systems that have a critical role in emergencies, acting as evacuation routes, and ensure a prompt response by primary agencies. Coastal locations in Yemen and Oman were also affected by strong winds and moderate storm surge<sup>19</sup> (figure 1.2 for historical tropical cyclones that have affected Oman).

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11 Luomi and others, 2019.

12 Marulanda, Cardona and Barbat, 2011; Velásquez and others, 2014.

13 DRR terms in this report adopt the open-ended intergovernmental expert working group on indicators and terminology, see United Nations General Assembly, 2016a.

14 Dabbeek and Silva, 2019.

15 De Bono and Chatenoux, 2015.

16 Youssef and others, 2016.

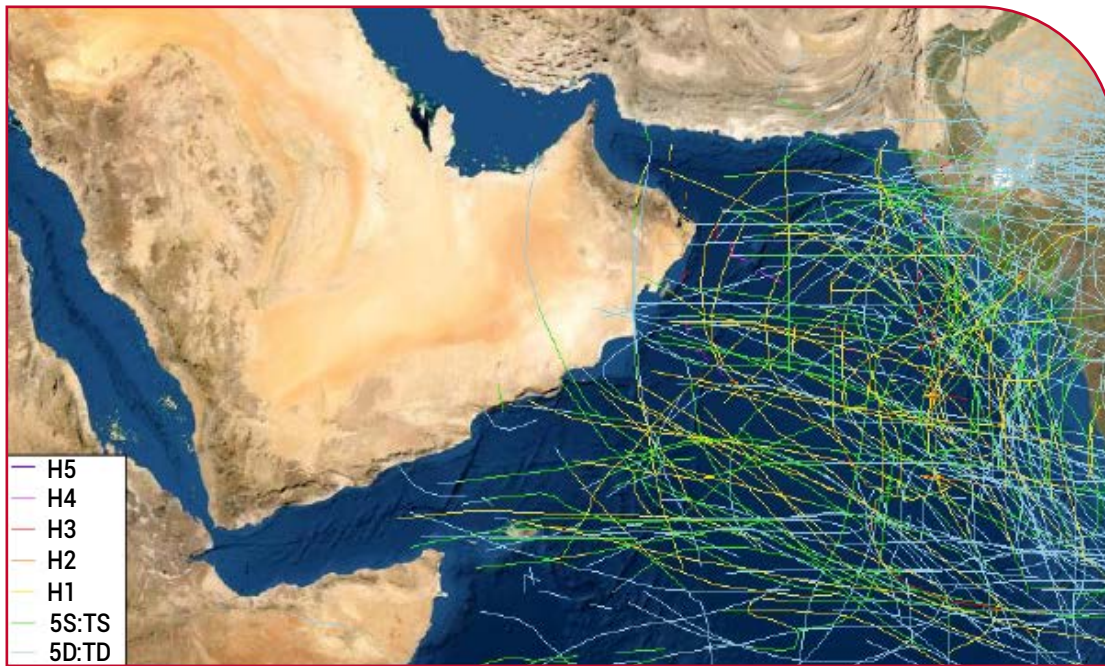
17 Fritz and others, 2010.

18 ACAPS, 2018.

19 Global Weather and Climate Centre, 2019.



Figure 1.2 Historical tropical cyclones in the region on the Saffir-Simpson scale (1881–2019)



Source: National Oceanic and Atmospheric Administration, 2020; NHC HURDAT data, see at <http://www.nhc.noaa.gov/pastall.shtml>; and IBTrACS data, see <http://www.ncdc.noaa.gov/oa/ibtracs>. Earthstar Geographics.

Note: The designations employed and the presentation of material on this map do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

Two of the 22 Arab countries, the Comoros and Bahrain, are Small Island Developing States (SIDS) and, as such, are recognized as facing considerable challenges related to DRM and disaster reduction. Climate change, mostly rising sea levels and droughts, is a permanent threat to their people and infrastructure, with most countries having limited space for relocation to reduce exposure. Simultaneously, increasingly severe and frequent storms impact large zones of the SIDS, pushing the response capabilities of local and national services beyond their limits.

Over the past 50 years, droughts in the region have had the largest cumulative impact in terms of death, affected people and economic losses, their frequency and severity shaped by climate variability.<sup>20</sup> They have caused considerable losses among the rural poor in Iraq, Morocco, the Syrian Arab Republic and Jordan, reflected in the decrease in land fertility, agricultural production and the loss of livestock and biodiversity.<sup>21</sup> The arid and semi-arid conditions in many parts of the region, combined with natural and anthropogenic causes, also lead to sand encroachment. Sand accumulation in coastal areas, along streams and on cultivated and uncultivated land, has caused damage to infrastructure, mostly roads and buildings, the loss of plantations, and a decrease in crop yields in countries such as Algeria.<sup>22</sup> Wildfires are a problem in Mediterranean countries; in Lebanon more than 1,200 wildfires have been recorded since 1981.<sup>23</sup>

From 1900 to 2011, 28 drought events were recorded across nine countries in the region, affecting 44 million people. Drought hazard data remain limited given the slow onset nature of the hazard, lack of a solid definition and insufficient measurement systems.<sup>24</sup>

20 CRED, 2020.

21 Van de Steeg and Tibbo, 2012; FAO, 2019a.

22 Boulghobra, Saifi and Fattoum, 2015.

23 CRED, 2020.

24 World Bank, 2014.



### 3. Geological hazards

The region is prone to geological hazards such as earthquakes, landslides and tsunamis. Studies have indicated that more than 30 per cent of the Arab population live in areas with medium and high earthquake hazard;<sup>25</sup> most urban centres and settlements within the Maghreb and Mashreq<sup>26</sup> regions lie close to seismically active areas. In the past 60 years, moderate and large earthquakes have destroyed urban areas in Algeria, Egypt and Morocco, and there are recordings of vast destruction caused by the ground shaking in Lebanon, the State of Palestine and the Syrian Arab Republic during the past 2,000 years. In highly urbanized contexts, managing earthquake risk must be a priority; a single event lasting a few seconds can transform the latent accumulated risk into fatalities, injuries, displacement and economic losses. Figure 1.3 shows the instrumental seismicity recorded in North Africa and Eastern Mediterranean, together with an earthquake hazard map depicting the peak ground acceleration (which is equal to the maximum ground acceleration occurring during earthquake shaking at a location) for the 500-year return period. Earthquake hazard for the region as a whole is defined as intermediate and high, despite several locations not recording seismic activity in the past 100 years.

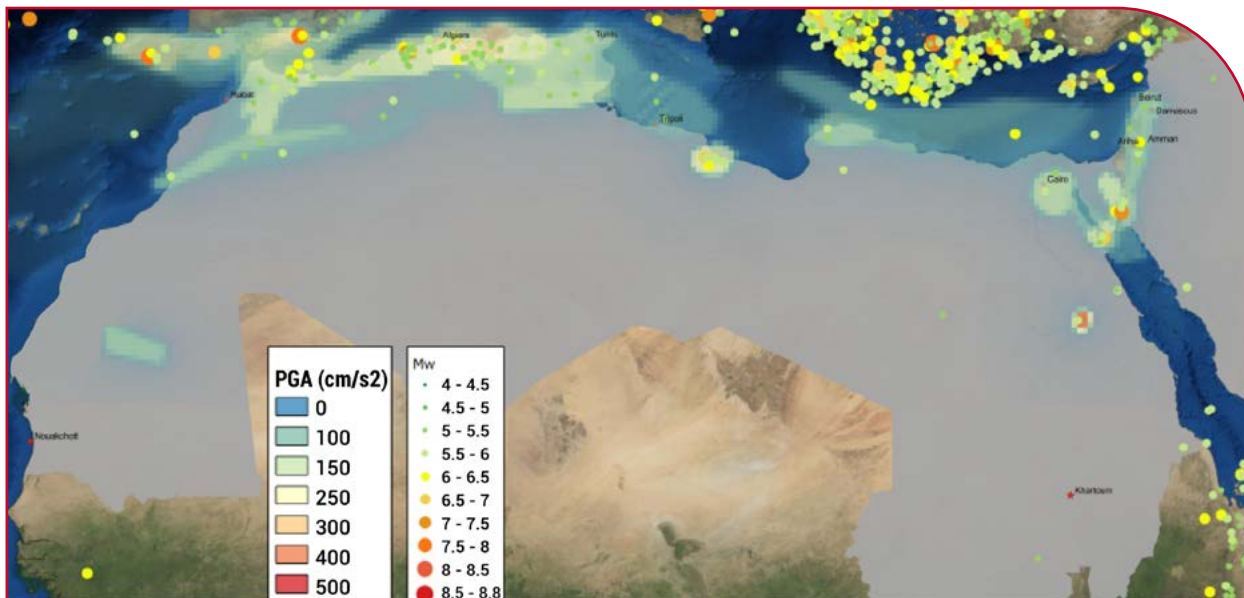
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25 Ordaz and others, 2014.

26 UNESCWA Maghreb countries are Algeria, Libya, Morocco and Tunisia; Mashreq countries are Egypt, Iraq, Jordan, Lebanon, the State of Palestine and the Syrian Arab Republic.



Figure 1.3 Historical seismicity and earthquake hazard map for the Arab region



Source: *Evaluación de Riesgos Naturales*, 2020.

Note: The designations employed and the presentation of material on this map do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

### Box 1.1 The 1960 Agadir earthquake, Morocco

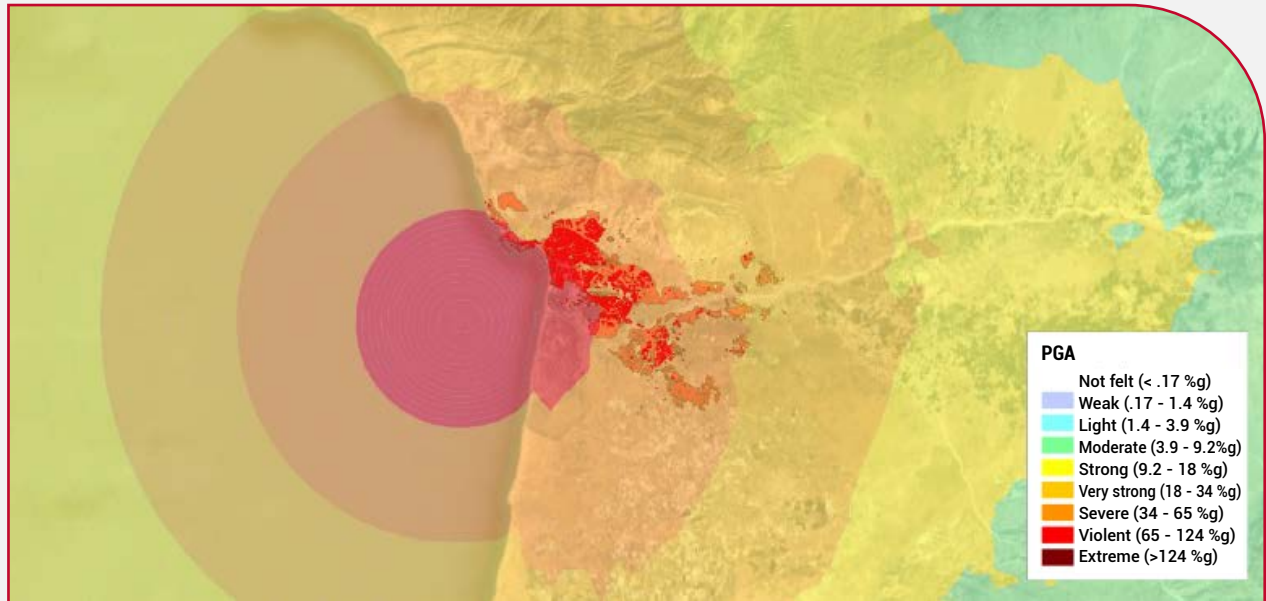
Agadir is the capital city of a prosperous region, and in 1960 was home to 36,000 people. Minutes before midnight on 29 February, a ground shaking lasting less than 20 seconds caused by an earthquake with moderate magnitude (Mw 5.8) led to the deaths of 15,000 and injured 12,000 more. Some 3,500 houses were destroyed and 20,000 people rendered homeless, with economic losses of about 60 per cent of the total exposed value. Although the city lies in an intermediate earthquake hazard zone, no recorded earthquakes since 1731 had resulted in low earthquake risk perception and a risk accumulation in the form of poorly built homes.<sup>a</sup>

Today, Agadir has a population of more than 400,000, and is normally an active domestic and international tourist destination. It has an important fishing industry and a port for exporting Moroccan goods. A seismic building code was utilized in the city's reconstruction for the design of new structures and the retrofitting of existing ones, under comprehensive urban planning that included abandoning the most affected areas. Despite this, unsound construction practices that pose a risk to inhabitants and the built environment remain.

Although another earthquake with a similar or larger magnitude could occur in Agadir, now a more highly populated city, a low risk perception remains among many of its inhabitants. Figure 1.4 shows the ground acceleration values of the 1960 quake superimposed on the built environment in the urban area. There are currently some 55,000 buildings and houses, and a simulation considering similar ground shaking intensities as in 1960 indicates that approximately 35 per cent of those would suffer moderate to severe damages, and more than 5 per cent would collapse. If these results are not comparable to the earlier losses in relative terms, in absolute terms the impact could be considerably larger. Although disaster risk is usually quantified in terms of losses, intangible effects such as human suffering should not be overlooked.<sup>b</sup>



Figure 1.4 Current exposure and PGA of the 1960 M5.8 earthquake in Agadir, Morocco



Source: United States Geological Survey (USGS), 2020.

Note: The designations employed and the presentation of material on this map do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

a Plufke, 1960.  
b Paradise, 2005.

Some countries are exposed to tsunamis triggered by earthquakes, even if they have not occurred in the recent past. Regional and global studies<sup>27</sup> indicate events in the Indian Ocean can cause tsunamis capable of reaching the Horn of Africa. For example, in December 2004, tsunami waves from the Sumatra earthquake reached the coast of Somalia, more than 10,000 km away, causing approximately 300 deaths, displacing 50,000 people<sup>28</sup> and damaging many fishing boats.

The tsunami hazard map for the 500-year return period in the region indicates coastal locations in Oman and Somalia are expected to have tsunami waves of up to 5 metres (figure 1.5). Countries with Mediterranean coasts, such as Egypt, Morocco and Libya, are also exposed to tsunami hazards. In addition, there are records of historical tsunamis in Beirut (551), and the destruction of ships and large recorded waves in Tripoli<sup>29</sup>. Along the Syrian coast, there are records of the withdrawal of the sea shoreline, or drawdown, after the 859 and 1202<sup>30</sup> earthquakes.

Active volcanoes in the region are mostly located in western Saudi Arabia and Somalia. The eruption of Jabal Yar Volcano in Saudi Arabia, close to the border with Yemen, was recorded in about 1810, with a relatively small Volcanic Explosivity Index (VEI2) but with lava flows. Landslides are small-scale disasters that occur in localized areas with particular geological and topographical characteristics.<sup>31</sup> Between 1981 and 2019 in Lebanon there were at least 75 landslides, and although they had a small to moderate impact, their cumulative effects may have been significant;<sup>32</sup> a lack of consistent records on landslides losses contributes to underestimation of disaster risk at regional level.

27 Norwegian Geotechnical Institute and Geoscience Australia, 2015; Kumar, 2008.

28 Tsunami Inter Agency Assessment Mission, 2005.

29 Darawcheh, 2000.

30 Sbeinati, Darawcheh and Mouty, 2005.

31 Centre for the Observation and Modelling of Earthquakes, Volcanoes and Tectonics, 2020.

32 CRED, 2020.

Figure 1.5 Tsunami run-up height for 500-year return period



Source: Norwegian Geotechnical Institute, Australia, Department of Industry, and Geoscience Australia, 2015.

Note: The designations employed and the presentation of material on this map do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

#### 4. Biological hazards

In the region, biological hazards of different types have been present. It has been affected by epidemics, mostly related to cholera and yellow fever. More recently, the COVID-19 pandemic has highlighted the complex systemic risks latent across health, social, economic and environmental systems. In addition, rainfall variations and increased vegetation can lead to locust infestations. Morocco, Libya and Tunisia are exposed to this hazard, with significant social and economic impacts. Heavy rains in Saudi Arabia in 2018 gave rise to several locust swarms in 2019. They remain an ongoing problem, affecting more than 20 countries and raising fears of food shortages. These countries are experiencing high levels of food insecurity, potentially impacting on more than 20 million people.<sup>33</sup>

#### Box 1.2 COVID-19 pandemic in the Arab region

All 22 Arab region countries have reported COVID-19 cases, the latest being Yemen, whose first case was confirmed on 9 April 2020.<sup>a</sup> Most have taken measures to minimize the impact of the coronavirus, such as closing borders, public places, schools and religious sites. However, the lack of universal health service coverage in many countries, together with the prevailing social fragility and high population density that is said to facilitate contagion, make the region in general ill-prepared for such an event.

Preliminary estimates by UNESCWA quantify the direct economic impact of the pandemic in the region as a contraction of \$42 billion of gross domestic product (GDP). Although countries such as the United Arab Emirates, Qatar, Saudi Arabia and Egypt have secured billions of dollars to boost their economies and encourage activity in critical sectors, most do not have the means to apply similar measures. Further, the enforced closure of sectors such as tourism in Tunisia, Morocco, Jordan and Egypt, where it accounts for about 10 per cent of their GDP, will be reflected in the loss of more than 1.5 million jobs. Many Arab countries in the Mediterranean region also have close geopolitical and commercial relationships with other European countries heavily affected by the pandemic, including Italy, France and Spain. For most countries in the region, COVID-19 has become an exacerbating factor for existing development challenges, thereby highlighting the importance of integrating biological hazards in DRR strategies using a systemic risk management lens.<sup>b</sup>

a UNDP, "Covid-19 in the Arab region". Available at <https://www.arabstates.undp.org/content/rbas/en/home/coronavirus.html>.

b UNESCWA, 2020a.

33 Benaim, 2020; FAO, "Desert Locust upsurge continues to threaten food security in Horn of Africa and Yemen despite intense efforts", 2020.

## 5. Chemical and technological hazards

The complex infrastructures of oil and hydrocarbon industries in the region are susceptible to failures during normal operations due to poor maintenance or external shocks. There have been advances in procedures for extracting, storing and transporting oil and gas, though there is a lengthy record of historical events that have resulted in spills and explosions.

During the 1991 Gulf War, more than 1 million m<sup>3</sup> of crude oil ended in the sea along Saudi Arabia's coastline.<sup>34</sup> In 2004, a poorly maintained boiler in a liquefied natural gas plant in Algeria exploded, killing 27 people.<sup>35</sup> The consequences of such events can reach beyond chemical and technological fields. They significantly impact on nature and the environment, affecting ecosystems and having social and economic repercussions. For instance, potable water can become contaminated, and in fishing communities, existing vulnerability to climate change and hydrometeorological hazards can be severely aggravated by water contaminated with chemicals, highlighting the need for a systemic approach to managing disaster risk.

There are several conventions for managing and transporting hazardous chemicals, including the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal, the Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade, and the Stockholm Convention on Persistent Organic Pollutants.<sup>36</sup> The control of major accidents and hazards in chemical and industrial factories forms part of DRR efforts across economic sectors, where specific regulations are developed to assess, reduce and manage residual risks, including the Control of Major Accidents and Hazards Regulations<sup>37</sup> and the Strategic Approach to International Chemicals Management.<sup>38</sup> The Beirut port explosion on 4 August 2020 is testament to the potential of major accidents to cause damage that can run into billions of dollars,<sup>39</sup> with a consequent impact on public safety,<sup>40</sup> thereby underlining the importance of risk governance and accountability.<sup>41</sup>

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## C. Exposure

The region's geographical and geological characteristics have driven Arab communities to build on coastal, mountain, valley and riverside locations because of the obvious benefits in trade, agricultural production, water access and communications. More than 90 per cent of the total population now lives on approximately 3 per cent of the land surface,<sup>42</sup> and this concentration of exposure<sup>43</sup> has been mostly overlooked. Further, since the 1950s, the regional economy has grown at a much higher rate than the population, resulting in the transformation and alteration of ecosystems, mostly to cope with food demand.<sup>44</sup> This has impacted on biodiversity and increased the exposure and vulnerability<sup>45</sup> to hazards, leading to high disaster risk levels. A paradigm shift is required to enable economic development to be considered a tool for achieving safe, inclusive and resilient communities that leave no one behind, and endeavour to reach the furthest behind first.

### 1. Exposure of the built settlements

Figure 1.6 shows the location of rural and urban built settlements across the region. Many capital and large cities such as Rabat, Algiers, Tripoli, Kuwait City and Muscat are located within kilometres of the shore. These coastal locations

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34 Linden, Jerneloef and Egerup. 2004.

35 Oil and Gas Journal, 2004.

36 The Hazardous Chemicals and Wastes Conventions.

37 Control of Major Accident Hazards Regulations 2015 (COMAH). Available at hse.gov.uk.

38 <https://www.saicm.org/>.

39 World Bank, "Beirut Rapid Damage and Needs Assessment (RDNA)", 31 August 2020 .

40 Abouzeid and others, 2020.

41 Fakh, 2021.

42 UNDP, Bahrain Center for Strategic and International Studies and Energy and UN-Habitat. 2020.

43 Exposure is defined as the situation of people, infrastructure, housing, production capacities and other tangible human assets located in hazard-prone areas, see United Nations General Assembly, 2016a.

44 UNDP, 2018a.

45 Vulnerability is defined as the conditions determined by physical, social, economic and environmental factors or processes that increase the susceptibility of an individual, a community, assets or systems to the impacts of hazards, see United Nations General Assembly 2016a.



increase the exposure of their populations and infrastructure to hazards, including storm surge, sand encroachment, coastal erosion and tsunamis. Slow onset hazards such as rising sea levels can also pose problems in the medium and long term, and should therefore be taken into account in social, economic and urban development plans.

*Figure 1.6 Location of built settlements in the Arab region*



Source: WorldPop, 2018.

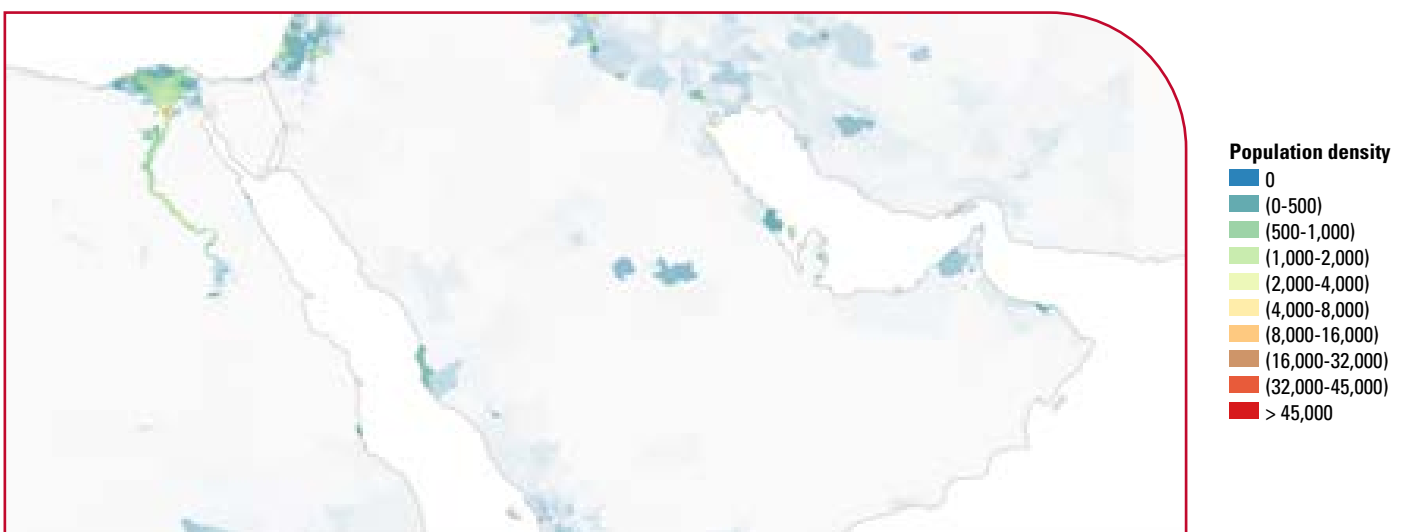
Note: The designations employed and the presentation of material on this map do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

## 2. Exposure of population

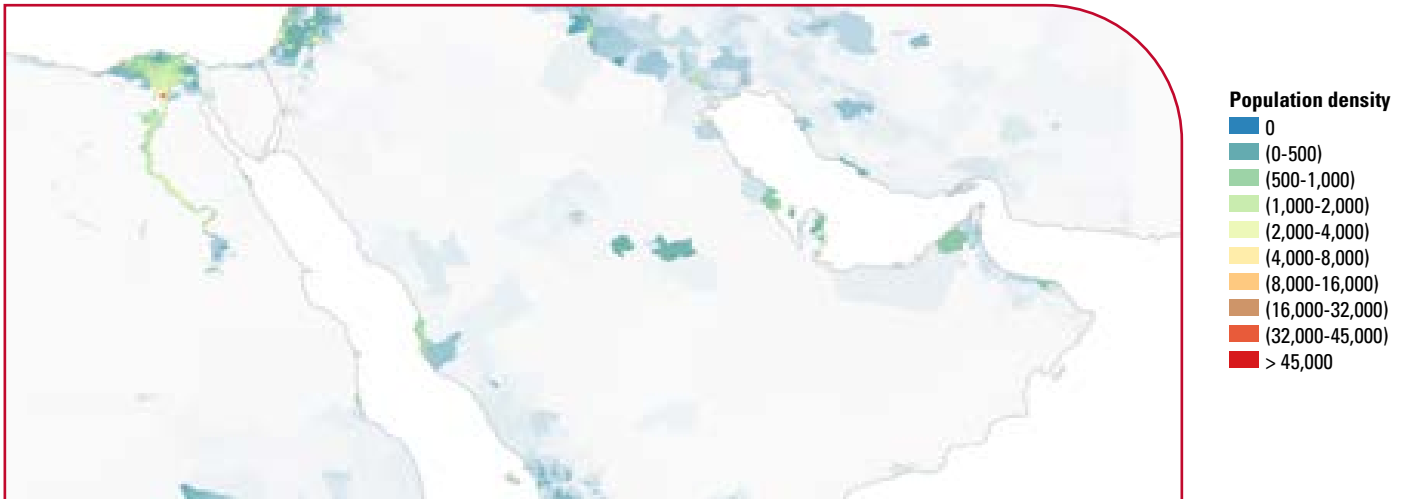
Figure 1.7 shows the population density in the northern Arabian Peninsula and eastern Egypt for the years 2000, 2010 and 2020, aggregated on pixels of 1x1 km. A significant increase in density can be observed in several places, but no major variations in the location, with new settlements appearing around previously existing urban centres. Growing populations in densely built areas put pressure on economic growth due to changes in the demand for goods and services in an environment with many constraints. These processes will continue to transform societies and economies in the region.

*Figure 1.7 Aggregated population density in 1x1 km cells, 2000, 2010 and 2020*

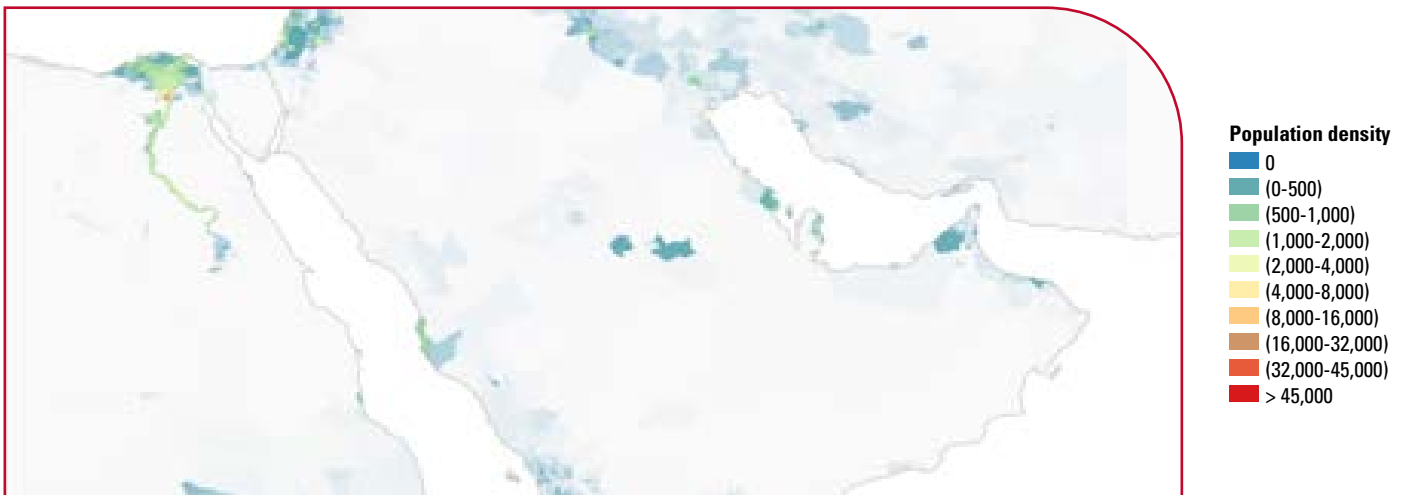
**2000**



**2010**



**2020**



Source: NASA, 2020a.

Note: The designations employed and the presentation of material on these maps do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

### 3. Exposure databases for the Arab region

Exposure databases have different resolution levels depending on available information, allocated resources and expected use. Relevant information may include main usage and the state of infrastructure, construction date and material, number of occupants and economic value. Since 2013, under the Global Risk Model framework,<sup>46</sup> a coarse-grain, multi-hazard exposure database was developed for urban regions, including population, buildings and local infrastructure. In 2015 and 2017, this database was refined and extended to provide coverage at rural levels. The aim is to raise awareness and inform DRM and development policy at national level. In many cases, particularly in the least developed countries (LDCs), the data filled a gap in exposure knowledge and assessments, and informed the decisions and actions of local and international public and private stakeholders. Figure 1.8 shows the total economic exposed value at country level as per the global exposure database, disaggregated in 5x5 km pixels for the region.

46 Cardona and others, 2014.



**Figure 1.8** Total exposed value at country level (left), and example of disaggregation in 5x5 km pixels (right), as per Global Exposure Database



Source: De Bono and Chatenoux, 2015.

Note: The designations employed and the presentation of material on these maps do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

More recent studies have provided higher resolution information on building typologies,<sup>47</sup> focusing on residential building stock with a more detailed overview of the characteristics of buildings and houses. In countries with the highest income levels and newest infrastructure, such as Bahrain, Qatar and the United Arab Emirates, more than 80 per cent of the residential exposure corresponds to well-built units of reinforced concrete. In countries heavily affected by armed conflict, such as Iraq, the Syrian Arab Republic and Yemen, more vulnerable earthen and masonry houses are found. Continuous and systematic updating of the databases is required to account for newly built areas and changes in the attributes of existing assets.

### **Box 1.3** Country risk profile for the Comoros

A country specific risk profile was developed for the Comoros in 2014,<sup>a</sup> based on a probabilistic risk assessment for earthquakes and tropical cyclones with a resolution level that allowed a disaggregation of results by sector. The private residential sector had the largest absolute and relative average annual loss. The public sector, although having a lower exposed value, had the same risk levels in relative terms. For instance, public administrative offices and urban infrastructures (ports and bridges) had a large share of potential losses with impacts on other dimensions.

These results will inform the drafting of DRR policies and recommendations at national level, while building the public sector's capacity in the use and understanding of risk assessment results. Continuous support for such initiatives can promote DRM and mainstream it at local levels.

a Ingeniar, 2014.

## **D. Vulnerability**

Vulnerability has social, economic, environmental and physical dimensions, with health falling under the social dimension. Different methodologies have been developed to account for social vulnerability<sup>48</sup> that exacerbates direct losses assessed by physical dimension approaches at global levels.<sup>49</sup> Vulnerability analyses at regional level, however, mostly cover the physical dimension. Understanding the vulnerability of complex social, economic and environmental systems – which cannot be captured using a siloed approach – will require more effort.

47 Dabbeek and Silva, 2019.

48 Cutter, Boruff and Shirley, 2003; Cardona, 2001; Carreño, Cardona and Barbat, 2007; Salgado-Gálvez and others, 2016a, 2016b.

49 UNDRR, 2017a.

## 1. Water, food and energy insecurity

Low crop yields in the region have made most Arab countries net food importers, increasing vulnerability to food insecurity for a large share of the population. Food demand has long exceeded domestic agricultural production and will continue to do so in the coming years. Further, unresolved conflicts, and the resulting loss of livestock, destruction of machinery and disrupted market access, are a key driver of food insecurity, discouraging the required investment in the agriculture sector. These factors exacerbate the overall vulnerability and need to be integrated within comprehensive risk assessments.

## 2. The rising uncertainty

A medium and long-term overview is required to assess future trends in hazards, exposure and vulnerability. The confidence level of climate change data actually improves over time, assuming a conservative emissions trajectory. However, disaster loss databases are based on observed historical data, while those for climate change focus on future projections based on various scenarios. Information on disaster losses reflects the historical record and should not be considered a reliable indicator of the future due to uncertainties that go beyond the frequency and severity of future hazardous events.<sup>50</sup> Indeed, uncertainties regarding the exposure in 30, 40 or 50 years are extremely high, even more so under conditions of unplanned urban expansion. Further, uncertainties due to the growing complexity of human financial, economic, social, health and political systems, and their interaction with environmental systems, are increasing. Uncertainty due to our limited understanding of the systemic nature of risk within and between these systems is also present. Such considerations should be accounted for when assessing vulnerability associated with future hazard scenarios.

## 3. Limitations of siloed vulnerability analysis

Progress has been made in developing multi-hazard risk assessments in different regions of the world (such as the Global Risk Model facilitated by UNDRR), often corresponding to a set of hazards without accounting for the interaction between them.<sup>51</sup> Recent events have shown that individual failures in one component or system, depending on the characteristics, complexity and integration levels of the system, can be amplified, leading to disruptions with catastrophic and unpredictable consequences. Current siloed exposure and vulnerability analyses can serve as the bases for expanding the coverage to other hazards and systems. Collaborative efforts towards defining data standards and accessibility, quality control and assurance are needed with experts from different disciplines. A paradigm shift in managing disaster risk, from the traditional siloed approach to a more comprehensive and holistic one, is required. The use of entry points to link CCA, conflict mitigation, sustainable development and DRR is one possible way forward.<sup>52</sup>

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## E. Risk trends in the region

A review of disaster risk trends by country and type has already been carried out.<sup>53</sup> This section provides a regional overview of risk trends based on available data. Figure 1.9 shows the number of events by subgroup and year between 1980 and 2019, based on the Centre for Research on the Epidemiology of Disasters, or CRED, international emergency events database (EM-DAT);<sup>54</sup> national disaster loss databases are not homogeneous or updated for most countries.<sup>55</sup> Analysing events within a relatively short observation period should proceed with caution; a country not having been affected by a severe event in recent decades is not indicative for the future.

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50 UNDRR, 2019a.

51 Ordaz and others, 2019.

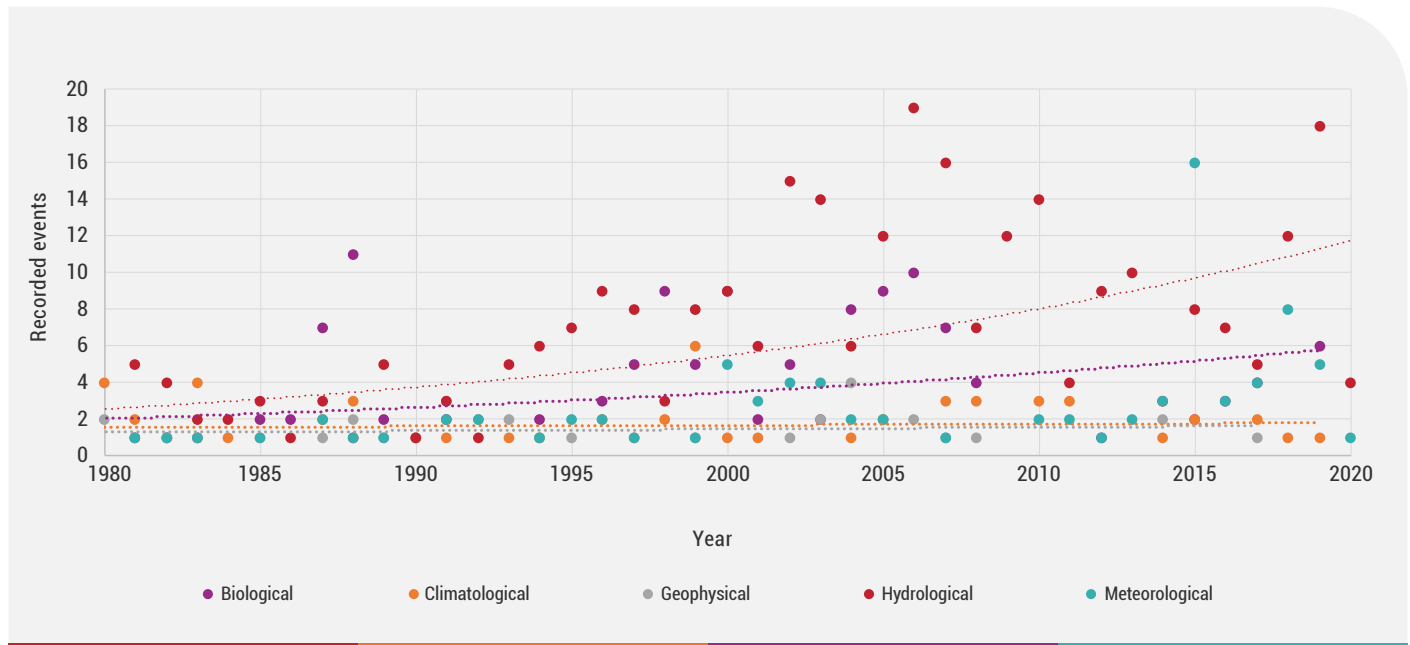
52 UNDRR, 2019a.

53 UNDRR, 2020a.

54 CRED, 2020.

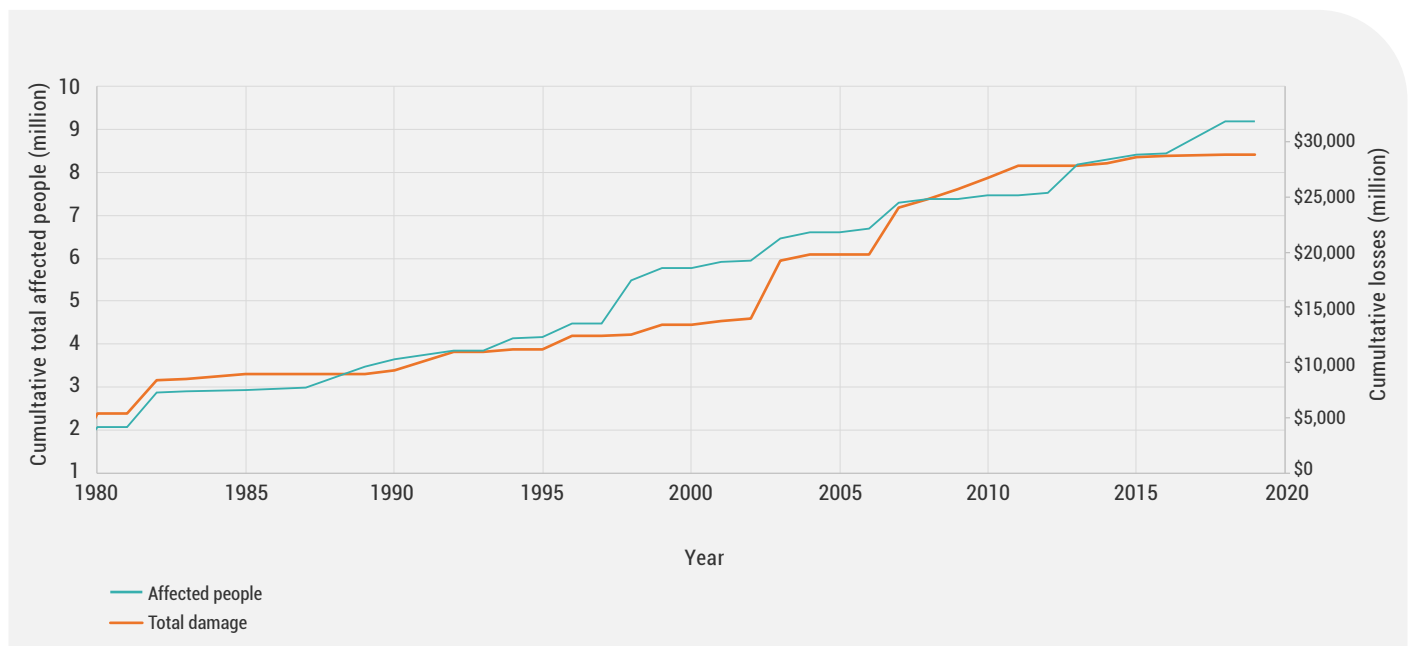
55 Of the 22 countries, 10 have UNDRR DesInventar national databases, with only Lebanon and Jordan having cut-off date of 2019.

Figure 1.9 Disasters by type and year in the Arab region, 1980–2019



Source: Centre for Research on the Epidemiology of Disasters (CRED), 2020.

Figure 1.10 Regional cumulative total damages and affected people in current \$, 1980–2019



Source: CRED, 2020.

Figure 1.10 shows the cumulative number of total affected people and economic losses over the same period in the Arab region. Both dimensions have similar trends, and the impact of large events such as the 2003 Boumerdes earthquake in Algeria and Cyclone Gonu in Oman in 2007 is clearly visible. Exposure and vulnerability have increased significantly in the region, leading to an increase in absolute losses without requiring variation in the frequency or intensity of hazards.

Table 1.1 shows 10 events from the EM-DAT database causing the largest damage, in United States dollars (current 2020). Sudden onset events such as earthquakes and tropical cyclones are the most common, although the 1999 drought that affected Morocco is also included.

**Table 1.1** Events with the 10 largest total damages in the Arab region

Year	Country	Event	Total damages (M USD)
1980	Algeria	Earthquake	\$5,200
2003	Algeria	Earthquake	\$5,000
2007	Oman	Storm	\$3,900
1982	Yemen	Earthquake	\$2,000
1992	Egypt	Earthquake	\$1,200
1996	Yemen	Flood	\$1,200
2010	Oman	Storm	\$1,000
1982	Yemen	Flood	\$975
1999	Morocco	Drought	\$900
2009	Saudi Arabia	Flood	\$900

Source: CRED, 2020.

**Table 1.2** Events with the 10 largest total damages in the Arab region, relative to GDP

Year	Country	Event	Total damages (M USD)	Relative to GDP (%)
1996	Yemen	Flood	1,200	20.7
1980	Algeria	Earthquake	5,200	12.3
1983	Comoros	Storm	23	12.0
2007	Oman	Storm	3,900	9.3
1992	Jordan	Extreme temperature	400	7.4
2003	Algeria	Earthquake	5,000	7.4
1992	Egypt	Earthquake	1,200	3.2
1985	Comoros	Storm	6	2.8
1987	Comoros	Storm	9	2.7
1992	Lebanon	Storm	155	2.7
1999	Morocco	Drought	900	2.2
1990	Tunisia	Flood	243	2.0

Source: CRED, 2020.

Absolute losses are not a comprehensive overview of the impact of events on a country's GDP. For instance, at global level, Japan and the United States have the largest absolute expected losses for earthquakes and hurricanes,<sup>56</sup> but not as a percentage of their GDP. Table 1.2 shows the events reported by EM-DAT where losses have equalled or exceeded 2 per cent of the country's GDP.

Drought has the largest cumulative impact in terms of deaths and affected people. It is the costliest type of disaster, with reported losses of \$29.742 billion over the past 50 years. The practice of reporting economic losses means those recorded with EM-DAT over the period 1970–2020 are a fraction of the real total for all countries, including low-income countries, which make up 59 per cent of total losses.<sup>57</sup>

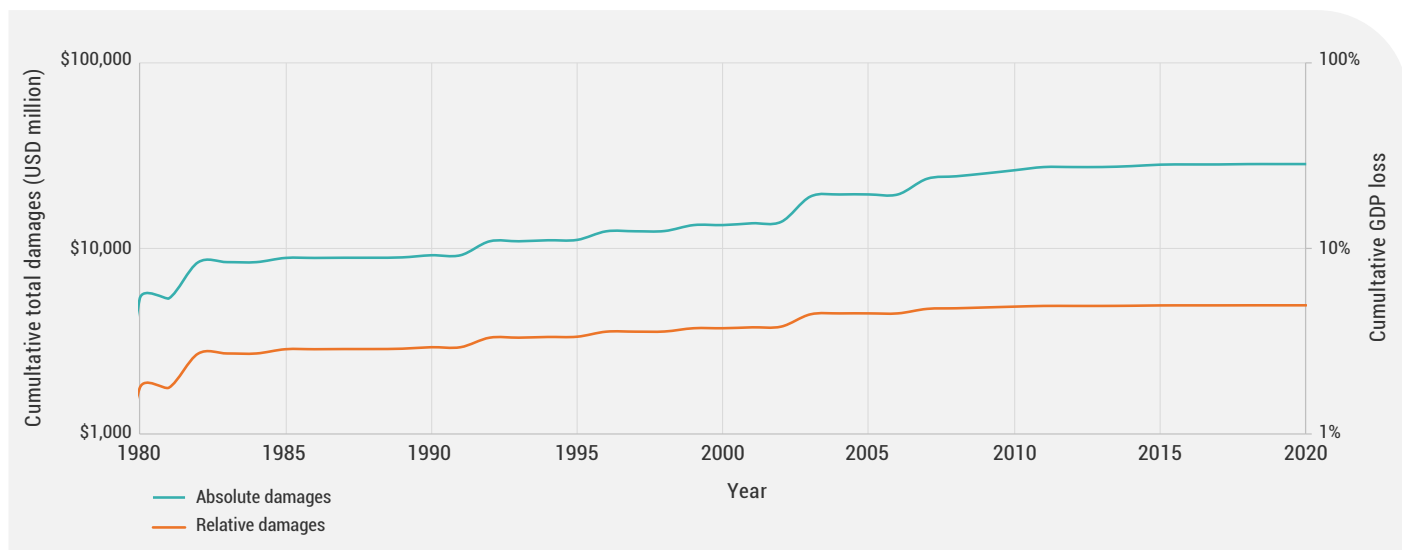
56 UNDRR, 2017b.

57 CRED, 2020.

SIDS are highly exposed to extreme events; for example, since 1980 the Comoros has been affected by at least three tropical cyclones, with total damages relative to GDP exceeding 2 per cent, a value large enough to set back social and economic aspects (table 1.2). Without financial preparations this necessitates a reallocation of resources, with resulting delays in infrastructure and social development investments, or requires international assistance. Figure 1.11 shows the cumulative total damages in absolute and relative terms (to GDP) in the region for the period 1980–2019. In absolute terms, the trend is increasing, while in relative terms, since 2015, the values have had the same orders of magnitude at regional level.

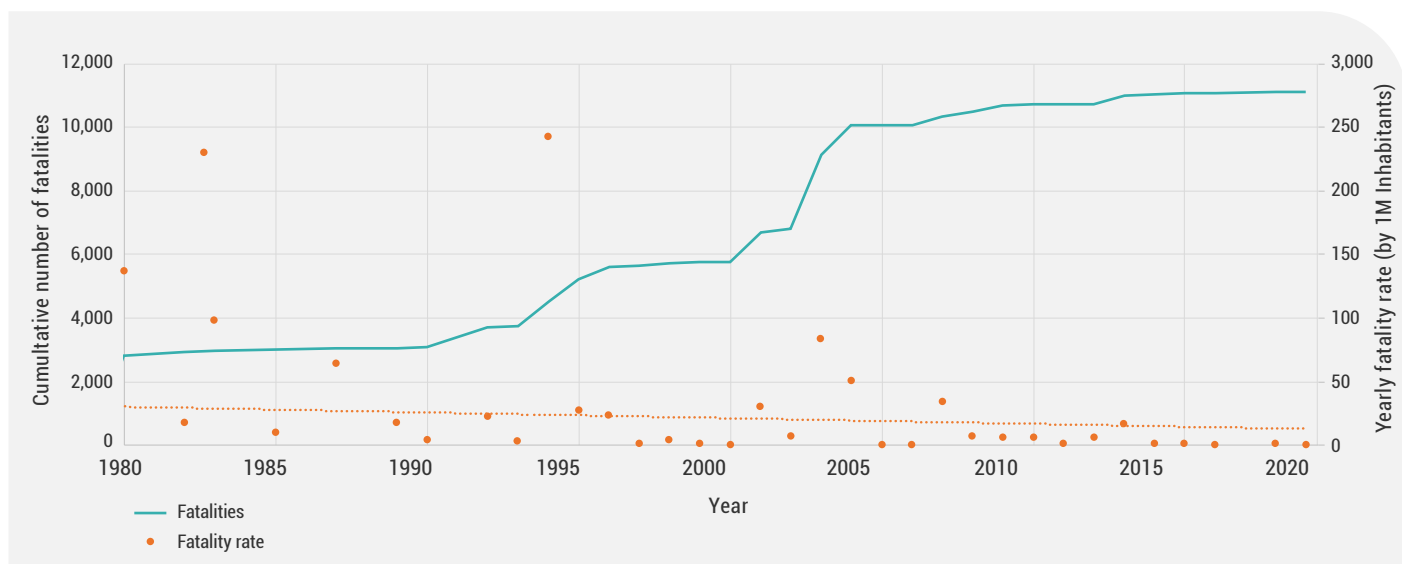
A common feature of the events discussed is that they correspond to low frequency and high severity events as defined by EM-DAT,<sup>58</sup> without accounting for small and medium scale recurrent disasters that affect localized populations, and can act as disaster risk drivers for large events.

Figure 1.11 Regional cumulative total absolute and relative damages in current \$, 1980–2019



Source: CRED, 2020.

Figure 1.12 Regional cumulative number of fatalities and annual fatality rates, 1980–2019



Source: CRED, 2020.

58 Only events that meet one of the following conditions are included in EM-DAT: (a) 10 or more deaths; (b) 100 or more people affected; (c) declaration of state of emergency; and (d) call for international assistance.

Refining the resolution of disaster loss data disaggregation remains a challenge in the region. Initiatives such as RICCAR, the Regional Initiative for the Assessment of Climate Change Impacts on Water Resources and Socio-Economic Vulnerability in the Arab Region,<sup>59</sup> and the DesInventar methodological tool<sup>60</sup> are, however, promoting the systematic collation of disaggregated disaster losses at different scales, using local and national disaster loss databases.

When disaggregated, disaster loss databases may enhance the understanding and modelling of hazards and risks with local impact, such as frequent flash floods and landslides that often affect more vulnerable areas and communities. When consistently recorded in loss databases on a sufficient time frame, data help to estimate recurrence patterns for different loss values, which can be as useful as engineering models for different purposes.<sup>61</sup>

Strengthening data collection is a cost-effective way to systematically understand disaster risk and provide evidence on its adverse impacts on exposed populations and infrastructure. The shared language presents an opportunity to develop robust disaster loss databases to serve individual countries and the region. This commonality does not exist in many other world regions for which disaster loss databases have been compiled, and should act as an incentive for their promotion and development.

## 1. National versus international disaster loss databases

Official statistics data make disaster risk visible at different scales. Table 1.3 shows recorded events in Lebanon, between 1980 and 2019, in the EM-DAT and DesInventar database. The latter is missing information on key attributes, such as fatalities, affected people and total damages; however, the scale and types of events not included in the EM-DAT can be easily identified.

*Table 1.3 Comparison of EM-DAT and DesInventar, type/number of events in Lebanon, 1980–2019*

Type	EMDAT	Desinventar
Geophysical	1	115
Hydrological	2	287
Meteorological	7	624
Climatological	1	1,251
TOTAL	11	2,277

Source: For EM-DAT, see CRED, 2020; for DesInventar, see <https://www.desinventar.net/DesInventar/profiletab.jsp>.

More than half of DesInventar data correspond to forest fires, while EM-DAT reports one, in 2007. For highly localized, small-scale hazards such as landslides and flash floods, EM-DAT shows one landslide and no flash floods; there have been more than 10 flash floods in Lebanon in the recent past. The cumulative impact of small-scale events has been shown to have a similar or higher order of magnitude than large-scale events. Failing to maintain consistent recording makes risk invisible, which leads many countries to perceive DRM and reduction as less of a priority. In turn, vulnerable populations remain caught in an unsustainable trap of poverty and small-scale disaster losses.

## 2. Risk transfer trends and practices

Disaster insurance penetration in the region is low, evidenced by the lack of comprehensive disaster loss information in insurance databases. Global insurance penetration, as a percentage of GDP, is about 3 per cent, compared with 1 per cent in the Arab region.<sup>62</sup> At national level, high-income countries, such as the United Arab Emirates, have greater insurance penetration, with values above 2 per cent of their GDP. The figure may drop to less

59 UNESCWA and others, 2017.

60 UNDRR, DesInventar Sendai. Available at <https://www.desinventar.net/DesInventar/profiletab.jsp> (accessed on 21 March 2021).

61 Velásquez and others, 2014.

62 Swiss Re, 2020.



than 0.5 per cent in middle-income countries. This low penetration rate is reflected in large protection gaps during past events, such as the 2007 storms in Oman, where less than 15 per cent of the total losses were insured, or the 2003 earthquake in Algeria, where the insured losses accounted for less than 1 per cent of the total.

### 3. Role of national statistics systems

A risk-informed development plan requires investment in data, methods, tools and capacity to identify and manage disaster risk. A common recommendation in the region is to clarify the role of the National Statistical Systems within DRM and DRR frameworks; for instance, risk identification can be enhanced with information from national statistical offices by making available exposure, vulnerability, resilience and risk data for setting baseline scenarios. Risk prevention and mitigation efforts can be complemented by a more nuanced examination of the factors that drive and cause disaster risk, such as land degradation, unplanned urban expansion and extreme poverty. Emergency preparedness plans can be better informed if organized inventories of supplies, personnel and the number of shelter areas are available, and the response would progress more efficiently if rapid statistics for an affected area were available in the immediate aftermath.<sup>63</sup>

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## F. Emerging systemic risks

### 1. Socioeconomic development background to emerging risks

Development priorities in the region have contributed to its climate and disaster risks. While Arab countries are shifting to more diversified economies, especially the oil-rich Gulf Cooperation Council (GCC) countries with investments in medium- and high-tech industries, this has not created sufficient decent employment, or increased labour productivity or wealth redistribution. In 2017, manufacturing value-added as a share of regional GDP was the second lowest globally, at 9.6 per cent against the world average of 16.4 per cent,<sup>64</sup> and provided 10.18 per cent of total employment.<sup>65</sup> Governments are the largest employers regionally, followed by agriculture and market services in non-oil and oil-exporting countries, respectively. Small and medium enterprises comprise 96 per cent of registered companies, and provide about half of all jobs. They receive just 7 per cent of bank lending, the lowest globally,<sup>66</sup> and have limited access to other financial services.<sup>67</sup> Poor infrastructure, especially in the LDCs, offers the region the least economic integration in the world.

The region has some of the highest levels of wealth concentration and income inequality globally.<sup>68</sup> Despite periods of positive economic growth, there has been little improvement in the income of the poor.<sup>69</sup> Excluding agriculture, informal employment is at 45–65 per cent.<sup>70</sup> Intraregional inequality is high and rising.<sup>71</sup> Access to basic services is limited. Some 47.5 million to 70.5 million people have no access to drinking water and basic sanitation.<sup>72</sup> Region-wide, out-of-pocket expenditure on health and education consumes 8 per cent and 11 per cent of poor and middle-class disposable income, respectively.<sup>73</sup>

Globally, the region has recorded the only increase in extreme poverty. The headcount poverty ratio at the \$1.90 per day international poverty line rose from 4 per cent in 2013 to 6.7 per cent in 2015.<sup>74</sup> Some 16 per cent of people in the Arab LDCs are below this threshold. Extreme poverty in the region is higher than the world average, and higher than all

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63 Bernal and others, 2017.

64 UNESCWA, 2020b.

65 Ibid.

66 Azour, 2019.

67 Rocha, Arval and Farazi, 2011; Saleem, 2017.

68 Arab countries included in report are: Bahrain, Egypt, Iraq, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, the State of Palestine, the Syrian Arab Republic, the United Arab Emirates and Yemen. The report also covers Iran (Islamic Republic of), and Turkey. See World Inequality Lab, 2018.

69 UNESCWA, 2020b.

70 Chen and Harvey 2017.

71 Calculated by UNESCWA, based on data from World Bank, 2019a.

72 UNESCWA, 2020b, p. 86.

73 UNESCWA, 2017a.

74 Calculated by UNESCWA, based on data from World Bank online datasets, POVCAL.NET.

developing regions, save sub-Saharan Africa.<sup>75</sup> Multidimensional poverty measures<sup>76</sup> place poverty rates at 41 per cent for 10 countries covering 75 per cent of the Arab people.<sup>77</sup> The propensity to slip into extreme poverty, especially in middle-income countries is high.<sup>78</sup> GCC countries have used oil revenues to address poverty and access to services, but stark disparities exist between their nationals and the huge proportion of overseas migrant workers. In addition, future generations are unlikely to enjoy the benefits of oil and public spending, with diminishing or depleted reserves.

This 'development pattern' makes the Arab region particularly vulnerable to systemic risks due to intertwining environmental degradation, unsustainable production and consumption, multidimensional poverty, rapid and poorly managed population growth and urban growth, water scarcity, inefficient agriculture, pandemics, population displacement, disease outbreaks, market volatility, governance deficits and disruptions in social cohesion.<sup>79</sup> For example, the extreme drought in Iraq in 2018/19 was brought about by environmental, development and political factors, with cascading consequences.<sup>80</sup> Some systemic risks, if not addressed, threaten the fabric of society and social cohesion in several Arab countries, with spillover effects for their neighbours.

## 2. Systemic rural/agricultural risk with rising food insecurity

The creation of new rural and agricultural risks is dependent on development choices at the rural/agricultural sector level. Two thirds of fresh water resources originate outside the region. There is a high concentration of surface water flow in only three rivers, namely the Nile, Tigris and Euphrates. These rivers, which account for more than 80 per cent of the total flow in the region, originate in the upstream countries of Turkey, Iran (Islamic Republic of) and Ethiopia.

The region is also one of the most water scarce in the world. In total, 18 of the 22 Arab States fall below the annual threshold for renewable water resources of 1,000 m<sup>3</sup> per person, and 13 below the annual absolute water scarcity threshold of 500 m<sup>3</sup> per person.<sup>81</sup> North Africa has been ranked the second most vulnerable region to emerging climate risks by the IPCC,<sup>82</sup> which will likely exacerbate freshwater scarcity. High subsidies for water and fuel – up to two thirds of the supply cost – have contributed to the overuse of scarce water resources.

For many countries, annual freshwater withdrawals exceed total renewable water resources. For instance, Bahrain, Egypt, Libya, Kuwait, Qatar, Saudi Arabia, the United Arab Emirates and Yemen are currently withdrawing more groundwater each year than the sustainable recharge rates. On average, 80 per cent of extracted water is used in the agriculture sector; for some countries, this rises to 90 per cent.<sup>83</sup> Planting water intensive crops in arid regions has positive trade-offs in the short term but leads to water and food insecurity over time.<sup>84</sup> Due to the loss of biodiversity, the aforementioned actions threaten freshwater ecosystems and increase socioeconomic vulnerability, while also exacerbating desertification and land degradation. Depending on the location of underground water sources, high rates of extraction can lead to soil subsidence, with damage to above- and below-ground infrastructure, such as water and sanitation systems.

Agricultural strategies have not raised productivity or resilience to desertification.<sup>85</sup> Forest cover has fallen steadily since 1990,<sup>86</sup> due to encroachment on fragile natural habitats, and intensive farming, among other reasons.<sup>87</sup> Unsustainable soil and water management accelerate groundwater depletion, increasing agropollution and soil salinity. Irrigation efficiency is low, at 30–45 per cent,<sup>88</sup> causing losses of nearly 60 per cent.<sup>89</sup> The lack of permanent river systems

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75 Calculated by UNESCWA, all means are population weighted using latest (2015) population estimates (UNESCWA, 2020b). The calculated Arab regional aggregate includes the data values of the following countries: the Sudan (2009), Jordan and Tunisia (2010) Algeria, Lebanon and the State of Palestine (2011), Iraq (2012), Comoros and Djibouti (2013), Mauritania and Yemen (2014), and Egypt (2015).

76 UNESCWA, 2020b.

77 Covers Algeria, Comoros, Egypt, Iraq, Jordan, Mauritania, Morocco, the Sudan, Tunisia and Yemen, See UNESCWA 2017b.

78 UNESCWA, 2020b.

79 Sapountzaki, 2019.

80 UNDRR, 2019a.

81 IOM, 2019.

82 Seneviratne and others, 2012.

83 League of Arab States, AGIR, 2019.

84 Abdel-Dayem and McDonnell, 2012.

85 ANND, 2019.

86 Calculated by UNESCWA, based on World Bank, 2015. p. 190.

87 UNDP, 2018a.

88 UNESCWA and League of Arab States, 2013.

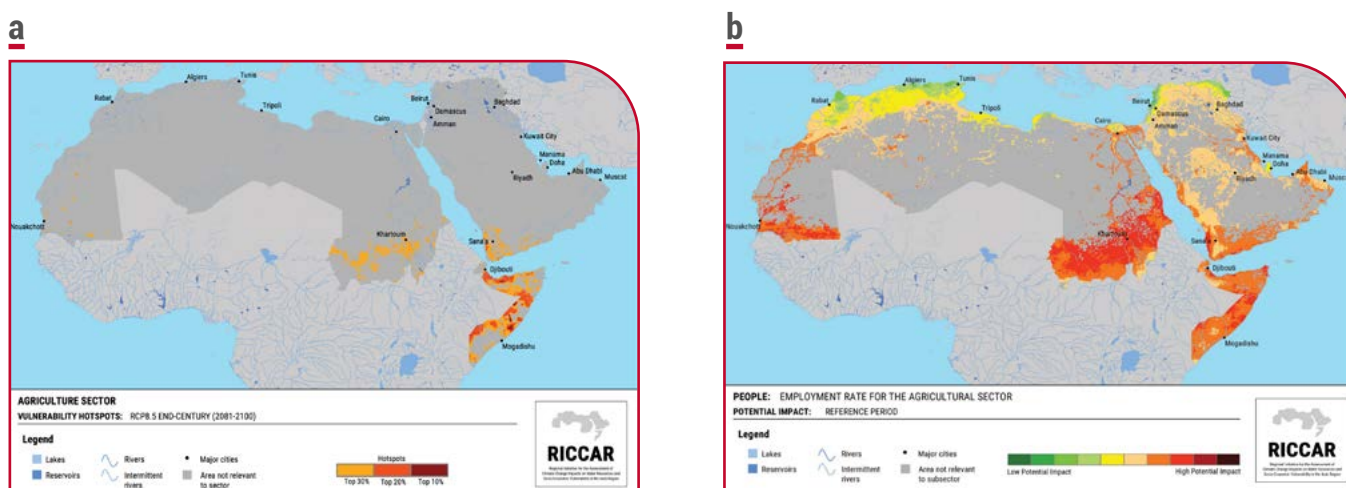
89 UNESCWA, 2015.

causes floods and erosion, even with poor rains. Water supply and diversion infrastructure is not climate-proofed and does not reduce flood impacts.<sup>90</sup>

The situation accentuates droughts, desertification, dust storms, heatwaves and floods. The Syrian drought in 2006–2010 destroyed the livelihoods of 800,000 people, and left a million food-insecure.<sup>91</sup> The 2017 Somalia drought reduced average harvests by 70 per cent, caused huge livestock loss and food insecurity for nearly 3 million mostly rural people.<sup>92</sup> The number of people affected by flash floods has doubled, to 500,000 region-wide, in the past decade.<sup>93</sup> By 2030, climate change will likely reduce renewable water sources by 20 per cent due to lower rainfall, increased water demand as temperatures rise, and seawater from rising sea levels entering coastal aquifers.<sup>94</sup> Agricultural production patterns could further change, reducing regional output by 21 per cent by 2080,<sup>95</sup> threatening livestock production, forests, wetlands and agricultural employment.<sup>96</sup> In the Sudan, the line of semi-desert and desert that has moved 50–200 km south since 1930 will continue to do so, threatening some 25 per cent of agricultural land and reducing food production by 20 per cent.<sup>97</sup>

Most poor people live in climate-sensitive rural areas. Agriculture constitutes 7 per cent of regional GDP, and employs 38 per cent of the population. It accounts for 23 per cent of GDP in Arab LDCs,<sup>98</sup> employing from 35 per cent of people (in Yemen) to 72 per cent (Somalia).<sup>99</sup> Further, 92 per cent of Arab land is hyper-arid and 73 per cent of arable land is degraded (figure 1.13).<sup>100</sup> Agriculture uses 80 per cent of water regionally,<sup>101</sup> yet water productivity is low. Scant rainfall inhibits natural recharging of surface and groundwater resources. Saline soil reduces productivity, causing an annual economic loss of \$1 billion regionally.<sup>102</sup>

**Figure 1.13** Agriculture sector vulnerability hotspots, end century (a), and employment rate vulnerability, 1968–2005 (b)



Source: UNESCWA and others, 2017a, 2017b.

Note: The designations employed and the presentation of material on these maps do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

90 UNDP, 2018a.  
 91 Nature Middle East, 2010.  
 92 Food Security and Nutrition Analysis Unit, 2017.  
 93 UNDP, 2018a.  
 94 UNESCWA, 2017c.  
 95 Cline, 2008.  
 96 UNESCWA and others, 2017a.  
 97 United Nations Human Settlements Programme, 2017b.  
 98 Calculated by UNESCWA, based on World Bank 2019a.  
 99 World Bank, 2019a.  
 100 UNESCWA and FAO, 2020.  
 101 UNESCWA, 2015.  
 102 UNESCWA and FAO, 2020.

With the largest food deficit, the region is the largest food importer in the world.<sup>103</sup> The average annual increase in the food production-consumption gap was 7.3 per cent between 2005 and 2014.<sup>104</sup> In the Arab States, nearly 55 million people (13.2 per cent of the population) are hungry, an increasing trend from 2013.<sup>105</sup>

Safe food, water, sanitation and health-care deficits place the poor at greater risk of undernutrition, anaemia, stunting and other illnesses. The interaction of rural poverty, growing population, environmental degradation, inequality, water scarcity, drought, conflict, displacement, market volatility and food insecurity is creating feedback loops, with cascading consequences that are difficult to identify and understand without a complex systemic lens for investigating risk.

### 3. Systemic risk in poorly planned rapid urbanization and population growth

Globally, 85 per cent of economic activity takes place in cities, accounting for approximately two thirds of energy demand and carbon emissions. Urbanization in the region has substantially increased in past years, due to demographic growth, rural to urban migration, conflict-inflicted displacements and investment deficits in rural development.

The Arab population will be about 520 million by 2030, and 676 million by 2050,<sup>106</sup> with eight of the 22 countries hosting 80 per cent of the total population. The urban population, on average above 70 per cent, will more than double by 2050,<sup>107</sup> reaching over 439 million<sup>108</sup> and making up 80 per cent of the total projected population.<sup>109</sup>

Urban development with limited planning and regulation is constructing new risks, locking the region into an unsustainable path.<sup>110</sup> The urban risk profile is incomplete, due to limited data, and significant effort is needed to avoid underestimating risk. Development choices need to be risk-informed, which increasingly requires assessment of interactions within and across urban systems, and between urban and rural systems.

Rising land values and rapid appreciation of buildings since the mid-1970s have led to a segmented land market and expensive housing. About 30.9 per cent of urban people live in slums, informal settlements or inadequate housing.<sup>111</sup> Intensive urbanization and overpumping is affecting groundwater volume and quality, particularly along coastlines, raising dependence on water transfers from other river systems and basins.

About 98 per cent of the Arab population is exposed to high levels of air pollution.<sup>112</sup> Water pollution from industrial waste, wastewater, and unregulated pesticide and fertilizer use threaten water quality and health. Coastal zones and the most fertile agricultural lands (especially in Egypt and Tunisia) hosting urban centres and increased economic activity are vulnerable to sea level rise, storm surges and coastal erosion. This threatens more than 43 Arab port cities,<sup>113</sup> industrial and tourist infrastructure and jobs,<sup>114</sup> and the assets and livelihoods of concentrations of urban poor living on precarious terrain that houses hazardous informal industrial or home-based production employing adults and children.<sup>115</sup> Further, unclean water, poor sanitation and multi-hazard exposure increase their susceptibility to waterborne diseases.

Risk managers and urban planners in the region do not properly recognize that mega-cities are prone to emergent systemic risks. Future risks will be more complex than current ones, and the interconnection of social, economic, technological and financial systems provides the conditions for amplifying the effects over a large geographical extent;<sup>116</sup> for example, a sustainable city needs to be supported by economic growth that serves to guarantee access to clean water and sanitation for its inhabitants, and also provides access to health and education services.

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103 AFED, 2017.

104 Ibid.

105 FAO, 2019b.

106 UNESCWA, 2017d.

107 UN-Habitat, 2012.

108 Ibid.

109 UNDP, Bahrain Center for Strategic and International Studies and Energy and UN-Habitat, 2020.

110 UNESCWA, 2020b.

111 Ibid.

112 United Nations Human Settlements Programme, 2017b.

113 UNEP, 2015.

114 Balgis, 2010.

115 El-Zein and others, 2014.

116 UNDRR, 2019a.

## 4. Systemic risk due to overdependence on natural resource extraction and non-sustainable consumption and production patterns

The region has the world's largest crude oil reserves and is the largest producer of fossil fuels, vital contributors to economic growth. Regional per capita emissions of carbon dioxide are increasing and, in 2013, were similar to the global average. In the GCC subregion, per capita emissions were about four times the global average.<sup>117</sup> Transport contributes about 25 per cent of carbon dioxide emissions.<sup>118</sup>

Energy consumption per person in the region increased by almost 70 per cent between 1990 and 2014, outstripping population growth. Further, energy intensity in the region rose during the 1990s, while global averages declined significantly. Regional energy intensity decreased at a slow pace, about 3 per cent, from 2010 to 2016.<sup>119</sup> Clean renewable energy forms only 4.1 per cent of regional energy consumption versus a world average of 18 per cent.<sup>120</sup> Steps have been made in some locations, such as Masdar City in Abu Dhabi-UAE, towards increasing renewable energy use and decoupling economic growth from overall energy consumption.

Underground aquifers are being exploited at rates that exceed their natural replenishment limits. While some countries have started using seawater desalination techniques<sup>121</sup> and recycling treated wastewater, these are often based on non-renewable energy sources. Building dams remains an expensive option for many countries as they would need to be risk-informed to avoid or reduce the creation of new risks and account for sustainability considerations.

The region is characterized by high rates of waste generation and low levels of recycling and reuse; about 80 per cent of municipal solid waste is decomposable, organic or recyclable material<sup>122</sup> but ends up in unsealed landfill.<sup>123</sup> Compostable solid waste is often mixed with industrial and toxic medical waste during collection and disposal, causing contamination and limiting sustainable treatment options. Some countries have prototyped waste-to-energy technologies using incineration and anaerobic digestion but high costs and low technical capacity have prevented scale-up. Only the United Arab Emirates has a recycling rate above 15 per cent of municipal waste; other countries report rates below 10 per cent.<sup>124</sup>

The region's population of more than 435 million has had a growth rate almost twice the global average in past decades. It is expected to continue to increase at an above-average rate. A consequence of this large demographic growth is an increase in demand for goods and services, thus far mainly supplied based on natural resource extraction. This has promoted non-sustainable production and consumption patterns – all of which exert pressures on ecosystems and the environment, and threaten sustainable development. These patterns challenge food security (most countries are net importers of food), and create economic dependence on oil exports, which are highly volatile, and an unsustainable development paradigm that gives rise to new risks. Continuing on a path of unsustainable development will lead to higher inequality, where risk-benefit trade-offs will serve only the few and exist only for the short term.

## 5. Systemic risk as manifested by the COVID-19 pandemic

COVID-19 has provided a textbook case of how a biological hazard that started in one place can spread geographically to almost all countries in the world, with a huge impact on economic, social and health complex systems, pushing millions of people back into poverty, increasing the socioeconomic vulnerabilities of several regions, limiting access to education for millions of children for whom online classes are not an option, and heavily disrupting the informal economic sector that employs a large portion of the vulnerable working population in developing countries.

In the Arab region the pandemic has shown the complex interactions between different biological, technological, health, social and economic sectors. In a matter of days, all 22 countries had reported cases, leading to protective measures such as shutting public places, schools and even borders. The closure of the tourism sector has had a large impact on

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117 IEA, 2019; OECD iLibrary, 2019; World Bank 2019b.

118 Calculated by UNESCWA, based on IEA, 2019.

119 UNESCWA, 2020b.

120 Ibid.

121 About 70 per cent of water desalination plants are located in the region, see <https://thewaterproject.org/water-crisis/water-in-crisis-middle-east>.

122 Al-Yousfi, 2004.

123 United Nations Statistics Division, 2016.

124 Ibid.



the employment and livelihoods of various vulnerable groups. Further, the anticipated decrease in remittances from people living abroad in countries such as Morocco can account for up to 6 per cent of the country's GDP.<sup>125</sup>

## 6. Systemic cyber risk in cities with advanced infrastructure systems

Risk managers and urban planners in major cities in the GCC countries need to recognize cyber risk as a key driver for systemic risk, by having the capability to affect the functioning of different interconnected systems. Current hyperconnectivity is reflected in increasing digitization, larger amounts of data stored in cloud services and greater use of the Internet for running systems. The consequences of cyber risk can be complex, affecting multiple industries simultaneously, reaching multiple geographical regions and cascading in an unpredictable manner. With oil the main export of several countries in the region, DRM of the large and complex production, transport and storage systems should include a cybersecurity perspective to reduce the likelihood of such disruptions.

Cyber risks can also include the control of physical processes, leading to deaths and injuries, and damages to property and assets. In 2017, data was quantified by a group of experts as the world's most valuable resource.<sup>126</sup> Financial services are one of the most connected components of modern economies and, because of the stakes, a highly desirable target for malicious cyberattacks. Digital markets in the region have grown at an average annual rate of 12 per cent<sup>127</sup> and the success of several initiatives increases the exposure to cyberattack. Between January and March 2019, the United Arab Emirates experienced more than 23 million instances of malware,<sup>128</sup> and cyberattacks in the country have accounted for approximately 5 per cent of the global total<sup>129</sup> in recent years. The health sector must prepare to address cyber risk, as it possesses protected information representing lucrative health-care data. In summary, cyber risk needs to be addressed promptly.

## 7. Emerging nuclear energy risks

The region is characterized by its high energy intensity economies, which goes against global trends. Several countries have embarked on nuclear power generation to try to diversify their energy portfolio. The 2011 Fukushima disaster in Japan is a reminder of the importance of addressing security and safety management considerations in nuclear installations.<sup>130</sup> To this end, comprehensive nuclear risk management plans should be developed, implemented, monitored and constantly updated in line with latest practices and global lessons.

## 8. The climate change-disasters-conflict-migration nexus

In the past five years, 40 per cent of Arab countries have had some type of armed conflict that has undermined development gains and increased the vulnerability of the population to disaster risk. There are 38.1 million migrants<sup>131</sup> and refugees in the region.<sup>132</sup> Conflict and natural hazard-based disasters displaced 2,566,000 and 631,000 people, respectively, in the Middle East and North Africa (MENA) region,<sup>133</sup> comprising 9.6 per cent of the global total.<sup>134</sup> In 2019, more than 800,000 new displacements due to disasters were recorded in the MENA region.<sup>135</sup> This is not an entirely new

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125 Coronavirus Increases Pressure on Morocco's External Finances, 16 March 2020. Available at <https://www.fitchratings.com/research/sovereigns/coronavirus-increases-pressure-on-morocco-external-finances-16-03-2020>.

126 Ross, 2020.

127 Strategy&, 2015.

128 Ramesh Chandra, Kumar Sharma and Ali Liaqat, 2019.

129 Ibish, 2017.

130 Fukushima Daiichi Accident - World Nuclear Association ([world-nuclear.org](http://world-nuclear.org)) (accessed on April 2021).

131 There is no universally accepted definition of the term migrant. This report draws on IOM's definition: "...an umbrella term, not defined under international law, reflecting the common lay understanding of a person who moves away from his or her place of usual residence, whether within a country or across an international border, temporarily or permanently, and for a variety of reasons. The term includes a number of well-defined legal categories of people, such as migrant workers; persons whose particular types of movements are legally defined, such as smuggled migrants; as well as those whose status or means of movement are not specifically defined under international law, such as international students." See [https://publications.iom.int/system/files/pdf/iml\\_34\\_glossary.pdf](https://publications.iom.int/system/files/pdf/iml_34_glossary.pdf). This report does distinguish between the terms migrant and refugee, defining refugee in line with the 1951 Refugee Convention.

132 UNESCWA and IOM, 2020.

133 The MENA region geographically comprises the States of Algeria, Bahrain, Egypt, Iran (Islamic Republic of), Iraq, Israel, Jordan, Kuwait, Lebanon, Libya, Morocco, Oman, Qatar, Saudi Arabia, the Syrian Arab Republic, Tunisia, the United Arab Emirates and Yemen. It does not include the States of the Comoros, Djibouti, Somalia and Mauritania, which are incorporated in the Arab region.

134 IDMC, 2020a.

135 IDMC, 2020b.



occurrence, however. Harsh ecological conditions over centuries have driven agropastoral and nomadic communities to move. Migration in the region, as elsewhere, happens for a variety of reasons, though there has been a clear link between climate change, disasters and migration in the past 15 years.<sup>136</sup>

Displacement can result in additional risks for those individuals, and for other communities affected by their movement. This can include reduced access to resources, opportunities and services, and increased exposure to hazards, violence and abuse.<sup>137</sup> In addition to being a symptom of disasters, displacement remains a driver of disaster risk. It frequently reduces available resources and assets, increasing the risk of impoverishment and abuse, and exacerbating pre-existing vulnerabilities. This is amplified when displacement is accompanied by the destruction of homes, livelihoods and assets, which is often the case, and/or when displacement is recurrent or unresolved for protracted periods of time.

Displacement, be it internal, cross-border (refugees and asylum seekers) or voluntary (migrants), is still perceived as a mostly negative issue. While forced migration does burden host communities, local economies and national governments, the opportunities it provides in many areas of development are not sufficiently recognized or acknowledged. This contributes to increasing both the risk and the impact of disasters, particularly on vulnerable displaced groups.

In the Sahel sites of Mauritania, each major drought triggered large-scale migration to cities.<sup>138</sup> In Iraq in 2006 and 2008, more than 60,000 drought-impooverished farmers migrated to urban areas.<sup>139</sup> Jordan witnessed similar migration movements. By June 2009 about 200,000–300,000 persons from Hassaka had migrated to urban centres in western Syrian Arab Republic.<sup>140</sup> In low-lying coastal regions, rising sea levels are expected to force migration away from original sites of residence as storm surges force saltwater into rivers and aquifers and degrade agricultural land, and the sea reclaims the land.<sup>141</sup> A 0.5 m rise in sea level in Alexandria, Egypt, could force 1.5 million of the city's population to migrate,<sup>142</sup> while a 1 m rise could directly impact 41,500 m<sup>2</sup> of territory and about 37 million people in the region.<sup>143</sup> Where direct causal links between climate change, disaster risks and migration are not obvious, migration may still be mediated by declining social and economic conditions, intertwined with poor ecological conditions and longer onset disasters, demanding more attention to be directed to sustainable development.<sup>144</sup>

The current situation where internally displaced persons and refugees are forced to use peri-urban areas due to unaffordable formal housing is reinforcing the creation of poverty traps for highly vulnerable populations. This stresses the need for urban resilience, requiring both urban planning and quality infrastructure. In the region, and globally, reducing disaster risk for displacement-affected populations requires systematic analysis and management of causal factors of disaster. This includes efforts to reduce exposure to hazards and the vulnerabilities of people and property, and increasing preparedness. Acknowledging DRR challenges in conflict settings has been new in recent United Nations Global Assessment Reports on Disaster Risk Reduction (GAR), such as the GAR19, which identified critical aspects to be considered.

## 9. Developing the tools to address systemic risks

Recognizing the need for a more systemic approach to address the integrated nature of sustainable development, and to establish a real implementation mechanism that can help achieve coherence between the three global agendas, Arab countries are directing efforts to improve the interaction between ecosystems and people, using several initiatives, including the Arab Geographical Information Room (AGIR) (box 1.4).

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136 D'Cunha, 2019.

137 IOM, 2020.

138 United Nations Human Settlements Programme, 2017b.

139 Ibid.

140 United Nations, 2009.

141 UNEP, 2015.

142 Verner, 2012.

143 UNEP, 2015.

144 D'Cunha, 2019.

## Box 1.4 The Arab Geographical Information Room

AGIR was established by the League of Arab States in 2015 to improve the science-policy interface in the region through enhanced information and analytical studies. AGIR, which is hosted by the AWC, works to unpack complex topics, such as how emerging climate-related risks interact with structural challenges, and how to foster coherence between regional, national and local actions and rationalize trade-offs between sectors while establishing development plans.

By utilizing advanced technologies, satellite imagery and geographic information systems (GIS) to conduct regional analysis of climate change patterns and hydrometeorological risks, AGIR activities focus on better characterization of hazards, exposure and vulnerabilities. These feed into policy and programmes, and the regular monitoring of emerging risks at national and regional levels. AGIR focuses on increasing synergies between data sets, and enhancing quality and uptake of climate impact and disaster loss databases for proactive preventive measures, as a foundation for more synergetic actions in decision-making.

In 2017, AGIR produced its first report, *Geographical Information towards Building Resilience in the Arab Region (Water, Food and Social Vulnerability Nexus)*. The report covers topics focusing on climate change as a challenge in managing and reducing risks. It emphasized the interconnectedness of climate change with disaster risk, thus highlighting the importance of understanding the multistressors of climate change and disaster risks, which can provide new insights and approaches. The report also enhanced knowledge towards a deeper assessment in several climate change areas, including risk and resilience building.

### The use of Earth observations to comprehend losses and make a case for DRR

Earth observations (EO) can support several DRM and mitigation activities. Advances that have occurred in the field have applications in the design and use of early warning systems (EWS), in increasing risk knowledge and in disseminating information in almost real time. This is highly relevant in response activities, particularly as risks become more complex and connected across systems (figure 1.14 for aerial image of flooded areas near Khartoum in 2020, and figure 1.16 for forest fires in the Syrian Arab Republic, located from spatial imagery).

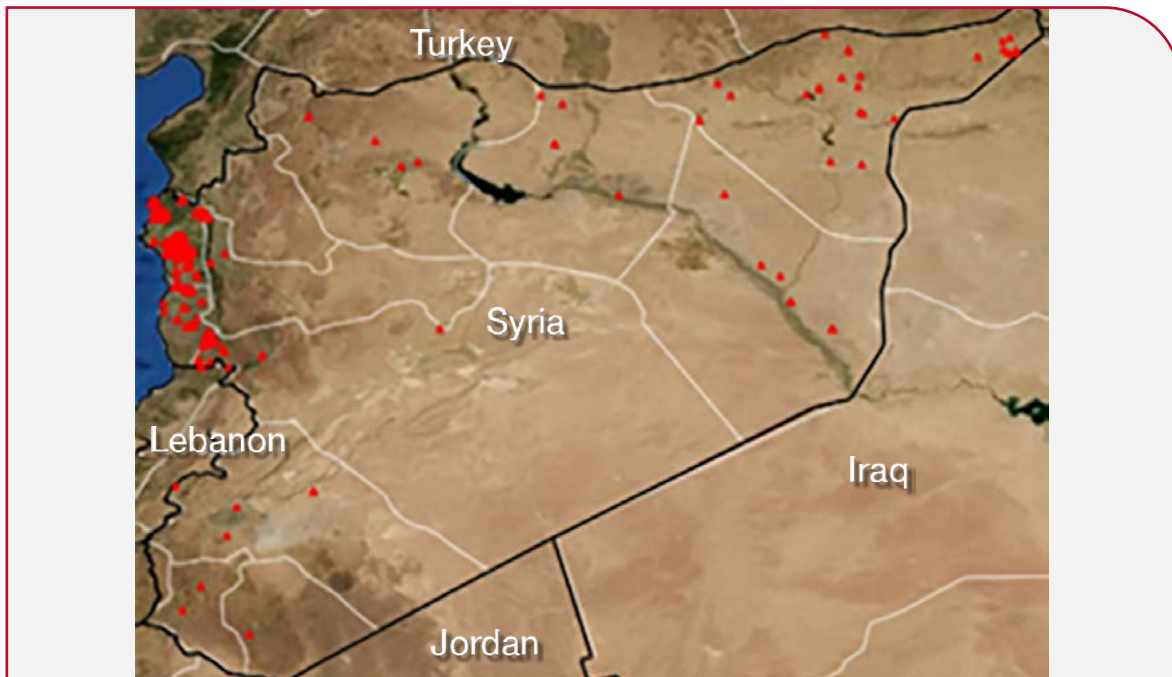
Figure 1.14 Satellite images of the Sudan floods near Khartoum, 2020



Source: NASA, 2020b.

**Note:** The designations employed and the presentation of material on this map do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

*Figure 1.15 Forest fire locations in the Syrian Arab Republic gathered from satellite images, October 2020*



Source: NASA, 2021.

*Note:* The designations employed and the presentation of material on this map do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

## **G. Conclusion**

The Arab region is exposed to myriad hazards that, combined with the continuous increase in exposure and vulnerability, are driving disaster risk to levels that require prompt management and reduction. The region has been identified as highly vulnerable to the consequences of climate change that may further threaten existing development gains and plans for future sustainable development at rural and urban levels. With one of the world's fastest growing populations, this is leading to excessive demands for basic services and housing within a highly urbanized context. The rapid urbanization process, if it continues in an unplanned manner, will increasingly use floodplain areas and neglect sound urban planning principles, thereby compounding the already high levels of exposure and vulnerability.

The socioeconomic development characteristics exacerbate the emergence of complex systemic risks that threaten existing development gains, the potential for future sustainable development and social cohesion. These include: systemic rural/agricultural risk with rising food insecurity; systemic risk in a rapidly urbanizing region; systemic risk due to overdependence on natural resource extraction and non-sustainable consumption and production patterns; systemic pandemic risks affecting social and economic systems; systemic cyber risk in cities with advanced infrastructure systems; nuclear energy risks; and systemic climate change-disasters-conflict-migration risks. This necessitates the development of new tools for governance arrangements in order to enhance understanding of the complex systemic nature of risk within and between different social, economic and environmental systems, as demonstrated by the COVID-19 crisis.



## Regional progress in disaster risk reduction

# 2.



The Sendai Framework (2015–2030) renewed the commitments of the Hyogo Framework for Action (HFA, 2005–2014), the global blueprint for DRR efforts, while capturing new hazards and growing complexities through action priorities and linked targets. The Sendai Framework attempts to bring about a paradigm shift, from reactive and silo-based approaches to managing disaster to proactive resilience. Environmental protection and climate change are recognized as necessary in understanding risks and risk drivers. In addition, the 17 SDGs, which aim to strengthen governance mechanisms to reduce the risks of poverty, food insecurity and social disparity, among other objectives, are recognized as a tool for achieving such societal resilience. The Sendai Framework also underlines the importance of local urban resilience, especially in the Arab region; with 56 per cent<sup>145</sup> of people living in cities, it is one of the most urbanized regions in the world.

Monitoring progress in DRR is crucial to strengthen the resilience of the region. Analysis of progress against global frameworks helps identify the current baseline, vertical and horizontal policy integration practices, coordination mechanisms and the reporting of challenges in order to identify specific themes for future focus. Chapter 2 is structured into three main parts: the first provides an overview of the shift from HFA to the Sendai Framework, and synergies among the various global agendas; the second reviews progress in implementing the Sendai Framework and related SDGs; and the third focuses on sectoral and local progress in mainstreaming DRM considerations in development planning.

145 UN-Habitat, 2016a.

## A. An overview of the shift in the post-2015 development agenda

The year 2015 was instrumental in bringing about a shift in the global development agenda, with three new agreements, namely, the SDGs,<sup>146</sup> the Paris Agreement on Climate Change<sup>147</sup> and the Sendai Framework.<sup>148</sup> The Addis Ababa Action Agenda (AAAA)<sup>149</sup> and the New Urban Agenda (NUA)<sup>150</sup> helped further define the road map to achieving the global agendas. The human security approach (HSA)<sup>151 152</sup> is essential to help ensure all elements of resilience building are integrated in a coherent manner. The Sendai Framework recognizes the importance of participatory and inclusive DRR and renews calls for multi-stakeholder resilience platforms for coordinated actions, long-term investment and community-based local action, preventing and mitigating disaster risks and building resilience. The Sendai Framework further emphasizes the need for multisectoral approaches to the social, physical, environmental and economic factors contributing to vulnerability. It calls for a whole-of-society approach that addresses the special needs of women, children, the elderly and persons with disability to ensure no one is left behind and to endeavour to reach the furthest behind first.

A milestone is the focus on measurable targets and outputs, with a defined timeline for the seven global targets and a set of 38 indicators to measure progress in achieving the targets for implementing the Sendai Framework. Common thematic areas through SDGs and DRR are shown in table 2.1.

*Table 2.1 Common thematic Sendai Framework areas through SDGs and DRR*

SDG	Sendai Framework focus	DRR factors
SDG 1: zero poverty	Eradication of poverty	Poverty is a major risk driver for disasters
SDG 11: sustainable cities	Urban resilience	Rapid urbanization is a risk factor
SDG 13: climate action	Addressing climate change	Climate change is one of the risk drivers

The 24 indicators of the Sendai Framework's first five targets overlap with 11 indicators under SDGs 1, 11 and 13 (table 2.2).

*Table 2.2 Common indicators between Sendai Framework and SDGs*

SDG indicator	Sendai Framework indicator
SDG 1: End poverty in all its forms everywhere	
1.5.1 Number of deaths, missing persons and directly affected persons attributed to disasters per 100 000 population	A1, B1
1.5.2 Direct economic loss attributed to disasters in relation to global GDP	C1
1.5.3 Number of countries that adopt and implement national DRR strategies in line with the Sendai Framework	E1
1.5.4 Proportion of local governments that adopt and implement local DRR strategies in line with national DRR strategies	E2

146 United Nations, Department of Economic and Social Affairs, 2015.

147 United Nations Framework Convention on Climate Change, 2015.

148 United Nations, 2015.

149 A/RES/69/313.

150 UN-Habitat, 2016b.

151 As noted in United Nations General Assembly resolution 66/290, "human security is an approach to assist Member States in identifying and addressing widespread and cross-cutting challenges to the survival, livelihood and dignity of their people". It calls for "people-centred, comprehensive, context-specific and prevention-oriented responses that strengthen the protection and empowerment of all people". See <https://www.un.org/humansecurity/what-is-human-security/>

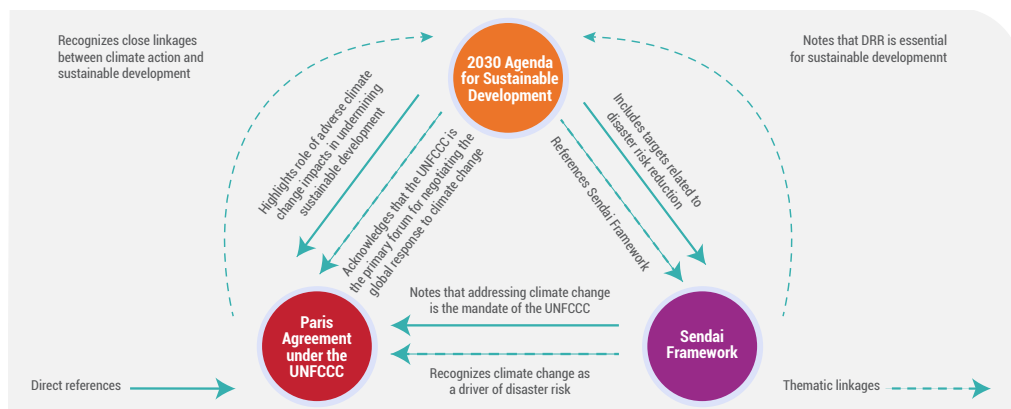
152 United Nations Trust Fund for Human Security, 2009.



SDG indicator	Sendai Framework indicator
<b>SDG 11: Make cities and human settlements inclusive, safe, resilient and sustainable</b>	
11.5.1 Number of deaths, missing persons and directly affected persons attributed to disasters per 100 000 population	A1, B1
11.5.2 Direct economic loss in relation to global GDP, damage to critical infrastructure and number of disruptions to basic services attributed to disasters	C1, D1, D5
11.b.1 Number of countries that adopt and implement national DRR strategies in line with the Sendai Framework	E1
11.b.2 Proportion of local governments that adopt and implement local DRR strategies in line with national DRR strategies	E2
<b>SDG 13: Take urgent action to combat climate change and its impacts</b>	
13.1.1 Number of deaths, missing persons and directly affected persons attributed to disasters per 100 000 population	A1, B1
13.1.2 Number of countries that adopt and implement national DRR strategies in line with the Sendai Framework	E1
13.1.3 Proportion of local governments that adopt and implement local DRR strategies in line with national DRR strategies	E2

The Sendai Framework seeks a substantial reduction in disaster risk and losses in lives, livelihoods and health, and in the economic, physical, social, cultural and environmental assets of people, businesses, communities and countries. The SDGs aim to mobilize efforts to end all forms of poverty, fight inequality, tackle climate change, and ensure that no one is left behind while endeavouring to reach the furthest behind first. Both the Sendai Framework and SDGs stress the importance of creating resilience in the natural and built environment to mitigate the risks occurring due to climate change. The Paris Agreement advances this through its global call for mitigating climate-related risks. It brings together national and regional parties on a common platform through nationally determined contributions (NDCs) by each country. It prescribes that parties shall communicate their NDCs every five years and provide information necessary for clarity and transparency. Further, climate finance is often contingent on alignment and linkage to NDC targets.<sup>153</sup> Hence, the Sendai Framework, SDGs and Paris Agreement push countries and governments to document national progress towards achieving the goals and targets. Figure 2.1 traces the common interlinkages between the three agendas.

Figure 2.1 Synergies in the Sendai Framework, SDGs and Paris Agreement



Source: NAP Global Network, 2019.

153 In 2015, several Arab countries submitted NDCs but the targets set were not aligned to the required temperature decrease. Currently, the Sudan, Somalia, Jordan, Morocco, Tunisia, Iraq and Lebanon are developing enhanced NDCs. There is an adaptation component in the ongoing analysis for water, agriculture, etc., but it is not possible to provide targets as for mitigation. The analysis addresses adaptation vulnerability and adaptation resilience, especially in water and food security, and coastal resilience. In terms of alignment to the Sendai/SDGs, the analysis is examining coastal vulnerability, climate risk, drought and floods. See UNDP ongoing analysis of NDCs, 2021.

The AAAA provides the foundation for implementing the global sustainable development agenda, with a strong focus on financing as a linchpin for development. The agenda prioritizes domestic resource mobilization with a string of measures aimed at widening the revenue base. To achieve this, it emphasizes a technology facilitation mechanism and a global infrastructure forum to boost cooperation among stakeholders. The AAAA is a proponent of financial measures favouring the poor and vulnerable, such as social protection schemes and access to basic health services, and promoting employment generation through encouraging micro, small and medium-sized enterprises (MSMEs). It also calls for commitments on addressing climate change to be reiterated.

The New Urban Agenda (NUA)<sup>154</sup> laid down policies and measures to achieve sustainable urban development, while also taking account of climate challenges and the priorities of the Sendai Framework. The NUA seeks consideration of multiscale spatial planning, from regional and national levels to the local level. It calls for the priorities to be implemented through programmes defined by line ministries, and local management of urban spatial growth, and emphasizes the need for regulatory mechanisms for inclusive and transparent financial systems.

In fragile and conflict settings, the Agenda for Humanity is an important consideration in developmental planning. The agenda<sup>155</sup> focuses on protecting internally displaced people, and furthering their interests along with those of the host communities. It calls for a proactive approach in eliminating underlying risk drivers, such as poverty, and stresses the need for investment in peacebuilding and the promotion of human rights. The human security approach helps identify and address cross-cutting issues related to people's survival and dignity. Human security is grounded in the fundamental recognition of the differing capacities, needs and circumstances of people, civil society and governments. It is based on the premise that all individuals, particularly those who are vulnerable, are entitled to freedom from fear and want, with equal opportunities to enjoy all their rights and fully develop their potential.<sup>156</sup> Freedom from fear and want, and living in dignity, is extended to include freedom from vulnerability and risk, thereby aiming for resilience and sustainability. It strengthens the local capacity to build resilience and promotes solutions that enhance social cohesion and advance respect for human rights and dignity.

Taken together, these frameworks make for a complete resilience agenda requiring actions that span development, humanitarian, climate and DRR. Such coherence strengthens resilience frameworks for multi-hazard assessments, and aims to develop dynamic, preventive and adaptive urban governance systems at regional, national and local levels. Analysing Arab regional progress through a coherent lens of the combined global frameworks provides an opportunity to identify priority areas.<sup>157</sup>

To this end, at the regional level, the Arab Strategy for Disaster Risk Reduction (ASDRR) 2030<sup>158</sup> was developed to direct efforts to coherently implement the Sendai Framework with the other global post-2015 frameworks. It takes account of the SDGs, with specific emphasis on SDG 11 on sustainable cities. Further, the ASDRR also focuses on mitigating food insecurity, water access constraints and the ongoing conflict in the region. It seeks resilience-building progress through securing freedom from hunger, water scarcity, unsafe habits, and fear of conflict.

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## **B. Progress in the region in implementing disaster risk reduction frameworks**

This section provides a regional overview of HFA implementation and of the preparations to reduce the risks outlined in the Sendai Framework.

### **1. Progress at regional level in implementing the Hyogo Framework of Action**

The HFA pressed national and local governments to recognize the need to integrate DRR considerations within development activities. It called for a shift from response to risk prevention and mitigation, and encouraged countries

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154 UN-Habitat, 2016b.

155 United Nations, General Assembly, 2016b.

156 United Nations, General Assembly, 2005.

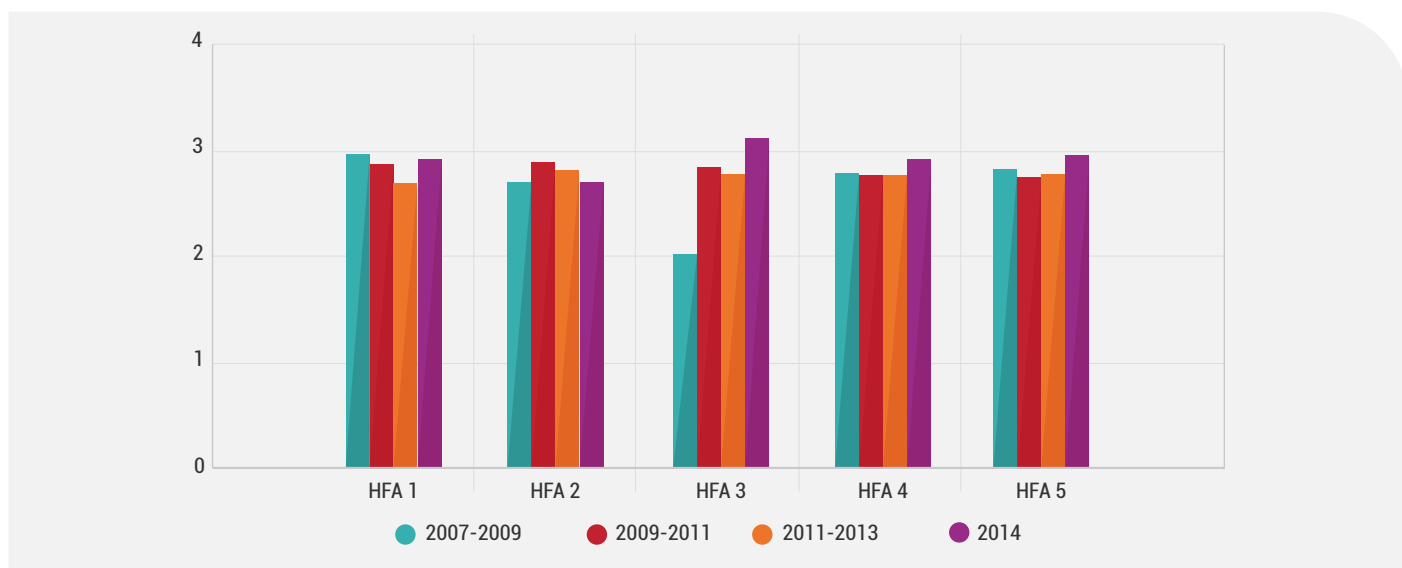
157 The Sharm el Sheikh Declaration stresses the need for greater coherence between the internationally negotiated processes of the post-2015 agendas.

158 UNDRR, 2018a.

to have strategic goal statements echoing the same priorities.<sup>159</sup> As a result, national platforms and committees for DRR were established in 13 Arab countries, namely Algeria, Bahrain, Comoros, Djibouti, Egypt, Jordan, Lebanon, Morocco, Qatar, the State of Palestine, the Syrian Arab Republic, Tunisia and the United Arab Emirates. Common challenges identified include the allocation of resources to support risk reduction activities vis-à-vis poverty alleviation programmes, in addition to the need for decentralized data collection, time-bound action plans to implement DRR strategies and tailored legislation to account for local capacities and needs.<sup>160</sup>

Regarding progress in implementing the HFA,<sup>161</sup> the average score for the Arab States in all priorities was less than three (figure 2.2).<sup>162</sup> Under priority one, the main observation was the need to enhance understanding of the interaction between the physical, economic, social, natural and institutional factors contributing to risk drivers, along with a better understanding of the relationship between climate change, poverty reduction, development and disaster risk. With priority two, the need to strengthen linkages between research and decision-making processes was identified. Review of progress under priority three stressed the importance of building two-way risk communication frameworks, and under priority four, the need to invest in reducing existing risks and to form partnerships with the private sector to promote DRR insurance and financing services. The importance of community participation in disaster planning was highlighted under the review of priority five, including post-disaster needs assessment, with a focus on gender-disaggregated vulnerability and capacity assessments.<sup>163</sup> The review findings underline the importance of delineating response and recovery plans to better prevent re-emergence of risk in post-disaster rehabilitation processes.

Figure 2.2 Progress of Hyogo Framework for Action priorities in the Arab region



Source: UNDRR, 2015.

## 2. Arab state participation in the Sendai Monitoring System

The online Sendai Framework Monitor (SFM) is a state-of-the-art system built to support the new indicators, extended hazards types and metadata mechanisms that were recommended by the Open-ended Intergovernmental Expert

<sup>159</sup> The 2013 Aqaba Declaration on DRR recognized the importance of local government/cities in creating resilience in the highly urbanized Arab region. The Sharm el Sheikh Declaration of 2014 highlighted the significance of disaster loss databases to measure progress in achieving DRR targets. In 2017, the Doha Declaration laid the foundation for monitoring progress in implementing the Sendai Framework. In 2017, during the Third Arab Preparatory Conference on DRR, the Arab Youth in Resilience campaign was launched to implement Sendai targets. Adoption of the ASDRR in 2018 marked a shift in the development agenda, and recognized the Sendai Framework as a means for sustainable development. The Tunis Declaration of 2018 accelerated the process of implementing the Sendai Framework in the African and Arab region through the adoption of a reporting and monitoring framework.

<sup>160</sup> UNDRR, 2015.

<sup>161</sup> Ibid.

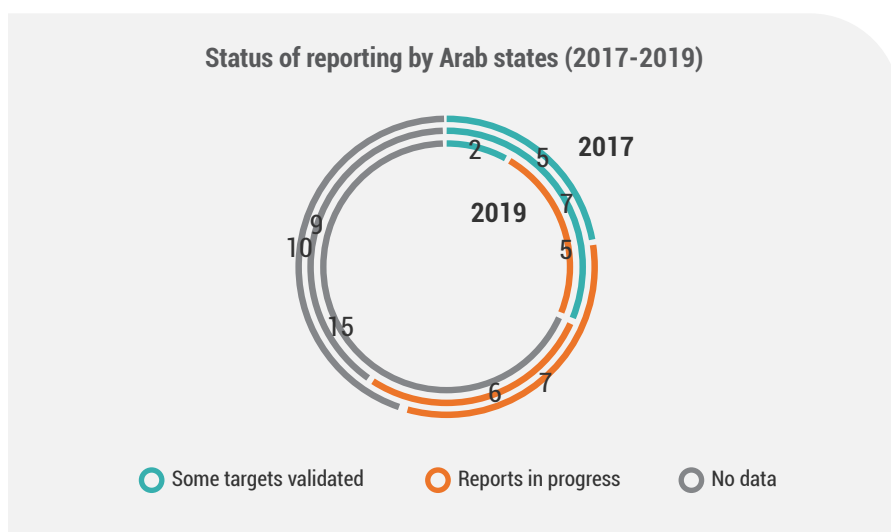
<sup>162</sup> HFA indicator score 3 indicates "institutional commitment with no comprehensive or substantial achievements".

<sup>163</sup> The five HFA priorities for action are: 1. Ensure DRR is a national and local priority with a strong institutional basis for implementation; 2. Identify, assess and monitor disaster risks and enhance early warning; 3. Use knowledge, innovation and education to build a culture of safety and resilience at all levels; 4. Reduce the underlying risk factors; 5. Strengthen disaster preparedness for effective response at all levels.

Working Group on indicators and terminology relating to DRR (OIEWG), and adopted by the United Nations General Assembly.<sup>164</sup> The SFM is an administrative tool that supports national governments to report progress towards the seven global targets of the Sendai Framework and their 38 indicators. This improved system enables detailed disaster loss and damage data to be collected at all scales (temporal and spatial) using common methodologies. It also allows the capture of disaster information that is location and time stamped, contributing to a strong analysis of disaster loss and damage.

Figure 2.3 shows regional reporting levels of Sendai targets, with the 2017, 2018 and 2019 data in the outer, middle and inner rims, respectively. There is a lack of progress in some targets validated, with 5, 7 and 2 countries reporting on this over the three years, respectively. There is progress in data availability, with 15, 9 and 10 countries reporting no data in 2017, 2018 and 2019. Training workshops were held in 2018 and 2019, with reporting on any year taking place the following year. This explains the apparent reversal in progress due to the COVID-19 crisis, which shows the wider effect of this crisis, and other potential pandemics, on government effectiveness.

Figure 2.3 Status of reporting by Arab States, 2017–2019



Source: Sendai Framework Monitor, 2018 (accessed on 10 April 2020)

Regional progress on global targets as reported by the SFM for 2018 shows that 8, 10, 12, 10, 16 and 14 countries have not yet started reporting for targets A (mortality), B (people affected), D (critical infrastructure and services), E (DRR strategies), F (international cooperation) and G (early warning and risk information), respectively (figure 2.4). However, 8, 8, 8, 7, 5 and 7 countries report progress for targets A, B, D, E, F and G, respectively. No country reported on target C (economic loss).

Figure 2.4 Status of reporting per target by the Arab States



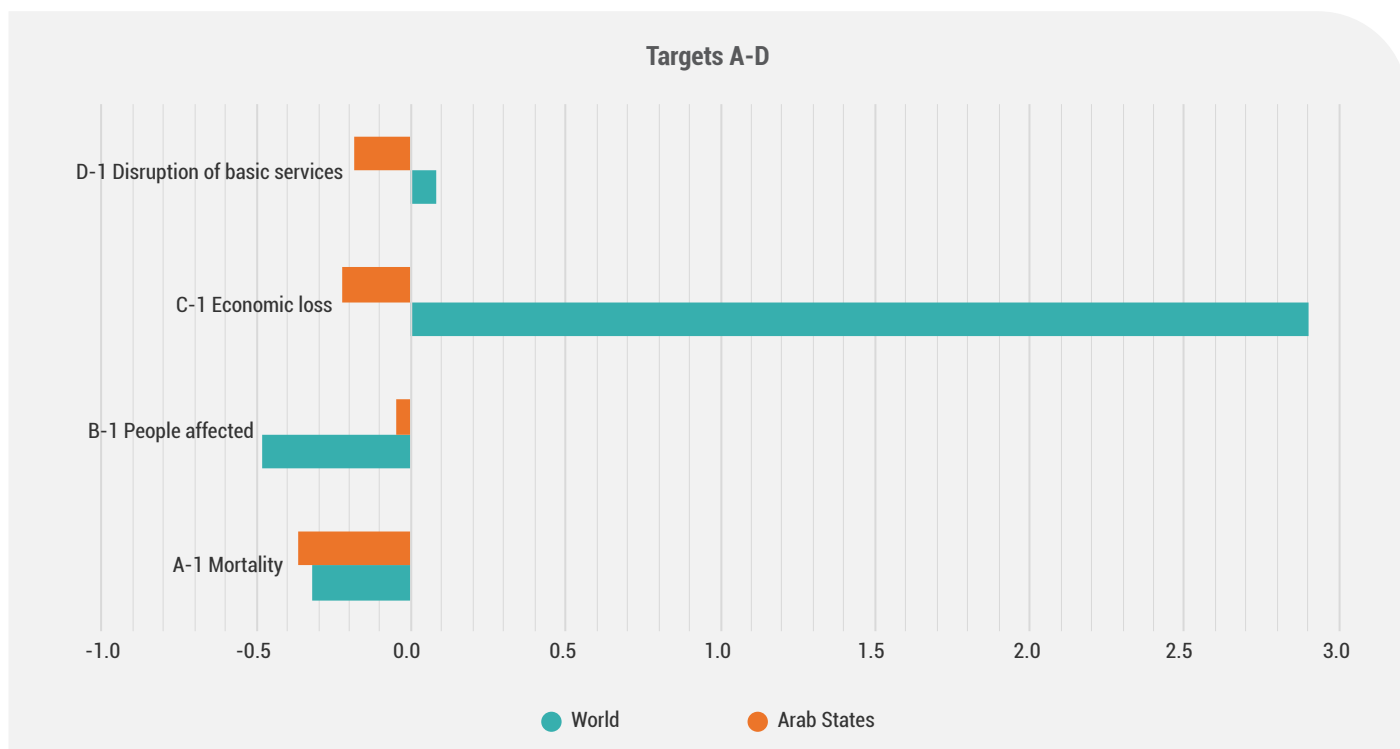
Source: Sendai Framework Monitor, 2018. Available at <https://sendaimonitor.undrr.org/> (accessed on 10 April 2020).

164 United Nations, General Assembly, 2016a.

### 3. Targets A to D: are losses being reduced?

The Sendai Framework targets A to D can be applied to the decade 2005–2014 and compared with the decade 2009–2018 to determine an increase or decrease in the value. This value is then compared to the world achievement level with the same baseline (figure 2.5). The Arab region registers an increase in economic losses and disruption of basic services compared with the world level, but a relative decrease, comparatively, in the number of deaths and people affected by disasters.<sup>165</sup>

Figure 2.5 Evaluation of progress in targets A to D



Source: Sendai Framework Monitor, 2018. Available at <https://sendaimonitor.undrr.org/> (accessed on 10 April 2020).

### 4. National databases versus EM-DAT for extreme events

Ten Arab States have DesInventar databases, which are updated with varying degrees of regularity. Further, four additional States have proprietary national disaster loss databases. To implement the Sendai Framework recommendations effectively, efforts should be made to generate disaggregated loss data and develop consistent national methodologies for estimating direct and indirect disaster losses to inform national, local and sectoral development, and climate change mitigation and adaptation policies and strategies.<sup>166</sup> In reviewing disaster loss data related to individual targets, it was decided EM-DAT would be used to provide a regional trend rather than data related to national databases; only 10 countries have provided disaster loss data, but intermittently.<sup>167</sup>

### 5. Target A: mortality

The ASDRR shows a 275 per cent increase in fatalities due to natural disasters from 2006 to 2015, compared with 1990 to 1999.<sup>168</sup> Figure 2.6 shows the deaths in the period 1970–2020, based on EM-DAT reports that show drought caused the maximum number of deaths (189,623) or 90.3 per cent of all such deaths.

<sup>165</sup> Probably due to practices in disaster loss collation that focus on reimbursement of eligible populations directly affected by disasters and do not collate numbers based on UNDRR scope of affected populations – as reported by various HFA regional progress reviews. This figure does not account for war-related fatalities and affected people.

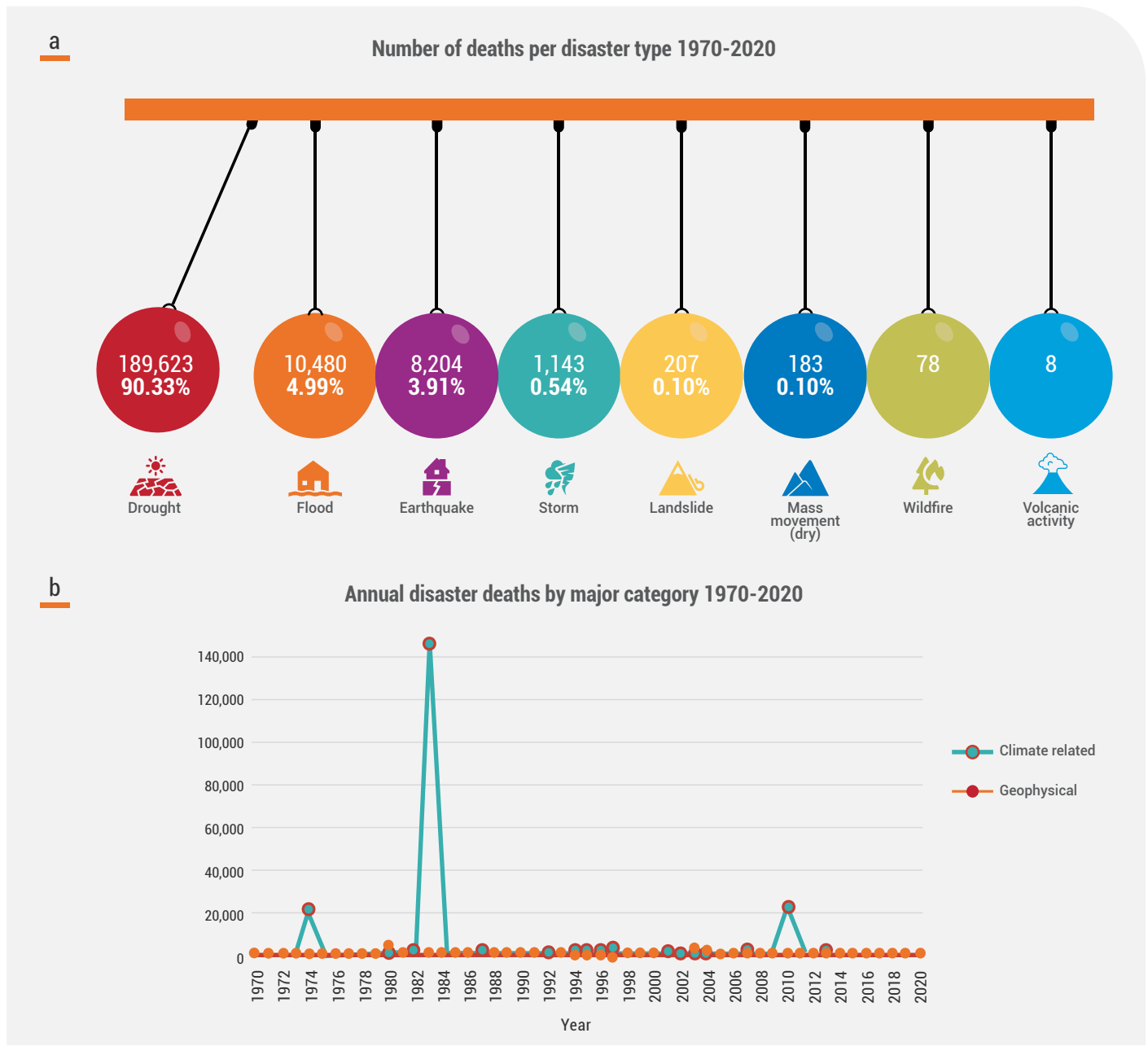
<sup>166</sup> UNDRR, 2015.

<sup>167</sup> Centre for Research on the Epidemiology of Disasters, 2020.

<sup>168</sup> UNDRR, 2018a.



Figure 2.6 Disaster mortality (a), and annual disaster mortality (b), 1970–2020



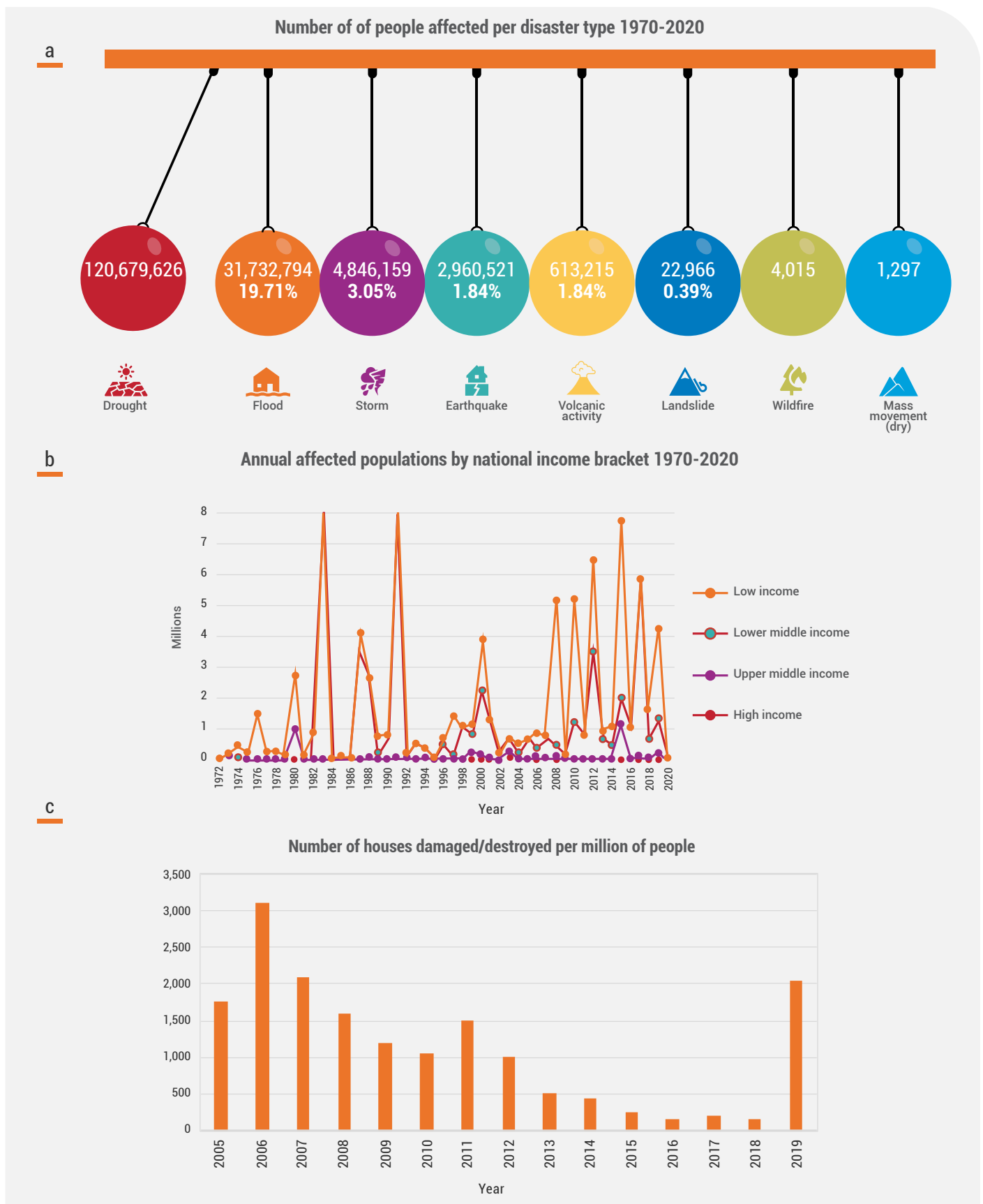
Source: CRED, 2020.

Two critical elements to meet the global targets for reducing mortality are to develop national disaster loss databases to first, increase the number of countries reporting on this target, and second, attempt to disaggregate fatalities per hazard category and intensive versus extensive risks. This will allow countries to further recognize the true human cost of disasters, and to prioritize efforts to reduce disaster-related mortality.

## 6. Target B: people affected

Figure 2.7 indicates that most people in the Arab region were affected by droughts, followed by floods and then storms, earthquakes, volcanic activity, landslides, wildfires and mass movement, with lower-income groups most disproportionately affected. The number of damaged and destroyed houses, which varies significantly, needs to be disaggregated into extensive and intensive risk to obtain a complete picture of the damage distribution within an income group.

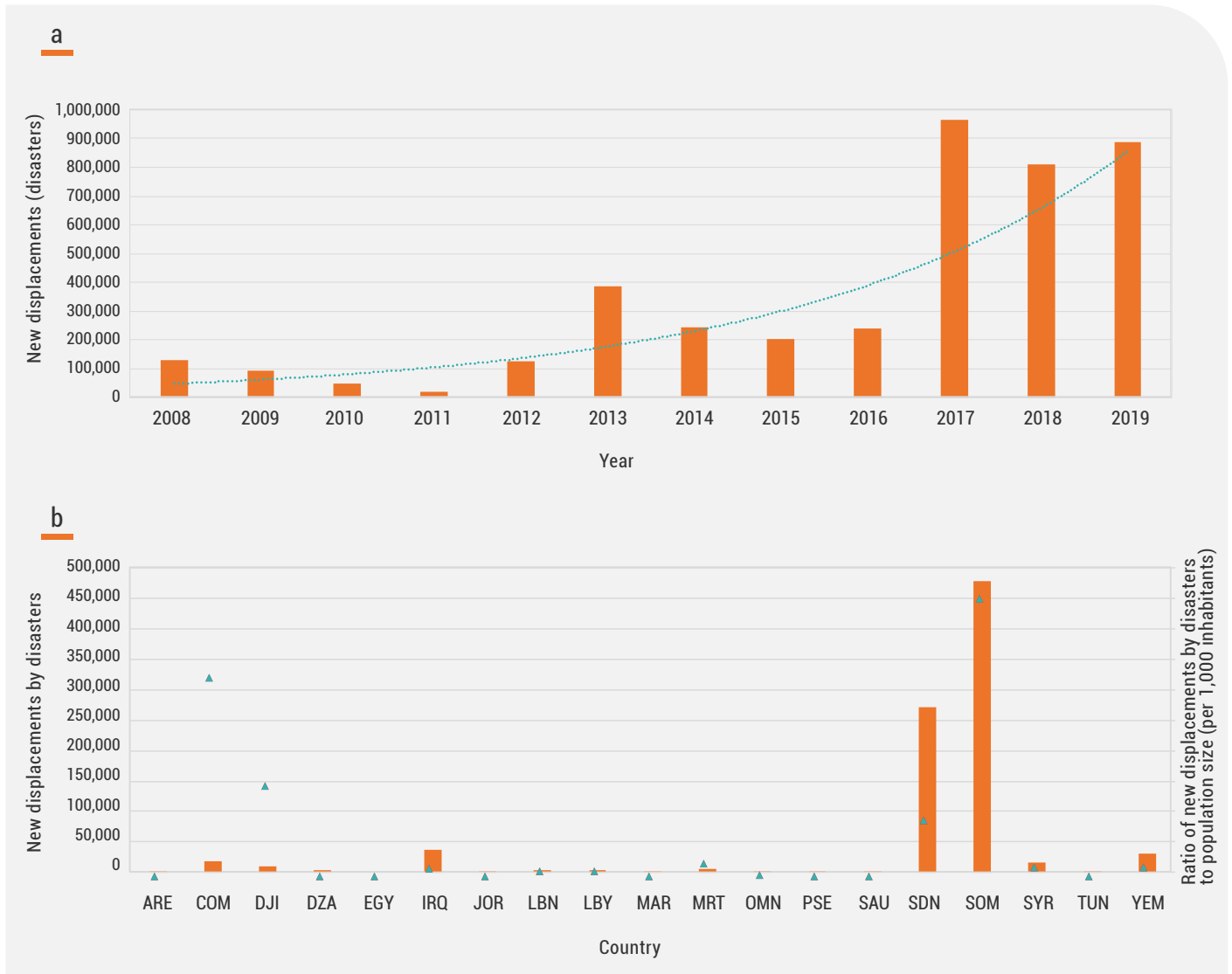
Figure 2.7 People affected by disaster (a) and people affected annually, by national income bracket (b), 1970–2020, and houses damaged/destroyed according to population size (c)



Source: CRED, 2020; Sendai Framework Monitor, 2018. Available at <https://sendaimonitor.undrr.org/> (accessed on 10 April 2020).

The complexities of population movement act as risk drivers, as represented by the limited access of internally displaced persons to decent jobs, and settlement in high-risk areas, thereby increasing the risk of secondary displacement. Meeting global targets for reducing those affected requires that special attention be paid to displaced people, in addition to the working poor and other vulnerable groups. Figures 2.8 (a) and (b) show new displacements by disasters at regional and national levels, respectively. These come on top of displacement due to conflict.

Figure 2.8 New displacements by disasters at regional (a), and national levels (b)



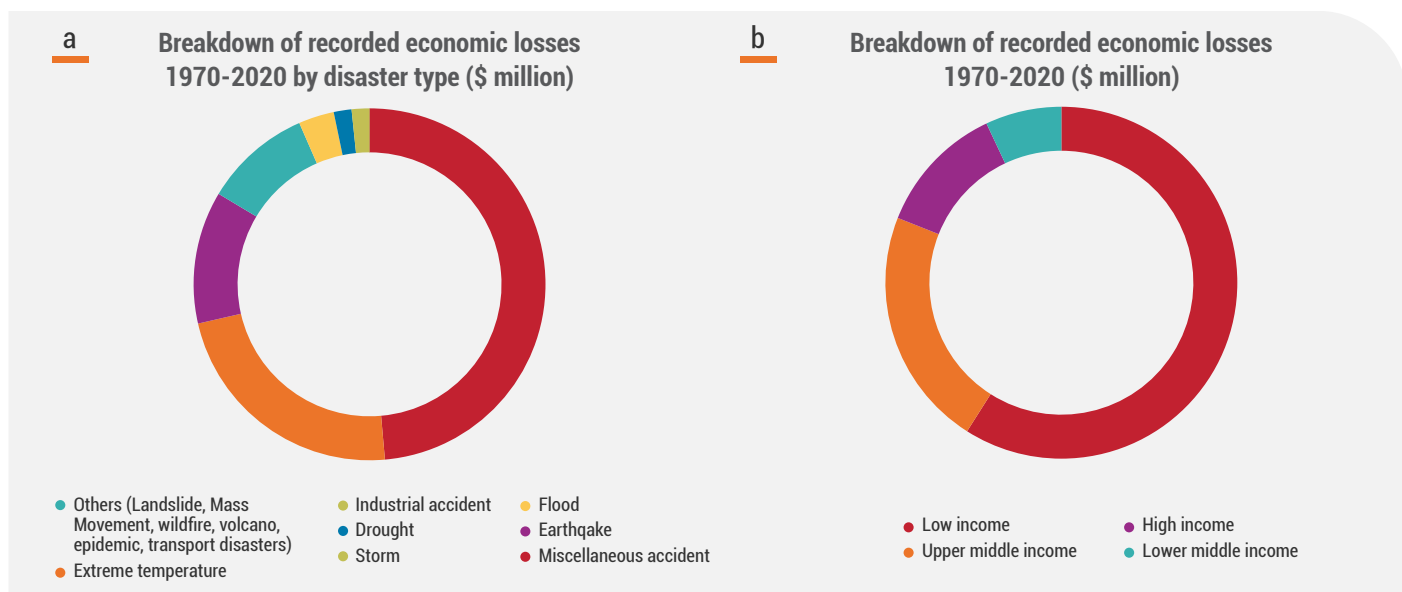
Source: IDMC, 2020b.

## 7. Target C: direct economic loss

Droughts are by far the costliest type of disaster in the Arab region (figure 2.9), with reported losses of \$29.742 billion over the past 50 years, three times those reported for either flooding or earthquakes. Further, reporting patterns are skewed to storm and drought damages, with 55 per cent of occurrences, compared with 11 per cent for extreme temperature events. The least reported types of disaster are dry mass movements, landslides and volcanic activities. The \$34.846 billion in losses recorded by EM-DAT over the period 1970–2020 in low-income countries (59 per cent of total losses) is a fraction of real total losses.

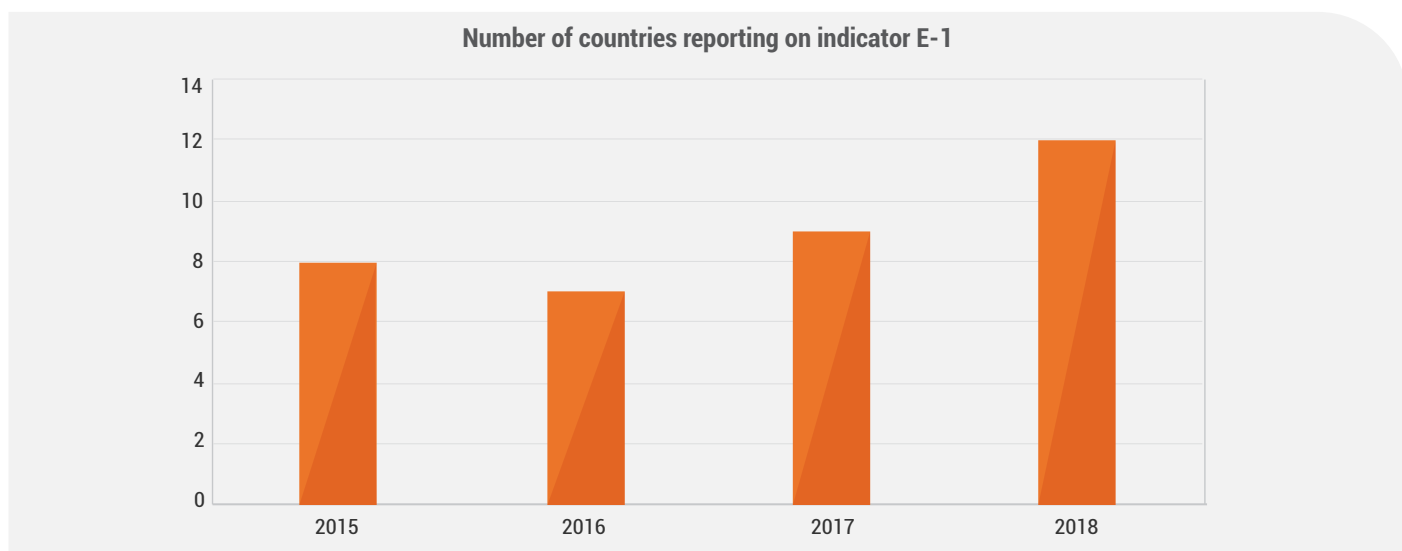
Data related to reporting on direct economic losses within national databases is scarce, due in part to capacity, awareness and coordination challenges. Meeting global targets for reducing direct economic losses requires Arab countries to report on direct economic losses per sector and hazard, and collate and differentiate between direct economic losses due to extensive versus intensive risk.

Figure 2.9 Economic losses (a), and economic losses by national income bracket (b), 1970–2020



Source: CRED, 2020.

Figure 2.10 Indicator E-1, countries reporting on national DRR strategies, 2015–2018



Source: Sendai Framework Monitor, 2018. Available at <https://sendaimonitor.undrr.org/> (accessed on 10 April 2020).

## 8. Target D: damage to critical infrastructure and public services

Meeting global targets for reducing damage to critical infrastructure and public services requires countries to collate information on damage to critical infrastructure per hazard type, disruption to public services per hazard type, and damage and disruption disaggregated per intensive versus extensive risks.

## 9. Target E: progress on disaster risk reduction strategies

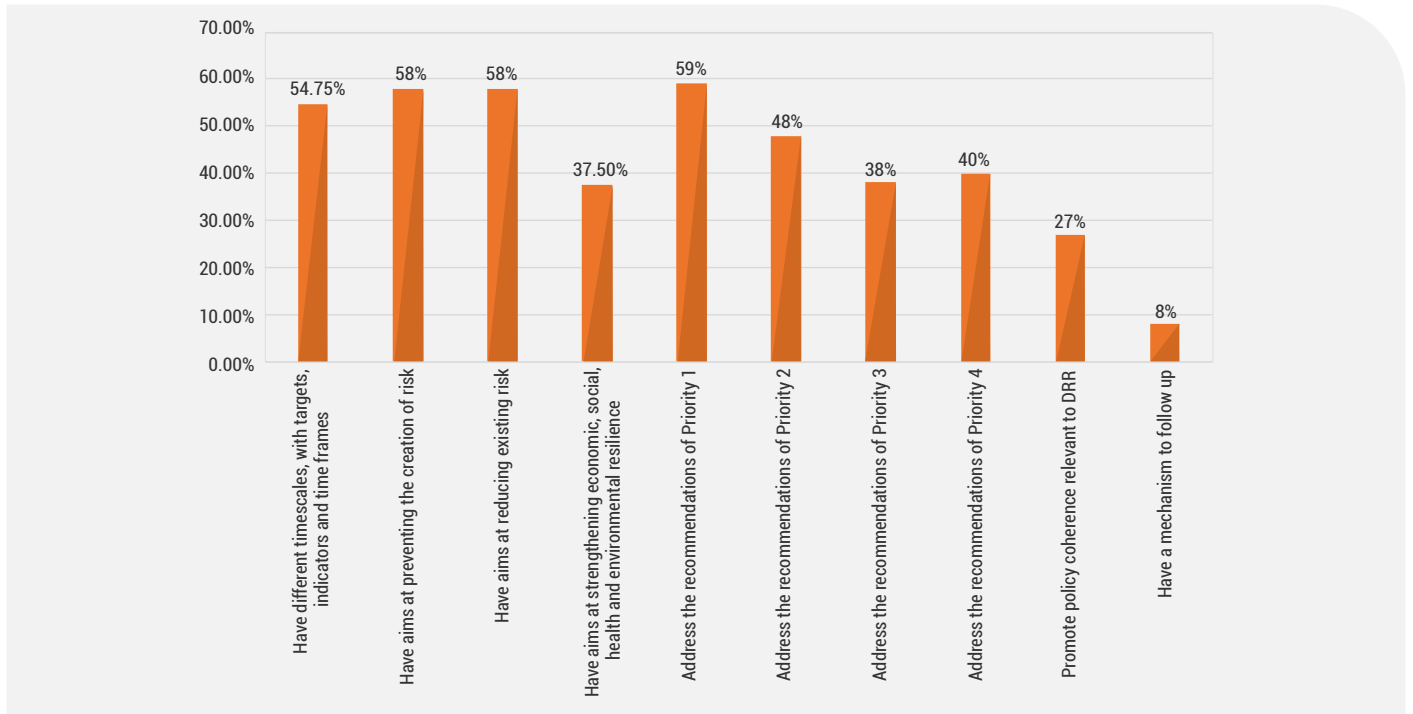
The number of countries reporting on national DRR strategies is increasing (figure 2.10), with 8, 7, 9 and 12 countries reporting on progress over the years 2015–2018, respectively.

Priority one of the Sendai Framework has been easier to align in the region, with gaps remaining in addressing priorities three and four (figure 2.11). Other areas where improvement is required include strengthening economic, social, health

and environmental resilience. Little progress is observed in achieving policy coherence to DRR, in addition to major gaps in follow-up mechanisms.

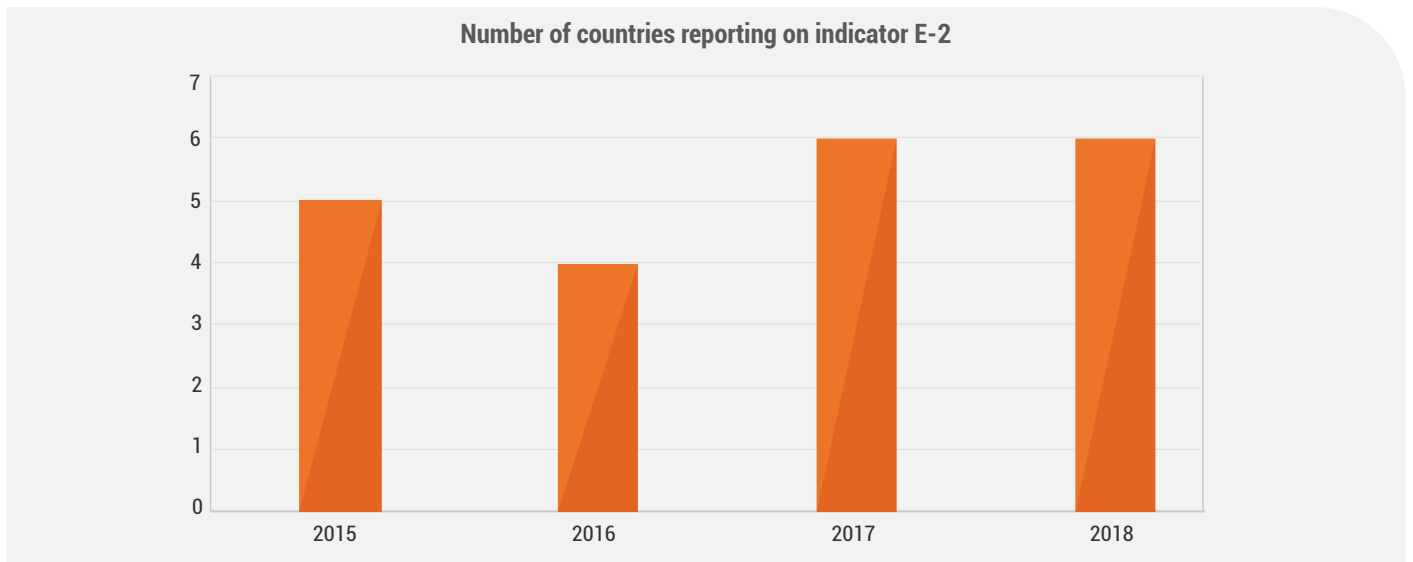
The number of countries reporting on progress in developing local DRR strategies – indicator E-2 – is increasing (figure 2.12), with 5, 4, 6 and 6 countries reporting in 2015 through to 2018, respectively.

**Figure 2.11** Alignment of national DRR strategies with 10 Sendai Framework elements



Source: Sendai Framework Monitor, 2018. Available at <https://sendaimonitor.undrr.org/> (accessed on 10 April 2020).

**Figure 2.12** Indicator E-2, countries reporting on local DRR strategies, 2015–2018

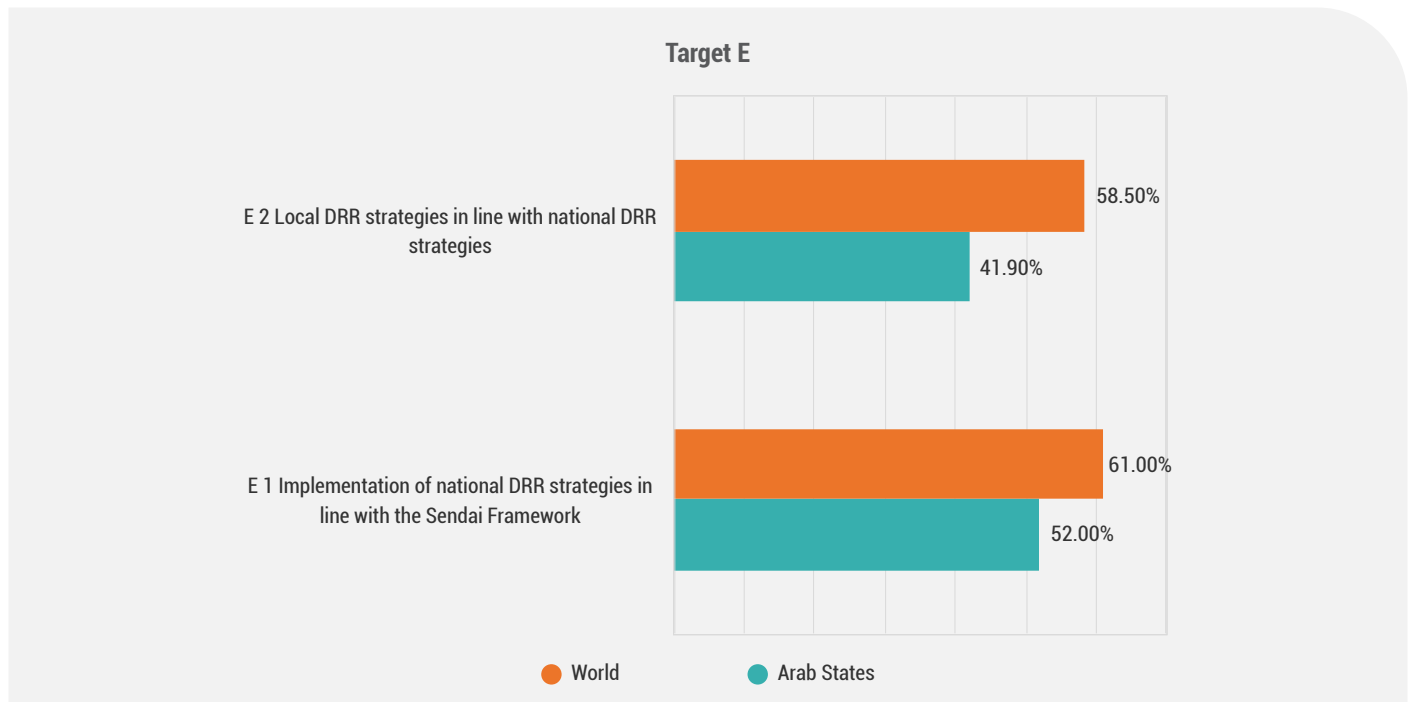


Source: Sendai Framework Monitor, 2018. Available at <https://sendaimonitor.undrr.org/> (accessed on 10 April 2020).

For target E, the actual achievement of targets for 2018 is calculated in percentage value and compared with the world level target achievement for the same year (figure 2.13). Both subtargets lag behind, the local level target being 70 per cent of the world average.



Figure 2.13 Achievement of target E, 2018



Source: Sendai Framework Monitor, 2018. Available at <https://sendaimonitor.undrr.org/> (accessed on 10 April 2020).

## 10. Target F: measuring international cooperation

Regional data for tracking official development assistance (ODA) and DRR expenditure – similar to that at global level – is incomplete.<sup>169</sup> For Arab countries to meet global targets on international cooperation, and to make an evidence-based case on the effectiveness of DRR measures, there is a need to improve efforts to track expenditure on DRR by line ministries and DRR agencies, and track incoming and outgoing international cooperation by line ministries and specialized DRR agencies.

## 11. Target G: multi-hazard early warning systems

As on the global level, reporting against target G has been a challenge for most Arab States, particularly those in fragile contexts; the four elements of people-centred multi-hazard early warning system (PCMHEWS),<sup>170</sup> even when developed at national/city level, are not sufficiently linked to act as a functioning system. To meet global targets on developing PCMHEWS, Arab States must develop the four elements of the system, and ensure they form the components of one linked functional system.

### Box 2.1 Multi-hazard early warning system in the United Arab Emirates

The National Emergency Crisis and Disaster Management Authority has developed a general national framework for early warning that covers most natural hazards and threats. The framework engages all relevant local and national authorities, and identifies an activation mechanism (figure 2.14).

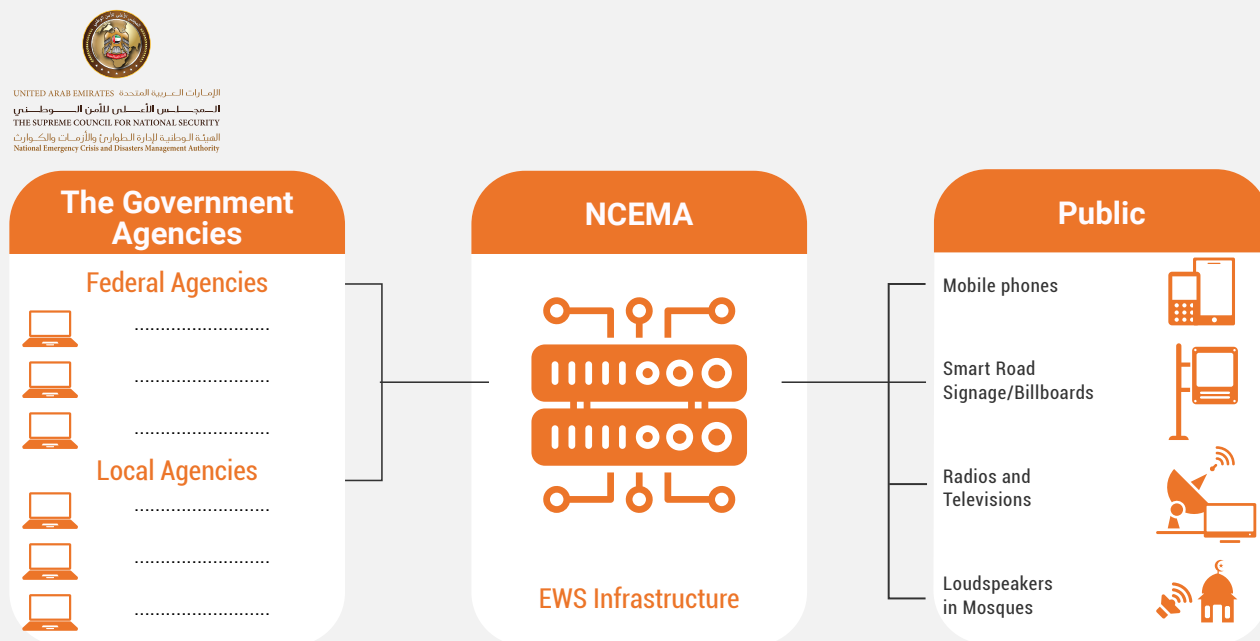


<sup>169</sup> UNDRR, 2019a.

<sup>170</sup> The four elements of people-centred multi-hazard early warning systems are: i) multi-hazard risk assessments and monitoring; ii) monitoring and forecasting; iii) dissemination and communication reaching wide coverage; iv) preparedness to respond and response plans.

The mechanism for activating the system is based on several inputs and databases, and monitoring and follow-up systems with national and regional coverage. This includes: (i) a national risk register and a database indicating the damage caused by major disasters and events; (ii) weather and climate nationwide monitoring stations covering the various sectors; (iii) a national and regional weather radar network that monitors violent phenomena and weather in the Gulf; (iv) a smart monitoring network to measure the seismic impact in major Emirati cities; (v) high-definition multichannel satellite stations; and (vi) high-definition numerical prediction models for multiple environmental hazards.

Figure 2.14 National framework for early warning system, the United Arab Emirates



Source: United Arab Emirates, Supreme Council for National Security, National Emergency Crisis and Disasters Management Authority, 2017.

To ensure that the system reaches the largest segment of people in a timely manner, the framework coordinates the roles and responsibilities of all local and national authorities, using traditional and modern methods provided by technology, and protocols of social communication networks

## 12. Progress on disaster risk reduction and related SDGs

A review of regional progress in implementing the Sendai Framework-related SDGs<sup>171</sup> shows mixed results for SDG 13 and slower progress in SDG 11, while SDG 1 remains difficult to monitor due to data scarcity. The region's average index score for all SDGs is 58, as noted in the Arab Region SDG Index and Dashboards Report, 2019.<sup>172</sup> These SDGs can be seen as drivers in reducing disaster risk, the success of which indicating progress in the objectives of the Sendai Framework.

More recently, four Arab countries, namely Comoros, Libya, Morocco and the Syrian Arab Republic, submitted voluntary national review reports during the 2020 High-level Political Forum (HLPF). Comoros reported disaster information related to SDG 1 (no poverty), SDG 2 (zero hunger) and SDG 13 (climate action), while Morocco reported disaster information related to SDG 11 (sustainable cities and communities).<sup>173</sup>

171 Sachs and others, 2019.

172 Luomi and others, 2019.

173 United Nations, Department of Economic and Social Affairs, Division for Sustainable Development Goals, "Voluntary National Reviews 2020". Available at <https://sustainabledevelopment.un.org/hlpf/2020> (accessed on 11 March 2020).

## C. Sectoral strategies in mainstreaming disaster risk reduction

DRR efforts to develop, recover and reconstruct PCMHEWS – including preventing new risk and reducing existing risk – are often best achieved when national DRM recommendations and international best practices are mainstreamed to the sectoral level (while not underestimating the importance of cross-sectoral efforts and mechanisms for coordinating DRM initiatives, including establishing DRR agencies and platforms). It is for this reason that data disaggregated by sector is required for a full reporting under the Sendai Framework, particularly for global targets C and D, where the indicators require more accurate collating.

### Box 2.2 *Agriculture sector disaster risk reduction regional strategies*

There are few sections in the ASDRR 2030 where agriculture is specifically mentioned.<sup>a</sup> It followed a review of the ASDRR 2020, which identified gaps and opportunities in DRR policies and processes for the sector.<sup>b</sup> A recurrent observation was the need for enhanced disaggregated information, stronger evidence and multi-hazard early warning frameworks, in addition to opportunities for policy development and coherence, and participatory processes.

In light of this, the Food and Agriculture Organization of the United Nations (FAO) has been supporting agriculture ministries in the region to mainstream DRR. In Lebanon, Egypt and Jordan, work is ongoing to understand the major hazards and risks that will contribute to the development of DRR action plans complementing each country's national agriculture strategy. In addition, FAO is working towards strengthening evidence for risk-informed policy development in the sector and building early warning and information systems to facilitate anticipatory action across agriculture subsectors, including transboundary plant pests and animal diseases.

a Agriculture is mentioned in table 24, Agriculture and forestry and identification of gaps, of the ASDRR. See UNDRR, 2018a.

b UNDRR, 2018b.

### Box 2.3 *Infrastructure seismic resilience*

The report, Making Algeria Resilient,<sup>a</sup> summarizes the country's efforts in building capacity. Such endeavours are informed by research studies and include sectoral risk assessments that prioritize infrastructure resilience through stringent building codes and national insurance policies. The National Center of Applied Research in Earthquake Engineering, under the Ministry of Housing, Urban Development and the City, provides risk modelling and simulations to inform national building codes, and the citing and zoning of all projects undertaken by ministries with regard to urban planning, major infrastructure and public works. The centre's research, including through advanced shake table technologies, has been critical in fully mainstreaming a scientific vision for DRR across critical sectors, such as urban housing, settlements and land use planning.

a UNDRR, 2013A.

### Box 2.4 *Risk awareness and disaster risk reduction through knowledge, innovation and education*

Bahrain's National Major Civil Contingency Strategy<sup>a</sup> aims to mainstream DRR and develop a culture of safety, risk awareness and risk reduction through knowledge, innovation and education, at all levels. The strategy builds on the strength of schools to bridge the gap between scientific knowledge and practical local action. Curricula are developed to inculcate in young people attitudes that are risk-informed and risk-averse, from schools to university levels. Educational campaigns and school drills are undertaken, and hazard and risk-related information to raise awareness is included in school syllabuses. The current risk information is assessed across age groups and then assimilated in curricula. Applied research is used to inform public opinion and raise awareness, and teachers are trained to deliver DRR concepts effectively.

a Bahrain, National Committee for Disaster Management, n.d.

## Box 2.5 Investment, finance and insurance

The National Strategy for Disaster Risk Reduction (NSDRR) 2030, endorsed by the Cabinet of Egypt,<sup>a</sup> recognizes the importance of DRR as one of the essential elements supporting the sustainable development strategy, and its policies, legislation, plans and programmes. The NSDRR stresses the importance of developing organizational frameworks that support providing funds and loans to sustainable development projects. These include providing suitable incentives and supportive legislation for a stable and effective capital market. The strategy includes the social sector, through prioritizing lending to small and micro-enterprises and CSOs operating in community development, the environment, and disaster management, and with development and agricultural banks. It highlights the importance of result-based financing and the need to create DRR funds. The NSDRR places value on protecting public and private investments through insurance mechanisms linked to risk assessment results, and seeks to increase the role of the insurance sector in disaster risk financing. It also prioritizes investment in the development of early warning systems to enhance preparedness. With its focus on financial planning to implement the sustainable development agenda, this sectoral strategy aligns with the AAAA.

a Egypt, Cabinet of Egypt, Information and Decision Support Center, 2017.

## Box 2.6 ICT disaster recovery and response

The Kuwait Government Initiative for ICT Disaster Response<sup>a</sup> outlines the sectoral strategy for ICT business continuity and disaster recovery. It mandates the Central Agency for Information Technology (CAIT) to supervise implementation of the national strategy and provide physical and network security to mitigate cyber risk. To fulfil this requirement, CAIT set up a national data centre with the authority to secure backup of all critical government data, at all levels. Government agencies are requested to prepare a Business Continuity Plan and test it regularly for operational efficiency.

The strategy ensures smooth coordination of the disaster response, with a network operations centre running proactive monitoring to identify malfunctions, based on technical risk assessment at national level. It is linked to the network of GCC countries for disaster preparedness and response, ensuring multi-stakeholder DRR partnerships at regional level.

a World Resources Institute, 2019.

## Box 2.7 COVID-19 multi-stakeholder multisectoral strategy

In the United Arab Emirates, government measures in response to COVID-19 included an emergency national strategy<sup>a</sup> designed to: (i) ensure quality food is constantly available; (ii) provide continuous health care and medicine; (iii) mitigate the economic and social impacts of COVID-19 and contribute to business continuity and livelihoods; (iv) provide support to friendly nations; (v) enhance state-society trust; and (vi) strengthen national and community resilience.

The strategy engages the food and water, health, safety and security sectors, with its application being the responsibility of the National Forum for DRR. The forum was set up in 2018 to coordinate the implementation of the national DRR strategy in line with the Sendai Framework. Forum members include the National Emergency Crisis and Disaster Management Authority, the ministries of Interior, Defense, Climate Change and Environment, Energy and Infrastructure, and Health and Protection, the Federal Competitiveness and Statistics Centre, the Insurance Authority and the National Center of Meteorology. The strategy has succeeded in ensuring business continuity and safeguarding livelihoods, while protecting people's health and preventing the uncontrolled spread of the coronavirus, thereby improving state-society trust and state security.

The United Arab Emirates has cultivated the first private sector alliance for DRR, the ARISE initiative.<sup>b</sup> Officially launched in November 2020, ARISE was conceived to close a number of preparedness gaps identified by private sector actors against a backdrop of the COVID-19 pandemic. It consists of various groups within the economy, including the real estate sector, the health care sector, technology start-ups, and asset management



and business management consultants. To address the risks posed by human-made and natural hazards, the group works to gather untapped expertise and resources across sectors in the United Arab Emirates, thereby aligning itself with three ARISE global priorities, namely integrating disaster risk into financial sector investment, building resilient infrastructure and enhancing the resilience of micro, small and medium-sized enterprises.

ARISE-UAE has played a significant role in the COVID-19 response through a series of activities. These include training on business continuity for firms, surveys and analyses on disaster risk and providing a forum for other stakeholders to engage with the private sector. The activities have sought to build on the know-how of firms while assessing the environment in which the private sector operates, and to develop tools to build resilience across firms. All activities are orientated to appeal to regulators, and illustrate the need for DRR initiatives and a regulatory framework capable of using up-to-date preparedness tools to continuously enhance resilience.

a United Arab Emirates, Supreme Council for National Security, National Emergency Crisis and Disasters Management Authority, 2020.

b UNDRR, 2020e.

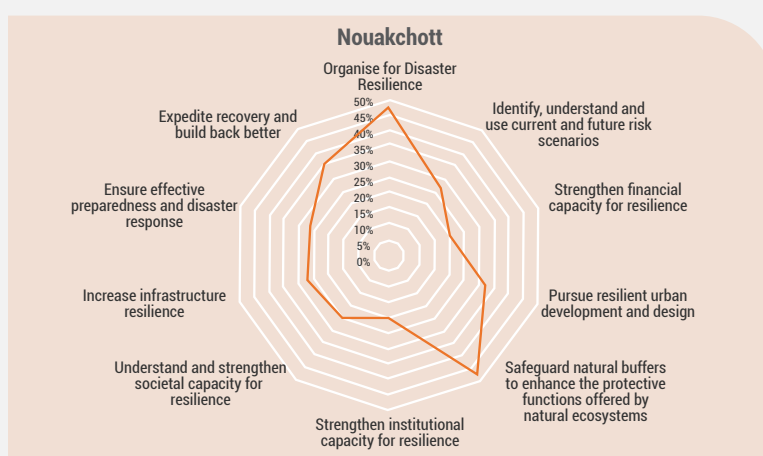
## D. Regional progress in implementing the Sendai Framework at local level

The Sendai Framework underlines the importance of resilience building at local level, recognizing that participatory approaches involving local stakeholders are crucial to achieving sustainable development. City plans drive the cultural, environmental and economic realities of each territory. Moreover, many hazards are local to a particular city, which requires that resilience capacity be developed at that level. Six Arab cities (Aqaba, Zarqa, Khartoum, Dubai, Nablus, Nouakchott) have followed the Ten Essentials criteria developed by UNDRR – they map directly against the Sendai priorities and its indicators for monitoring actions on DRR – to assess their resilience and develop local action plans,<sup>174</sup> and four cities (Amman, Byblos, Luxor, Ramallah) are part of the Rockefeller Foundation’s 100 Resilient Cities campaign.

### Box 2.8 Nouakchott Disaster Risk Reduction Plan

Nouakchott’s 2019–2023 DRR plan includes natural and health hazard-based risk assessment.<sup>a</sup> It identifies the need for a coherent legislative and institutional framework, especially as draft DRR laws and implementation decrees are pending approval. Based on the Ten Essentials criteria, the city’s score in 2019 was 28 per cent, well below the world average of 42 per cent. The plan proposes activities with targets and time frames as per the Ten Essential criteria, with budget sources identified.

Figure 2.15 UNDRR\* Ten Essentials, Nouakchott



Source: Mauritania, Nouakchott Authority and UNDRR, 2019.

Note: \* The United Nations Office for Disaster Risk Reduction officially changed its acronym to UNDRR from UNISDR in 2019.

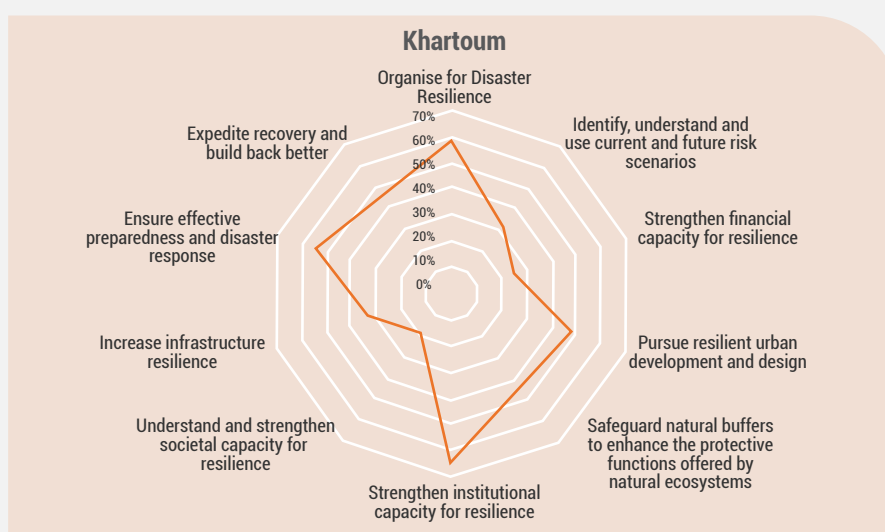
a Nouakchott Authority and UNDRR, 2019.

## Box 2.9 Khartoum State Disaster Risk Reduction plan

Khartoum State, which contains the capital city of Khartoum, is the major trading, financial and political centre of the Sudan. Its risk reduction action plan,<sup>a</sup> prepared in consultation with stakeholders including civil society, academia, NGOs and the private sector, identifies drought, flash floods and floods, torrential rains, earthquakes, dust storms, fires, epidemics and environmental hazards as the main threats to the state. The plan addresses the social aspects of vulnerability and seeks to empower residents through a community-based, bottom-up approach to DRR. Based on the UNDRR scorecard, the current status of resilience in Khartoum is 41.5 per cent, close to the world average.

The plan identifies local leadership, and draws on the assets and skills of the community to ensure their participation and ownership. Linkages between DRR, CCA and sustainable development plans are identified under the main pillars of environmental protection, urban development, green cover, natural waterways and rural settlement systems. The timeline and budget needs and sources to achieve set targets are clearly defined, and a coordination and accountability framework has been developed to monitor implementation status.

Figure 2.16 UNDRR\* Ten Essentials, Khartoum



Source: The Sudan, Ministry of Infrastructure and Transport, and UNDRR, 2019.

Note: \* The United Nations Office for Disaster Risk Reduction officially changed its acronym to UNDRR from UNISDR in 2019.

a The Sudan, Ministry of Infrastructure and Transport, and UNDRR, 2019.

## Box 2.10 The Aqaba Risk Reduction and Resilience Action Plan

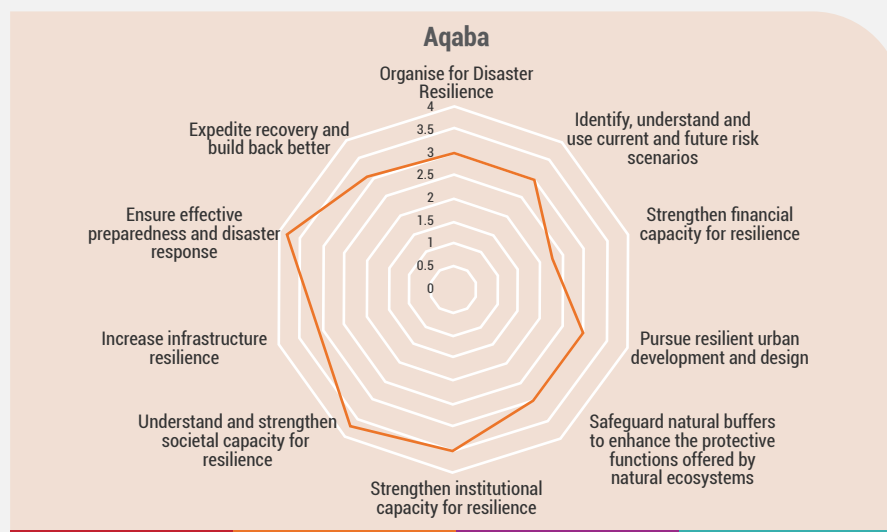
Aqaba is strategically important to Jordan. The country's only seaport city, it is an important import and export hub, with several industrial activities, and the main administrative centre in southern Jordan. Aqaba is vulnerable to earthquakes, flash floods, sandstorms and industrial hazards. The Aqaba Risk Reduction and Resilience Action Plan 2016<sup>a</sup> assessed seismic and other hazards affecting the city, including floods and flash floods, drought and extreme heatwaves. The plan recommends the city development plan be more risk-informed, through integrating the risk reduction plan within the local development plan. It also provides legislative recommendations to allow the Aqaba Special Economic Zone Authority (ASEZA) to more effectively participate in DRR. The plan recognizes the impact of economic growth on the existing marine ecosystem and advises integrating ecosystem services into urban land-use planning.

Aqaba Women's Association is included as a stakeholder, tasked with increasing women's role in DRR activities, with civil society working to generate awareness. The private sector is engaged in developing



contingency plans. The plan has scope for improvement in developing financial measures, including insurance and incentives for private sector investment and a dedicated fund for DRR activities, and strengthening its social vulnerability perspective.

Figure 2.17 UNDRR\* Ten Essentials, Aqaba



Source: Aqaba Special Economic Zone Authority (ASEZA) and UNDRR, 2016.

Note: \* The United Nations Office for Disaster Risk Reduction officially changed its acronym to UNDRR from UNISDR in 2019.

a ASEZA and UNDRR, 2016.

## E. Conclusion

This RAR is informed by the latest disaster data made available by Arab States, and that are available in international databases. Data are lacking on direct economic losses and damage to critical infrastructure and public services. Available disaggregated data need to be improved, including by gender, age, ability and poverty status, to better link to sustainable development and CCA, and a truly coherent and integrated approach for sustainable development needs to be adopted. The Sendai Framework Monitor represents an opportunity for countries to collate disaggregated data on disaster losses. While the monitoring period is too short to draw conclusions at regional level, it is possible to observe the following patterns:

- A common challenge observed in DRM strategies and action plans is the lack of legal and institutional support at country and local level. This makes it difficult to devise financial mechanisms to implement national and local level strategies, as highlighted in the AAAA, and limits the scope of private sector engagement. It also impedes accountability in implementing DRR strategies. This can cause poor reporting and documentation gaps at regional level. The absence of risk governance mechanisms creates the potential for disaster losses to cascade across interconnected socioeconomic systems, especially in cases of conflict.
- A common challenge facing Arab cities is in urban development, where ageing, non-resilient infrastructure networks of communication, roads and drainage lead to the creation of systemic risks. Additional effort is required to collate damages on infrastructure losses and interruption to basic services.
- Arab countries are increasing the number of local and national strategies in line with the Sendai Framework, reported to be 41 per cent and 52 per cent, respectively, in 2018.
- National DRR strategies often focus on hazard assessment rather than comprehensive risk assessment including all dimensions of vulnerability, capacity, exposure and the environment.
- National DRR strategies do not sufficiently identify and integrate gender and social issues based on participatory multi-stakeholder approaches. Addressing this gap could be an entry point for improving coherence and integration across the SDGs and the Paris Agreement.

- National DRR strategies do not sufficiently address financing needs and resources, including from national and international sources, and public and private sectors. Several countries recognize the role of the private sector as a partner in investment and insurance but a proactive private sector contributing to disaster-resilient investments is yet to be developed.

While some States have advanced early warning technologies, others depend on regional weather forecasts. Widespread availability and access to people-centred MHEWS, as envisaged by the Sendai Framework, are yet to be achieved.

**Building regional coherence between the three international agendas: climate change, disaster risk reduction and sustainable development**

**3.**



## A. Introduction

The impacts of climate change on people's livelihoods will hinder efforts to reduce poverty, or even exacerbate poverty in some or all of its dimensions. Changes in the biophysical environment, such as droughts, flooding, water quality and degraded ecosystems, are expected to threaten opportunities to generate income, which in turn will likely increase economic and social vulnerability of households and communities, especially among the poorest.<sup>175</sup> The effect on communities and households will vary among social-ecological systems.<sup>176</sup> The three primary documents of the post-2015 agenda, namely the Sendai Framework, 2030 Agenda and the Paris Agreement, call for strengthened coherence and linkages in the design and implementation of their strategies, policies, programmes and projects.<sup>177</sup> Building resilience, therefore, focuses on the opportunities and challenges of implementing the three agendas collaboratively to support integration, including financing at country level (figure 3.1).

175 IPCC, 2012b.

176 De Souza and others, 2015.

177 Murray and others, 2017.

Figure 3.1 Alignment of the three 2015 agendas for reducing vulnerability and building resilience



Source: UNFCCC, 2017.

## Lobbying for financial integration

The United Nations is coordinating the efforts of the Special Envoy on financing the 2030 Agenda for Sustainable Development, the Special Envoy for Climate Action and Finance, the United Nations Department of Economic and Social Affairs (UN DESA), and other relevant United Nations agencies and departments. Paragraph 28 of the General Assembly resolution of December 2019 on disaster risk reduction encourages increased investment, including in resilient infrastructure. It calls on all stakeholders to assist developing countries in producing comprehensive DRR financing strategies supporting national and local DRR strategies, promote investments in resilience and prevention, and explore the development of tailored financing mechanisms, including forecast-based approaches and disaster risk insurance mechanisms. Paragraph 29 of the resolution also encourages States to allocate increased domestic resources to DRR, including resilient infrastructure, consider DRR in budgeting and financial planning across all relevant sectors, and ensure that national financing frameworks and infrastructure plans are risk-informed, according to national plans and policies.<sup>178</sup> The intergovernmental-agreed conclusions and recommendations of the Economic and Social Council (ECOSOC) Forum on Financing for Development (FfD Forum) recognizes that the private sector and private finance can play a major role in achieving the SDGs, and in the immediate response to the COVID-19 pandemic and longer term recovery. The FfD Forum recommends the development of DRR financing strategies and financial instruments as essential to improving preparedness for future shocks.<sup>179</sup>

This chapter reviews regional opportunities for strengthening the alignment of the three global agendas, by examining their common objectives, identifying synergies and entry points for integration of activities. This will help regional efforts for coherent resilience building in order to achieve sustainable development that leaves no one behind and endeavours to reach the furthest behind first.

## B. Climate change hotspots in the Arab region

The three types of climate change hotspots<sup>180</sup> – defined as a combination of areas where climate change signals overlap with vulnerable communities, affecting socioeconomic development – include densely populated deltas and semi-arid

178 United Nations, General Assembly, 2019.

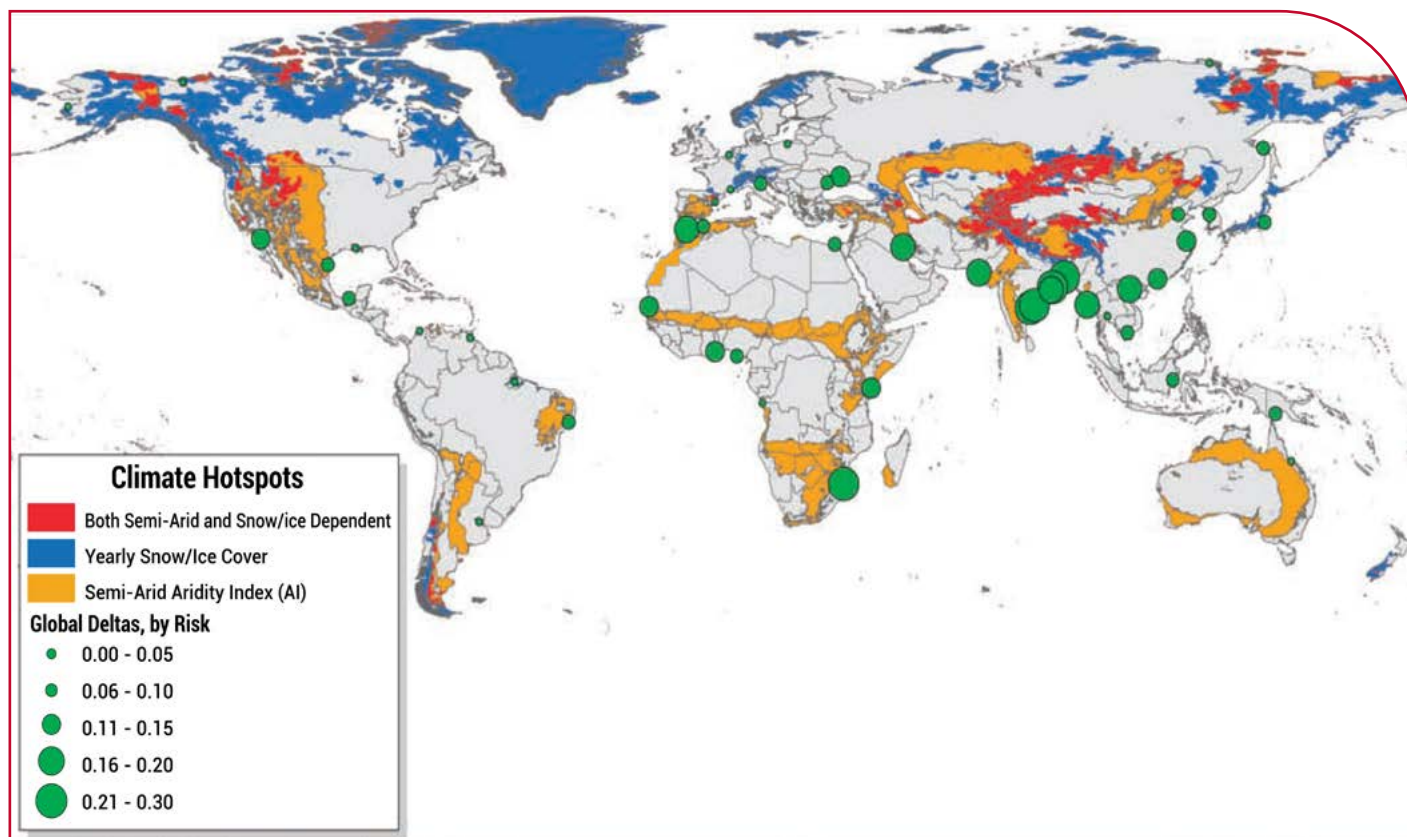
179 United Nations, Economic and Social Council, 2020.

180 The climate hotspots used in the proposed multiscale SDG framework include: (i) major global delta locations (green dots), varied according to contemporary risk due to sea-level rise and anthropomorphic factors; (ii) semi-arid regions (orange) where aridity index (AI) falls between 0.2 and 0.5; (iii) snow and ice run-off-dependent basins (blue), defined as basins with average yearly snow/ice cover  $\geq 25\%$ ; (iv) overlapping areas with both semi-arid AI and snow/ice run-off dependency (red).



regions and cover a large portion of the world, including the Arab region (figure 3.2).<sup>181</sup> These hotspots generally cut across administrative boundaries with limited political representation. As a result, they are not often a focus of direct policy action, with implications for sustainable development and welfare of local populations.

Figure 3.2 Climate change hotspots requiring attention using SDG indicator framework



Source: Szabo and others, 2016.

Note: The designations employed and the presentation of material on this map do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

Given the importance of climate hotspots to societal and ecological well-being, failing to adequately monitor the environment of these regions may impede their developmental progress, and hinder achievement of wider SDGs. It is also likely to impede SDG accountability, which requires monitoring at global, regional, national, and local levels. The choice of critical environmental indicators will reflect the climate and environmental priorities for 2030, with direct implications for financing for development.<sup>182</sup> Synergies in the monitoring of the international frameworks thus has increased importance.<sup>183</sup>

Human development challenges in climate hotspots is addressed by SDG 13, which seeks “urgent action to combat climate change and its impacts”. Targets and indicators relevant to climate change are included under other SDGs, covering different social and economic dimensions. One way to address the scarcity in disaggregated data at regional, national and local levels is to transform the global agreements into an integrated multiscale indicator framework that would reflect the significant developmental challenges in these hotspots in the region, and allow change to be monitored at different levels of analysis, including for cross-boundary regions (figure 3.3).<sup>184</sup>

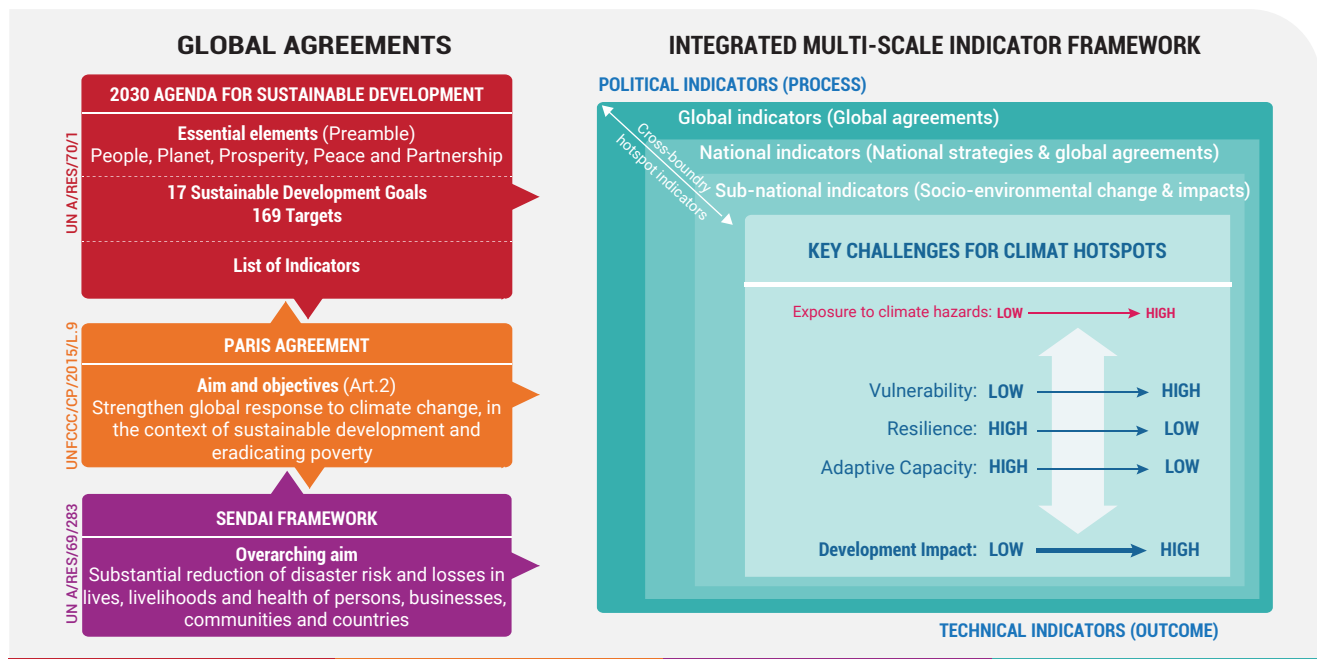
181 Szabo and others, 2016.

182 Ibid.

183 United Nations, General Assembly, 2017.

184 Ibid.

Figure 3.3 Proposed SDGs framework for climate hotspots that aligns 2030 Agenda, Paris Agreement and Sendai Framework



Source: Szabo and others, 2016.

## C. Taking the next steps: integrated development planning at regional level

The existing fragility in the Arab region, shaped by linked challenges of water scarcity, food insecurity, population growth, social vulnerability, rapid urbanization, low resilience and increased conflicts, is exacerbated by climate change. The situation requires an integrated CCA, DRR and sustainable development approach. Opportunities for integrating climate change adaptation with SDGs and the Sendai Framework may be categorized under the key recommendations of the United Nations Framework Convention on Climate Change (UNFCCC),<sup>185</sup> which focus on the following:<sup>186</sup>

- Coherence and autonomy of frameworks to save money and time, enhance efficiency and enable adaptation action.
- Enhancing resilience and ecosystems as core concepts for motivating integration.
- Building capacity for coherence and coordination will clarify roles and responsibilities and encourage partnerships among a range of actors, including State and non-State, operating across multiple sectors and scales from local to global, which in turn can facilitate policy coherence. Further, vulnerable people and communities can initiate and benefit from bottom-up, locally driven solutions that contribute to multiple simultaneous policy outcomes.
- Building capacity for data management will improve data availability, including climate and socioeconomic data, and resolution and disaggregation, which in turn will inform more coherent policymaking.
- The process of formulating and implementing national adaptation plans can support the implementation of enhanced adaptation action and development of integrated approaches to adaptation, sustainable development and DRR. This is due in part to its demonstrated success as a planning instrument and the resources available for support, and its iterative nature and flexible, nationally driven format.
- Adequate, sustainable support to adaptation efforts from multi-sources, such as public, private, international and national, is crucial. Access to finance and technology development and transfer, and capacity-building support is also critical, particularly in developing countries.

185 UNFCCC, 2017.

186 UNDRR, 2019a.



### Box 3.1 Arab Partnership for DRR Forum

UNDRR has convened biannual meetings of the Arab Partnership for DRR since 2017 to create a forum for technical and operational deliberations on the progress, challenges and gaps in the regional implementation of the Sendai Framework and ASDRR 2030. The Arab Partnership seeks to facilitate discussion on innovative solutions to climate risk management and DRR integration in the SDGs in the region. The aim is to achieve coherent implementation of the post-2015 global agendas and risk-informed sustainable development. These periodic discussions will also inform the deliberations of the Arab regional platforms on DRR.

## 1. Coherence and autonomy of frameworks

The UNFCCC and GAR19 (Global Assessment Report) identify the main entry points for integration of national adaptation plans across SDGs 2, 3, 6, 7, 9, 11, 14 and 15. GAR19 also identified the main entry points for integration of the Sendai Framework and SDGs 1, 11 and 13. DRR actors have, at global and regional levels, advocated for resilience as a cross-cutting aim within the SDGs to be framed more deeply as a development challenge in which both equity and environmental protection are central.

According to a recent assessment of regional strategies undertaken in 2018 by the WFP, AWC and the Sustainable Development and International Cooperation Department (SDIC) of the League of Arab States, most development policymaking in the region is focused on sectoral approaches that do not address complex systemic and cascading risks and challenges. This requires revising strategies to better address the post-2015 agendas, by developing a nexus for coherently integrating risks across natural, economic, health, environmental and social dimensions. Future efforts should aim to delineate the roles and responsibilities of key regional and international actors in developing coherent and integrated strategies, attract funding to carry out these roles and responsibilities, and develop associated monitoring mechanisms to evaluate the progress and impact of current strategies and determine long- and short-term gains.<sup>187</sup>

Clear delineation of the roles and responsibilities of national institutions and stakeholders in implementing DRR and CCA policies and actions would enhance governance practices and institutional systems, build a favourable environment of private-sector engagement, and expedite development of integrated policies, programmes and projects. A legal framework with suitable economic incentives ensures access to sustainable green finance and private sector partnerships under the SDG, CCA and DRR nexus. A first step may be to pilot national stakeholder analysis for DRR and CCA (in an SDG context) in a number of selected countries to identify and strengthen institutional interlinkages and synergies.

### Box 3.2 Tunis Declaration on disaster risk reduction

The Tunis Declaration<sup>a</sup> was adopted at the Africa-Arab Platform on DRR in October 2018. It commits to improving coordination of efforts to accelerate implementation of the Sendai Framework and the ASDRR 2030 at national and local levels, including periodic follow-up and evaluation of progress. The declaration focuses on a multisectoral, all-of-society approach that enhances women and youth leadership and participation, and considers the needs of all vulnerable groups. It seeks to preserve human security, and health and environmental safety, in DRR policies and practices. It also commits to accelerating actions to achieve Target E and enhancing the understanding of disaster risk through disaster loss data collection and analysis, and risk assessment and management.

Through the declaration, Arab States committed to using science and technology to inform decision-making on DRR, including encouraging research and the development of energy efficient technologies to reduce disaster risks that threaten ecosystems. States pledged to implement sustainable development policies that are integrated with DRR strategies and programmes at all levels, as well as integrate CCA and mitigation measures and DRR in policies and practices, including in the field of renewable energy. The declaration called for investment in resilient infrastructure to prevent the emergence of new risk and to seize the opportunity to build back better in reconstruction work in recovery phases.

a UNDRR and League of Arab States (2018).

187 League of Arab States and Arab Water Council, 2018.

### **Box 3.3** *Regional Climate Risk Nexus Initiative*

Recognizing that trade-offs between goals are critical for long-term planning, initiating a nexus approach can help identify a balanced way forward, where optimal outcomes for one target can be achieved while ensuring the best scenarios of potential influence on others. In 2015, the regional Climate Risk Nexus Initiative (CRNI) was launched, supported by the League of Arab States and AGIR, and hosted by the AWC.<sup>a</sup> The CRNI helps achieve greater policy coherence across the goals of climate change, DRR, food and water security, and social vulnerability. It aims to enhance partnerships, including with UNDP, UNDRR and WFP, among other United Nations development agencies. A core goal towards achieving a sustainable resource base and resilient societies is to develop the capacity of the League of Arab States and member States to adopt integrated approaches when addressing climate change, DRR, land degradation, food and water insecurity, and social vulnerability.

Efforts will be made to strengthen regional cooperation and knowledge networks across disciplines, respond to gaps in science and data for managing risks, enhance the use of indicators and early warning systems, build local leadership and capacity for risk reduction and resilience-building, and support the paradigm shift in development policies.

a League of Arab States, 2018.

### **Box 3.4** *Improved coherence through the human security approach, Tunisia and Mauritania*

At local level, achieving coherence between the three global frameworks requires effectively building capacity to carry out multisectoral, multi-hazard inclusive risk assessments, and to develop resilience action plans to ensure ownership and the sustainability of interventions. To improve coherence in realizing the SDGs at city level, UNDRR, partnering with UNDP, adopted the inter-disciplinary human security approach<sup>a</sup> in 10 cities in Tunisia and Mauritania. The project<sup>b</sup> engaged stakeholders, from local and municipal officials to vulnerable communities. Detailed risk assessments conducted in Rosso, Kaedi and Tevragh Zeina in Mauritania, and Gabès and Mateur in Tunisia, identified priorities in risk management and risk reduction for urban environmental, health, social and natural hazard risk. Participatory and inclusive local resilience action plans, developed in partnership with economic development actors and stakeholders, gave municipalities in the five cities ownership of their risk adaptation planning. Further, the project provided local actors with enhanced technical capacity for integrated monitoring and implementation. Plans address environmental, economic, personal, social and health risks, adopting an integrated approach to simultaneously enhance multiple dimensions of sustainable development. The project provided a baseline for identifying risk drivers and addressing them in a manner that enables inclusive and sustainable development.

a UNTFHS articulates the human security approach as multi-hazard, multisectoral bottom-up, people-centred and prevention-oriented, aligned with DRR and promoting community participation in DRR at local/national levels. It recognizes challenges resulting from multiple, cascading risks and interconnectedness of natural hazards and their impact on human insecurities (economic, social, environmental, physical, political). Its adoption strengthens coherence among stakeholders and United Nations entities in their efforts to achieve the SDGs, reduce risk and adapt to climate change. See United Nations Trust Fund for Human Security, 2009.

b UNDRR and UNDP, 2020.

## **2. Resilience and ecosystems are core concepts for integration**

Enhanced integration and coherence of resilience building and ecosystem management efforts can proceed in a bottom-up, top-down whole-of-society approach that will engage vulnerable local communities by protecting the ecosystems on which their livelihoods depend.

### **Box 3.5** *Greater Gabès Oasis destruction, Tunisia*

The Greater Gabès transformation – from fishing and agricultural city, to phosphate treatment and fertilizer centre – while contributing to non-sustainable short-term socioeconomic prosperity, resulted in the depletion and pollution of its oasis, rapid unplanned urbanization and a degraded ecosystem. This led to a generation of new risks, including waterlogging, water diseases and water and soil salinization, as well as increasing people's exposure to pollution and industrial accidents. A risk assessment<sup>a</sup> to identify the impact on the oasis and its biodiversity analysed natural, societal, economic and environmental hazards, and the urban population's vulnerability to them. Twelve types of risks were identified in the five municipalities of Greater Gabès, including oasis destruction. The municipalities prioritized local resilience-building action plans for the short and medium term. These included assessments to understand the exposure of areas, neighbourhoods and oases to risks, and also protecting people and their livelihoods, and the oasis, by proclaiming it a prohibited area for construction, thereby preserving the agricultural wealth and the natural and historical heritage of the community, and preventing the spread of soil moisture and salinization.

a UNDRR and UNDP, 2020.

## **3. Availability, resolution and disaggregation of data and risk information**

In a region facing environmental degradation and scarcity, climate change and political instability, building coherence among the three global agendas requires consideration of the interconnectedness between social, economic and environmental systems during both the risks assessment and the evaluation of development plans. It also needs improved access to advanced technologies to address gaps in the development and use of data, information and knowledge. Closing the gap in disaggregated data would strengthen the science-policy interface for decision-making processes, ensure development policies and practices were better aligned with the results of contextualized analysis and needs, and enhance the efficiency of investments allocated for individual and multi-hazard prevention and mitigation projects and the development of sustainable infrastructure systems.<sup>188</sup> A remaining challenge is generating and developing the data, methods and tools to account for the emerging systemic risks interacting across environmental, health, physical, social and economic systems.

### **Box 3.6** *Linking historical disaster loss databases and RICCAR projected extreme weather indices hotspots and vulnerable areas*

Regional climate models, already developed and tested,<sup>a</sup> provide evidence-based rationales for prioritizing investments in CCA and DRR at locations under national development plans. Data on disaster losses, though they reflect only the historical record, can be employed to analyse trends and complement vulnerability analysis of areas and regions to future climate change impacts using climate modelling projections such as those generated by RICCAR.<sup>b</sup> To demonstrate this, analyses were conducted to test the correlation between RICCAR climate change indices and DesInventar historical events. Six susceptibility/hazard maps for floods, torrents, storms, forest fires, heatwaves and droughts were produced following European Commission and ISO 31010 (international standard) guidelines based on DesInventar data, covering the baseline period (1986–2005) of the current study. These susceptibility/hazard maps showed a dominance of floods, torrents and storms in northern parts of the Arab region, while an obvious dominance of forest fires, heatwaves and droughts was observed in its southern parts. This can be explained by climatic zones, which directly influence the probability, intensity and spatial footprint of the hazards under study.

Vulnerable areas based on RICCAR extreme indices for future projections from 1986 to 2100 were mapped and analysed to investigate climate change indices projection maps with future natural hazard susceptibility. In general, the findings indicate a slight decrease in the percentages of the high susceptibility levels for water-related hazards, such as floods, torrents and storms, in the northern parts of the study area, and an



188 Arab Water Council, "AWC demonstrated some of the maps generated from its 'Arab Geographical Information Room (AGIR)", 2019.

increase in the south. Conversely, a significant increase in the projected percentages of high susceptibility levels for high temperature-related hazards, like forest fires, heatwaves and droughts, was observed. High drought susceptibility may apply to as much as 50 per cent of the study area, which is already prone to drought, by the end of the century. This should be taken into account, especially in the Arab region, where these hotspots are already vulnerable and suffer from varying levels of water scarcity.

The temperature and rainfall extreme indices were tested against weather-related hazards. The results are presented in table 3.1,<sup>c</sup> which shows that all seven extreme climate indices seem to have a correlation with at least one of the hazards, and therefore play a role in determining the occurrence and/or intensity of different hazards. A maximum temperature greater than 40°C (SU40, or very hot days) and consecutive dry days were the most frequent explanatory factors, introduced in three models involving three hazards. Conversely, a rainfall intensity greater than 10 mm a day (introduced only in storms) and maximum temperature greater than 35°C (SU35) were the least explanatory factors.

*Table 3.1 Correlation between extreme climate change indices and weather-related hazards*

Climate change indices	Logistic models	Explains
Consecutive wet days (CWD)	2	Floods, storms
Rainfall intensity greater than 10 mm/day (R10)	1	Storms
Rainfall intensity greater than 20 mm/day (R20)	2	Torrents, droughts
Consecutive dry days (CDD)	3	Torrents, forest fires, droughts
Maximum temperature greater than 35°C (SU35)	1	Heatwaves
Maximum temperature greater than 40°C (SU40)	3	Storms, forest fires, droughts

a UNESCWA, 2017c; UNESCWA and others, 2017a.

b UNESCWA and others, 2017a.

c Ibid.

### **Box 3.7 Regional coordination on water resources management and capacity-building**

During the period 2012–2017, the World Bank and the Global Environment Facility (GEF), collaborating with the United States Agency for International Development (USAID), the National Aeronautics and Space Administration (NASA) and the AWC, implemented “the Regional Coordination on Improved Water resources and Capacity Building Programme” that met priorities set by Egypt, Jordan, Lebanon, Morocco and Tunisia for improving sustainable water resources management and achieving water and food security.

The objective of the programme was to improve water resources and agricultural management and planning across beneficiary countries, based on quantitative and spatial-based decision-making tools that used advanced technologies, including geographic information systems, data assimilation and modelling techniques.

The programme consisted of three components, namely improving local water resources and agriculture management, capacity-building and project management, and regional integration and cooperation.



Under the framework of this programme, the National Council for Scientific Research (CNRS) in Lebanon, Jordan's Ministry of Water and Irrigation, the National Authority for Remote Sensing and Space Sciences (NARSS) in Egypt, Centre royal de télédétection spatiale in Morocco, Tunisia's Centre régional de télédétection des états de l'Afrique du Nord (CRTEAN) and the AWC joined efforts to implement the national and regional components. For example, the Center for Remote Sensing, at the CNRS, through their national project CAPWATER, considered the enormous capabilities offered by space-related remote sensing techniques and established the Sustainable Natural Resources Management Platform and Early Warning System. This platform connects CNRS researchers with the DRM unit at the Prime Minister's Office, thereby creating an integral link between data analysis and decision-making.

The project highlights the importance of building human and scientific capabilities for risk prediction and early warning, which will improve national decision-making processes to prevent and reduce risks and disaster losses.<sup>a</sup>

a Arab Water Council, 2014.

### **Box 3.8** *Regional Initiative for the Assessment of Climate Change Impacts on Water Resources and Socioeconomic Vulnerability in the Arab region, or RICCAR<sup>a</sup>*

RICCAR<sup>b</sup> was developed to carry out an integrated assessment of the region's vulnerability to climate change using regional climate and hydrological modelling, and geospatial vulnerability assessment, taking into consideration extreme climate events and disaster loss databases. It has identified vulnerability hotspots in water-dependent sectors that have informed evidence-based prioritization and justification for investment in both CCA and DRR in national development planning. The resulting regional climate projections and vulnerability maps can be used to help identify the future risk of weather-related disasters. This better understanding of patterns, trends and quantitative indicators of disaster risk contribute to improved planning processes, building a science-policy interface and enhancing the effectiveness of investments in individual and multi-hazard prevention and mitigation projects and for sustainable infrastructure systems.

a UNESCWA and others, 2017.

b RICCAR was launched in 2010 under the auspices of the Arab Ministerial Water Council (AWMC) and derives its mandate from resolutions adopted by the council, the Council of Arab Ministers Responsible for the Environment, the Arab Permanent Committee for Meteorology and the 25th UNESCWA Ministerial Session. The AWMC technical scientific and advisory committee serves as the advisory board of the RICCAR knowledge hub.

## **4. National adaptation plans as a means for integration with the Sendai Framework and SDGs**

National adaptation plans (NAPs) as an inclusive planning instrument may be used to ensure and enhance integration with Sendai Framework and SDG strategies, policies and plans.

### **Box 3.9** *The Sudan national adaptation plan: contributing to disaster risk reduction and sustainable development*

The Sudan's NAP, developed in 2016, is a multi-hazard strategy integrating climate change risks into an action framework of climate impact prevention, preparedness and response. It aims to reduce the vulnerability of communities most exposed to climate-related disasters, such as droughts, flash floods and vector-borne disease outbreaks. The underpinning goal is to contribute to sustainable development and poverty reduction by reducing the long-term impacts of climate change.<sup>a</sup>

The sectors most at risk from climate change are agriculture, water and health. Their vulnerability is assessed at national level, where adaptation strategies are identified. The major climate-related factors impacting the sectors in almost all the Sudan's 18 states are droughts and floods. This results in crop damage or failure, deterioration of forests and rangelands, lack of food and water insecurity, and the spread of disease. ...→



Adaptation programmes establish disaster management units and health centres, employ early warning systems, and introduce drought-resistant crop varieties and efficient irrigation techniques. The Red Sea State, the only coastal state in the Sudan, is also highly vulnerable to rising sea levels and changes in sea surface temperature, which pose threats to coastal ecosystems and marine biodiversity, intensify floods and increase the salinity of coastal groundwater. Ecosystem-based management is a key adaptive measure adopted by the NAP for resilient coastal zone management and development.

The implementation of the Sudan's NAP is dependent on an overarching enabling environment that includes institutional development, support to rural communities, access to information, raising awareness, project planning and fundraising. A five-year budget, estimated at \$300 million for the implementation of priority adaptation measures in the 18 States, has been determined. Financing and technological resources are needed throughout the entire NAP process, along with further quantification of investment and climate-finance needs and analysis of adaptation options and strategies.

a The Sudan, Ministry of Environment, Natural Resources and Physical Development, 2016.

### **Box 3.10** *Palestinian national adaptation plan: socioeconomic sectors vulnerable to climate change*

In its NAP, the State of Palestine<sup>a</sup> identifies 12 socioeconomic sectors/themes that are highly vulnerable to climate change, including agriculture, energy, food, health, industry, coastal and marine, tourism, terrestrial ecosystems, urban and infrastructure, water, solid waste and wastewater, and gender. Adaptation options are identified under each sector to reduce climate sensitivity or increase adaptive capacity. These options include management and operational strategies, infrastructural changes, policy adjustments and capacity-building, many of which require the application of advanced technology.

In Gaza, for example, rainwater harvesting to sustain coastal agriculture and saline-tolerant crops necessitates applied research and advanced equipment for soil testing. In the West Bank, the installation of an agriculture DRR and management system would enhance crop and livestock production, and coupled with an agricultural insurance and compensation plan, would build farm resilience. The total cost of implementing such adaptation measures in the West Bank and Gaza is estimated at \$3.54 billion over a period of 10 years.

a State of Palestine, Environment Quality Authority, 2016.

## **5. Public, private, international and national financing for the SDGs, Sendai Framework and Paris Agreement**

Gradual shifting and channelling of existing financial outlay is of prime importance; it is estimated that globally, \$5 trillion to \$7 trillion is needed each year until 2030 to meet the SDGs.<sup>189</sup> In developing countries alone, the investment gap is estimated at \$2.5 trillion annually. Further, profits generated by a 30,000-company universe in the transition to a 2°C world are estimated at \$2.1 trillion.<sup>190</sup> It is therefore essential to assess how climate-related risks, benefits and opportunities will impact different stakeholders and vulnerable communities.

Arab States need a minimum of \$230 billion annually to support achieving the SDGs. The financing gap is estimated at more than \$100 billion per year, with a cumulative total of more than \$1.5 trillion to 2030. Hence, funding sustainable development requires new, sustainable sources, plus the greening of budgets and redirection of existing budgetary allocations away from conventional investments. This is in addition to the cost of post-conflict recovery in the region, estimated at more than \$900 billion since 2011.<sup>191</sup>

189 AFED, 2018.

190 United Nations Environment Programme Finance Initiative, 2019.

191 Arab Forum for Environment and Development, 2018.

The international financial environment, including the weak global economy, low trade growth, soft commodity prices, the volatility of international capital flows and increased geopolitical challenges, make the mobilization of such sustainable investment requirements a primary concern. The impact of COVID-19 has prompted revisions to baseline forecasts. The global growth contraction for 2020 was estimated at -3.5 per cent, 0.9 percentage points higher than projected in the previous forecast, reflecting stronger-than-expected momentum in the second half of 2020. UNEP has proposed five steps to embed financing within sustainable development, building on country-level plans to ensure the financial system fulfils its historical purpose of meeting long-term needs, engaging key international institutions effectively and developing the new generation of methods and standards that can institutionalize sustainable development in the governance and practice of financial and capital markets worldwide, as follows:<sup>192</sup>

1. National financial market reform and development plans consider the SDGs and the Paris climate commitments, and vice versa.
2. Financial technology mobilized to support accelerated alignment of the financial system with sustainable development, particularly for developing countries.
3. Public finance to undergo disciplined analysis and, as required, redeployed to align with the SDGs and Paris commitments.
4. Investment in awareness raising and building key capabilities so the financial community can effectively implement new approaches and plans.
5. Development of conventional methods, tools and standards to enable sustainable development priorities to be measured and incorporated into financial practice.

Public and private financing sources in the Arab region vary considerably. In most non-GCC countries, sources are constrained and below levels needed to implement the SDGs. Strengthening partnerships between public and private funding, as well as national and international policy environments, and building the coherence of regulatory frameworks should be recognized as a necessity. Further, changes in investment patterns must be encouraged to align with resilience-building efforts and to facilitate funding for sustainable development, CCA and DRR.

### **Box 3.11** *SDG Climate Facility: Climate Action for Human Security*

The SDG Climate Facility: Climate Action for Human Security project<sup>a</sup> was launched in 2019 as a multi-partner platform of regional and global experts. It brings together UNDP with the League of Arab States, the AWC, WFP, the United Nations Environment Programme Finance Initiative (UNEPFI), UNDRR and UN-Habitat to help countries gear climate actions towards broader SDG targets and scale up access to and delivery of climate finance, including through innovative partnerships with the private sector.

To improve the lives of internally displaced persons and reduce the risk of future displacement, the project also seeks to maximize the impact of partnerships by linking individual actions on interdependent issues, such as security, climate finance, private-sector engagement, early warning, solar systems for recovery and ecosystem resilience.

a SDG Climate Facility - United Nations Environment - Finance Initiative (unepfi.org).

### **Box 3.12** *Morocco: co-financing projects as incentive for prevention investment*

For several years, Morocco's public authorities have committed to building resilience and better protecting vulnerable populations and assets exposed to multi-hazard risks. To this end, the Fund to Combat the Effects of Natural Disasters (FLCN) was created in 2009 to help prevent natural hazard-induced disasters and recovery from them, and to build resilience through co-financing risk reduction projects by institutional partners, including ministerial departments, local authorities and public institutions and enterprises. Co-financing is carried out through an annual Call for Projects (CFP) process that aims to increase investments in structural and non-structural risk reduction measures.<sup>a</sup>



192 UNEP, 2016a.

This “resilience fund” is the financial arm of the Integrated Natural Disaster Risk Management and Resilience Program. Through its other tools, such as an operational manual, environmental and social guide and a grievance management guide, the Program has promoted good risk governance practices. A national selection committee chooses projects eligible for financing, while an associated steering committee includes several ministerial departments involved in risk management. These projects, selected in a transparent, strategic and cost-effective manner and validated by the steering committee, address the four high-priority risks, namely floods and torrential floods, mass movements such as rock and block falls, landslides and mudflows, seismic events, and coastal erosion and tsunamis. The FLCN also provides technical assistance to project leaders through targeted training.

a Morocco, Ministry of Interior, Department of Natural Hazard, 2020.

## 6. Capacity-building for coherence, integration and financing

Capacity-building at all levels should be scaled up in the push for a transformative shift towards sustainable development. Despite the challenging global economy, collective public and private actions can effect a positive transformation. Changes are required in public policies and regulatory frameworks, in the use of public finances and in securing an increase in such finances. The key is to bring the global debate to the Arab region through a transparent and inclusive multisectoral, multi-stakeholder forum for dialogue that is able to contextualize discussion on blending financing instruments and developing risk-informed financing opportunities and partnerships that leverage public and private resources. To achieve this shift, there is a need to build capacity while accounting for the following realities:

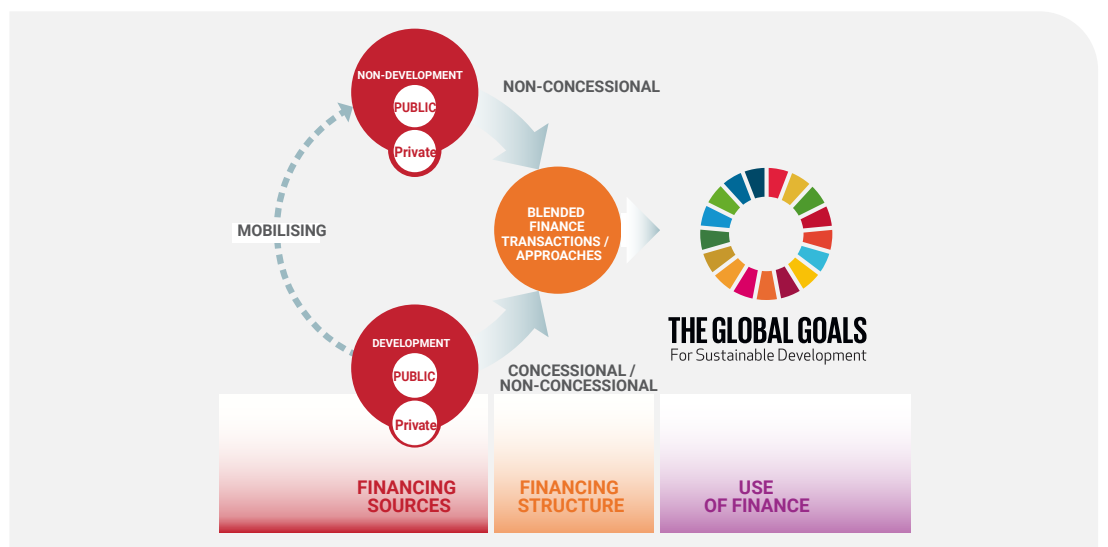
- Domestic public resource mobilization remains insufficient to meet needs in several Arab countries. The prime driver is economic growth, supported by sound policies and an enabling and coherent policy environment at all levels. The strengthening of public institutions and infrastructure on which much of society depends – including the private sector – is critical. Thus, there is also a need to strengthen tax administration, implement policies to generate additional resources and combat corruption in all forms.
- Placing domestic and international private finance within new investment models that allow synergy between public and private investment can bring transformative results by avoiding losses and realizing the savings and co-benefits to different sectors of society.
- Achieving the post-2015 actions more coherently is in the best interests of the private sector as it may unlock an abundance of new business opportunities, provide a source of finance and investment, and become an engine for economic growth and employment.

The above points should be further analysed and put into a regional context while accounting for the following global trends: (a) impact investing that generates specific beneficial social or environmental effects (as a subset of socially responsible investing) in addition to financial gains; (b) private philanthropy, which is reshaping the development landscape and considered the third provider of health funding in developing countries, with the trend taking shape regionally through the League of Arab States; (c) social entrepreneurship that recognizes a social problem and uses entrepreneurial principles to organize, create and manage a venture to effect social change; (d) corporate social responsibility, which is a growing force, with an increasing number of companies looking to invest in communities and institutions that make their success possible; and (e) blended finance, a method to unlock private capital for development by structuring global investment deals with a mixed portfolio of public/private funds to spread risk-reward profiles, increase catalytic private investment in sustainable financing and create markets in developing/new contexts. Blended finance “crowds in” private capital by managing, transferring or mitigating the risk, inherent or perceived, in the developing world, while also producing a return and creating jobs and growth through investments that otherwise would not exist (figure 3.4).<sup>193</sup>

SDIC of the League of Arab States organizes annual sessions and programmes for sustainable finance. It aims to establish a regional centre – one that will shape the future of SDG investments in the region – to increase the number of public-private partnerships and the use of blended financing instruments, and improve reporting on the impact business has on achieving the SDGs. The centre will regularly bring public and private sector leaders together to address key financing challenges and accelerate investments, as stepping stones towards achieving sustainable development in the Arab region.

193 OECD, 2017; Savoy and Milner, 2018.

Figure 3.4 Blended finance and how it works



Source: OECD, 2017; Savoy and Milner, 2018.

## D. Climate risks relevant to national adaptation, risk reduction and development

The key climate risks relevant to national adaptation and risk reduction strategies were identified in GAR19 as: i) extreme hazard events related to flooding, water availability and extreme drought; (ii) increased vector-borne diseases and heat-related morbidity and mortality; (iii) extinction, local species loss and degradation of terrestrial, marine and wetland ecosystems important to human health and livelihoods; (iv) net reduction in crop yields with direct impacts on food availability and security; (v) risks associated with ocean warming and acidification of fisheries; and (vi) reduced economic growth by the end of the century, particularly in low- and middle-income countries and regions. This section provides a discussion on some of these depending on available data.<sup>194</sup>

### 1. Water availability, extreme drought and conflict

#### Disaster risk reduction as an entry point to address water availability and conflict towards sustainable development

Water scarcity in Yemen is intricately linked to localized conflict. In Sana'a, water sources are mainly shared dams, with communities in distant locations often unable to access adequate water. In Lahj, farmers living in the vicinity of canal headworks have the advantage, and the ability to control the flow of water, with some blocking water for farmers downstream. This created tension between upstream farmers and downstream farmers who perceived a breach of their right to access shared natural resources. Disputes also arose over unregulated water extraction, overexploitation, diversion and hindered agricultural production. The situation was further complicated by the entrenched nature of conflict, in which tribal or community leaders issued decrees forbidding conflicting parties from using the disputed water sources, measures they had originally introduced to prevent escalations of conflict.

Despite a long history of community-based resolution, Yemen's ongoing conflict has stretched existing mechanisms and overwhelmed traditional non-formal actors, such as the tribal and community leaders. The war has weakened governance structures, such as the Ministry of Water and Irrigation, which in the past had a role in regulating water resources, leaving farmers to manage themselves. This has resulted in overexploitation by some farmers and scarcity for others.

194 UNDRR, 2019a.

To address this, in 2018 and 2019 the FAO and IOM implemented a series of interventions in Sana'a and Lahj to strengthen community-level peacebuilding capacities through natural resources management. The project revived traditional mechanisms for conflict resolution through community dialogue, and empowered women to take an active role in these processes. The FAO and IOM partnership helped restore 14 water user associations (WUAs) for local stakeholders, and built their capacity in conflict resolution and project administration, demonstrating that recovery based on "build back better" includes social as well as economic, environmental and physical measures. FAO established women's user groups (WWUGs) within each WUA to ensure their concerns were incorporated into water management decision-making, and enabled 30 per cent and 14 per cent female participation in the Board of Directors in Sana'a and Lahj, respectively.<sup>195</sup>

The project also facilitated conflict resolution processes, empowering women to act as agents of peace by supporting the WUAs and WWUGs to resolve conflicts and rehabilitate water infrastructure to improve access to water. Each WUA was helped to set up a conflict resolution committee (CRC), with equal female and male representation. The CRCs chart conflict parties, reaching out to the actors to understand grievances and offer general localized solutions. FAO and IOM held sessions in 2018 and 2019 to train WUAs on conflict resolution, gender responsive actions and water rights. Women assumed leading roles in these processes and in mobilizing community members to support resolutions, at community and institutional level.

The WUAs have subsequently helped resolve 15 local conflicts and implemented, with FAO and IOM engineers, the rehabilitation of water infrastructure to increase sustainable access and fair distribution. Following the interventions, the WUAs have reported a reduction in conflict, increased access to irrigation water and an anticipated increase in agricultural production.

## 2. Impact on ecosystems and species for human food and livelihoods

Biodiversity is essential to ecosystem functioning and services delivery, and contributes to agriculture and food production.<sup>196</sup> The region has diverse ecosystems, including aquatic, terrestrial and wetlands. The major drivers of biodiversity loss in the region include urban expansion, and the spread of intensive agricultural systems and cultivation of marginal land due to high population growth. In addition, the region has been identified as one of the most vulnerable to climate change. It will be impacted by sea level rise, increasing temperature and a change in the amount and frequency of rainfall, leading to increasing scarcity and drought, groundwater salinity, and desertification. A major challenge is the lack of available information on biodiversity and ecosystem services. Recent conflicts have delayed conservation work and hindered countries in achieving their biodiversity programmes and plans. According to the 2015 International Union for Conservation of Nature (IUCN) Red List, more than 2,000 species in the region are under threat, with fish comprising 28 per cent of these threatened species, plants 18 per cent, birds 12 per cent and mammals 9 per cent, among others.<sup>197</sup>

The Fertile Crescent and Mediterranean ecosystem has been rich in its biodiversity resources, where most agricultural species originated and were first planted as commercial crops. Over time, valuable plant genetic resources are being eroded through degradation of natural habitats, more intensive cultivation of arable lands, expansion of cultivation into marginal areas, replacement of diverse and widely adapted landraces by new cultivars based on a narrow genetic base, and over-exploitation of natural pastures and grazing lands. It has been reported that the region's ecological footprint is growing sharply and now exceeds the global average.<sup>198</sup> Countries are improving efforts to mainstream biodiversity in their agriculture sectors, as reported in their national biodiversity strategic action plans (NBSAPs). However, cross-sectoral strategies are required for taking tangible actions at regional and national levels, with the full engagement of all relevant stakeholders to implement these plans.

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195 In Lahj, there was less female participation on the Board of Directors due to deeper cultural constraints, though women were included in WUA subcommittees, including monitoring and planning committees.

196 Encompasses domesticated crops and livestock raised by farmers/livestock-keepers, trees planted and harvested by forest dwellers, and aquatic species harvested or raised by fishers/aquaculture practitioners. It includes other species of plants, animals and microorganisms that underpin production, whether by creating and maintaining healthy soils, pollinating plants, purifying water, protecting against extreme weather events, or enabling ruminant animals to digest fibrous plant materials. It also includes wild species harvested for food and other purposes, and microorganisms used in food processing and agro-industrial processes. See FAO, 2019.

197 International Union for Conservation of Nature, 2015.

198 FAO, 2019e.

### 3. Agriculture and fisheries

#### Resettlement of the drought-affected Hawaweer, the Sudan

Wadi Al Magaddam in the Sudan's Northern State is the traditional homeland of two nomadic tribes, the larger of which is the Hawaweer. A nomadic pastoralist group, they lived in the middle of the Bayoda desert, a dry tributary of the river Nile, which starts in Kordofan in western Sudan and joins the Nile in Korti in the north.<sup>199</sup> They depended on camels, sheep and goats, and in years with good rainfall also practised crop production. The Hawaweer were seriously affected by the droughts that occurred in 1983 and 1984. Most families lost their livestock. It is estimated that 20,000 families have been displaced in the Nile area, with only about 6,000 families remaining in the wadi.<sup>200</sup>

Drought and market failure were among the prime causes of the 1984 famine. The serious rainfall deficiency led to hugely inflated food prices and a severe widespread decline in purchasing power. Supplies were readily available at national level but redistribution mechanisms were inadequate.<sup>201</sup> High malnutrition rates were identified among nomadic children, with the Adventist Development and Relief Agency (ADRA) implementing emergency food distribution to the nomads. Farmers had to dispose of their animals to maintain food entitlements and avoid imminent loss through death of the animals. Asset-poor households were dependent on nonagricultural products and transfers to augment their low income. Some farmers had to move from their villages earlier than the normal season in search of work or relief support. Given the large share of income spent on food, households had to adjust consumption by cutting the size and frequency of meals and by changing their diets. This resulted in a decline in agricultural production, translated into a large fall in farm employment.

The drought, and subsequent famine, also highlighted commonalities in socioeconomic and political processes in the Sudan that were responsible for the war, food crises and the collapse of environmental equilibrium.<sup>202</sup> The 1984–1985 famine was the outcome of a long process of drought and desertification, absent or misplaced public food and agricultural policy, and insufficient public response. The government lacked a permanent institution responsible for famine preparedness, and the political will for early intervention to prevent large-scale hunger and mass movement. Emergency food aid, which usually followed official recognition of the existence of famine, was constrained by untimely availability and logistical and managerial limitations. In addition, the macroeconomic policy environment in the 1970s and 1980s was not conducive to preventing erosion of the national capacity to deal with drought crises, which was further undermined by war and civil unrest.

Some 10,000 Hawaweer remained living in the Um Jawasir area, along a major desert route between Khartoum and the Northern State. Men worked on farms, in construction and services, while women cleaned houses and worked on farms.<sup>203</sup> In response to the catastrophic drought in the Sahel region, the Norwegian Ministry of Foreign Affairs had established the Sahel-Sudan-Ethiopia Programme (SSE) to achieve food security and environmental rehabilitation. Although the programme was phased out in 1996, ADRA and other NGOs continued to implement interventions to improve the livelihood security of vulnerable households in drought-prone and marginal areas. To develop the home areas of the Hawaweer, ADRA focused on Um Jawasir, due to its fertile soil and groundwater in sufficient quantities for irrigation, and the fact that families had practised agriculture there during good years.<sup>204</sup>

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## E. Disaster risk reduction and financing for development under COVID-19

Following the High-level Event convened by the prime ministers of Canada and Jamaica and the United Nations Secretary-General in May 2020, and attended by more than 50 heads of State and government, six discussion groups were set up. These were for external finance, remittances, jobs and inclusive growth; recovering better for sustainability; global liquidity and financial stability; debt vulnerability; private sector creditors engagement; and illicit financial flows.<sup>205</sup>

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199 Moh, 1999.

200 The Sudan, Ministry of Agriculture, ADRA-Sudan and Andrews University, 1995.

201 Olsson, 1993.

202 de Waal, 1997; Elmekki, 1999.

203 Johnsen and others, 2000.

204 ADRA-Sudan, Land Use Desertification Control Administration and University of Khartoum, Institute of Environmental Studies, 1999.

205 United Nations, 2020a.



The discussion groups had open membership and included regional organizations, participating Member States and some 50 institutional partners, such as international financial institutions, think tanks, academic institutions, CSOs and relevant United Nations entities. Their main collective output is a menu of policy options providing guidance on actions that stakeholders can undertake to overcome the COVID-19 crisis and steer recovery towards achieving the 2030 Agenda.<sup>206</sup> The options on financing for development in the era of COVID-19 and beyond identified updating national DRR strategies as an option for bridging the short-term (2020) and the long-term (2023–2030) recovery measures (based on build back better) in view of shrinking public resources. Integrating DRR in national planning and financing processes was highlighted as one policy area to consider in the medium term (2021–2022) in order to recover better from the impact of COVID-19. In the long term, policy options included operationalizing the link to the financial sector to ensure implementation of national DRR strategies. In particular, the short and medium to long-term policy options to ensure the alignment of national planning, spending and implementation included establishing and revising national DRR strategies, with appropriate financing incorporating multiple, interrelated risks. These include climate change.<sup>207</sup> COVID-19 recovery strategies of Arab countries will be informed by the short-, medium- and long-term recommendations.

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## F. Conclusion

Achieving the Arab region's vision of making development sustainable requires a deep understanding of climate and disaster trends, expansion of drylands and land degradation, food and water insecurity, and the increased levels of social vulnerability.

Yet, development challenges lack strong risk profiles at regional, national and local levels, with disaggregated exposure and vulnerability data along various socioeconomic and spatial parameters. Such an understanding is increasingly important to address the nature of systemic and cascading risks and their implications for development and recovery efforts. The scarcity of disaggregated data is most efficiently and accurately addressed by adopting a coherent and integrated approach across administrative (regional, national, local and community levels), sectoral and international framework levels.

In a region with a large financing gap for sustainable development, coherence and integration present an opportunity. Several regional initiatives are already promoting and adopting a coherent, integrated approach for sustainable development, CCA and DRM strategies. Further, at local level, there has been progress through a range of entry points, such as the adoption of multisectoral, multi-hazard, bottom-up and top-down approaches to develop risk assessments and local resilience action plans.

However, several key challenges remain. The capacities and skills required for financing the mainstreaming of DRM and CCA considerations into sustainable development in an institutionalized manner, backed by legislation and with the involvement of all stakeholders, including the private sector and vulnerable communities, remain inadequate. Gaps exist in generating risk-disaggregated information and also in understanding the emerging vulnerability of environmental, health, financial, economic and social systems to cascading and systemic risks.

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206 Ibid.

207 United Nations, 2020a, 2020b.

*Vulnerabilities and capacities in climate change mitigation and adaptation and disaster risk reduction: addressing structural drivers, impacts and empowerment of affected populations*

**4.**



## **A. Introduction**

This chapter explores the structural drivers of vulnerability to climate change and disaster risk, and the impacts when risk is realized, including the relationship with distress migration within the sustainable development paradigm. Drivers of both vulnerability and impacts are analysed across different population segments, sectors, occupations and geographies, to the extent data is available. Although the Arab region is prone to multiple hazards, this chapter focuses on droughts and floods in rural and urban contexts, due in part to their high significance and the availability of data. Drawing on analysis of progress and lessons from good practices at regional, national and community levels, the chapter identifies areas where vulnerabilities might be sustainably reduced, resilience built and the capacities of different population groups to respond to climate change, disaster risks and distress migration enhanced. The analysis is underscored by a nexus approach that addresses the connectivity between these issues and that bridges the humanitarian and development agendas.

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## B. Framing the discourse on climate and disaster-related vulnerabilities and impacts within the sustainable development paradigm

### 1. Discourses on climate change and disasters

The planet is in multiple, related crises: degraded ecosystems, climate change, the COVID-19 pandemic, disasters, water and energy deficits, food scarcity, increasing impoverishment and distress migration. The discourse on climate change originated in the biophysical sciences, with a focus on numerical models, geoinformation science technologies and computer visualizations of climate processes, and on global warming, rising sea levels, melting glaciers and extreme climatic events. These approaches largely obfuscated the role of social sciences, socioeconomic-political processes and human action in climate change,<sup>208</sup> and assumed homogenous impacts on people. Alternate discourse on anthropogenic climate change, climate justice and human rights advance intrinsic links between planetary crises that threaten sustainable development<sup>209</sup> and ensue from a lack of it. These discourses are pervasive in the Arab region.

The discourse on disaster risks likewise framed disasters as hazardous “natural environmental phenomena”. It changed to recognize human action as causing hazard-related risks, and defined disasters as the impact of hazards, mediated by structurally determined exposure and vulnerability.<sup>210</sup> Exposure, vulnerability and risk to hazards can be reduced by socioeconomic and political action to strengthen disaster resilience.<sup>211</sup>

### 2. Framing discourse within the sustainable development paradigm

Anthropogenic discourse on climate change, and vulnerability-resilience paradigms on disasters, assert that environmental degradation, climate change, disaster risks and their impacts largely ensue from unsustainable models of development. These models prioritize production, consumption and distribution for immediate economic gain over a fairer distribution of risks and benefits from the use of resources, social and environmental sustainability, health and well-being.<sup>212</sup> These discourses agree sustainable development is best achieved through governance and accountability that combine growth with equity, and holistic development that builds social-economic-environmental system resilience in an interactive manner through mitigation and adaptive action, sustainable financing, technology transfer, capacity-building, economic diversification, sustainable production, consumption and natural resource management.<sup>213,214</sup> They assert that governance systems could benefit from prioritizing the most vulnerable,<sup>215</sup> and that mainstreaming valuable local knowledge, resources, lifestyles and practices would preserve ecosystems, and strengthen community engagement and resilience.<sup>216</sup>

Development in the Arab region could be more sustainable. It currently exhibits the highest levels of wealth concentration and income inequality worldwide, with the top 10 per cent of the population holding more than 60 per cent of the national income.<sup>217</sup> Despite periods of positive economic growth, incomes of the poor have improved only marginally. The regional unemployment rate in 2016 was 10.3 per cent, the highest globally and almost double the world average.<sup>218</sup> While most of the region’s poor live in climate-sensitive rural areas, agricultural production and consumption could be more efficient and sustainable. Agricultural strategies have not raised productivity or resilience to desertification or floods. Infrastructure deficits, poor investment in technology, water-efficient irrigation and drought-resistant seeds,<sup>219</sup> and maladaptive practices deplete natural resources, increase food loss and amplify climate-disaster risk and vulnerability. For example, forests as a proportion of land area have fallen by 25 per cent regionally since 1990<sup>220</sup>

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208 Cohen and others, 1998.

209 Sweden, Ministry of Foreign Affairs, Commission on Climate Change and Development, 2009.

210 Kelman and others, 2016.

211 UNDRR, 2002.

212 Adams and Luchsinger, 2009.

213 United Nations, Department of Economic and Social Affairs, 2015, paras. 20, 27–29, 33–34, pp. 6–9, 13–14; United Nations Framework Convention on Climate Change, 2015, articles 6 (8), 7(e), p. 8 and 11.

214 United Nations, Department of Economic and Social Affairs, 2015, paras. 2–3, 28 and 41.

215 United Nations Framework Convention on Climate Change, 2015, para. 11, p. 2.

216 Ibid, article 7, para. 5, p. 9.

217 World Inequality Lab, 2018, note: The Arab countries included are Bahrain, Egypt, Iraq, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, the State of Palestine, the Syrian Arab Republic, the United Arab Emirates and Yemen. Iran (Islamic Republic of) and Turkey are also covered. UNESCWA and FAO, 2017.

218 UNESCWA, 2020b.

219 ANND, 2019.

220 Calculated by UNESCWA based on World Bank, 2015, p. 190.



because commercial interests encroach on fragile natural habitats, because wood is harvested to produce charcoal (an income-earner for 70 per cent of low-income pastoralists) and because of poor restrictions on biomass use and intensive grazing in some countries.<sup>221</sup> Ensuing climate and disaster risks will thus cause a further loss of harvests, livestock, livelihoods, employment and food and water security, and a reduction in agricultural output.

The urban Arab population more than quadrupled between 1970 and 2010, and is forecast to more than double again by 2050.<sup>222</sup> Investment deficits in rural development and climate-disaster-resilience, combined with conflict, have contributed to urban migration, altering lifestyles and resource use. This will widen the region's food production-demand-consumption gap, given food production is already declining as agriculture loses land and people. It will further stress strained economic and social infrastructure and services, including employment, credit, land, food, water, sanitation, housing, education and health.<sup>223</sup> Rising urbanization in the region has led to land reclamation, and encroachment on agricultural land and natural habitats, depleting biodiversity.<sup>224</sup> Unsustainable urban production and consumption is exhausting natural resources, generating toxic wastes and emissions and disposing of them in an unsafely manner,<sup>225</sup> thereby increasing climate and disaster risks and impacts.

Unsustainable development leads to multidimensional poverty,<sup>226</sup> rural and urban, that erodes human capability and constitutes a key vulnerability to climate change and disaster risks that exacerbate it. Another impact of skewed development, climate change and disaster risks is distress migration. The IPCC noted, "the gravest effects of climate change may be those on human migration as millions are displaced by shoreline erosion, coastal flooding and severe drought";<sup>227</sup> conflict in the region exacerbates migration.

Trend reversals can only follow from building resilience to these drivers. Focus is best placed on multidisciplinary, nexus approaches that (a) address the structural drivers of vulnerability to climate change, disaster risks, distress migration and their impacts, strengthen climate and disaster risk-migration and resilience and pre-empt humanitarian crises, as an integral part of sustainable development, and (b) provide effective protection avenues for forced environment-related migration, and integrate displacement and humanitarian considerations into CCA and DRR-related strategies. This requires expanded multisectoral-stakeholder partnerships that include migration, gender equality and development partners for coherent and amplified impact.<sup>228</sup>

Poverty and inequality, exacerbated by environmental crises and distress migration, are framed by age, sex/gender, economic, ethnic/racial, nationality and migration status, health/well-being, and sectoral, occupational and spatial locations. These interacting vulnerabilities also interface with socially mediated agency at one end of a continuum and extremely negative survival strategies at the other. It is these priority groups highlighted in the Sendai Framework<sup>229</sup> and the Paris Agreement<sup>230</sup> – women, children, youth, persons with disability, older persons, indigenous persons, migrants – that this chapter addresses regarding the structural drivers of vulnerability to climate change and disaster risks, related capacities and impacts, based on data availability.

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## C. Overall regional trends in climate change and natural hazards: the broad interface between climatological and socioeconomic-political drivers

The diverse Arab region, located in the arid horse latitudes,<sup>231</sup> has historically experienced harsh weather conditions; poor rainfall, water scarcity including the lowest endowment in freshwater resources globally, frequent floods, extreme

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221 UNDP, 2018a.

222 UN-Habitat, 2012.

223 UNESCWA, 2020b.

224 Ibid, p. 190.

225 Ibid.

226 Alkire, n.d, cited in OECD, 2015.

227 IPCC, WMO and UNEP, 1992.

228 D'Cunha, 2019.

229 United Nations 2015c, para. 36(a), p. 23.

230 United Nations 2015b, preamble, para. 11, p. 2.

231 The horse latitudes are subtropical latitudes 30 to 38 degrees north and south of the equator and characterized by calm winds and low precipitation.

See <https://oceanservice.noaa.gov/facts/horse-latitudes.html>.

temperatures and droughts.<sup>232</sup> These have converged with socioeconomic-political processes to make the region, and its diverse population, among the most vulnerable worldwide to climate change.

The average temperature in the region has increased by 1.5°C over pre-industrial levels,<sup>233</sup> with projected increases of 5°C in some parts by the end of the century. The consensus is that rainfall will decline,<sup>234</sup> with the highest drop likely in North Africa along the Mediterranean Sea. The Moroccan highlands could see a decline in rainfall of up to 40 per cent by the end of the century.<sup>235</sup> The global mean sea level could rise by 26 cm to 82 cm over the same period as a result of climate change.<sup>236</sup> Extreme climate events are predicted to increase and worsen. While the number of disasters globally has almost doubled since the 1980s, in MENA the average number has tripled.<sup>237</sup> Africa has recorded its nine hottest years since 2003.<sup>238</sup> Severe droughts are occurring annually or biannually, from a six- to eight-year frequency. Increases in humidity and temperature triggered tropical cyclones in the Arabian Peninsula in 2007 and 2010 and are predicted to recur. Single cyclones with heavy rainfall are likely to skew average annual rainfall.<sup>239</sup> The World Bank indicates that multiple hazards threaten several of the countries examined in its study of natural hotspots;<sup>240</sup> for example, 43 per cent of Somalia's land area, home to 54 per cent of the population, is acutely exposed to floods and droughts.

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## D. Structural drivers and impacts of climate change and disaster risks with respect to different population groups

The Arab population is diverse, resulting in a differentiated experience of inequality, poverty, climate change, disaster risks and migration. These groups, rural or urban, consist of women, children, informal workers, youth, older and indigenous persons, those with disabilities, migrants and refugees. Regional intergovernmental institutions, international organizations, national governments and CSOs, recognizing the severity of the problem, including silo approaches, have begun addressing the issues.

Arab governments endorsed five Arab voluntary stakeholder group action plans on DRR at the Africa-Arab Platform on Disaster Risk Reduction in October 2018.<sup>241</sup> The groups were established under the aegis of UNDRR.<sup>242</sup> The action plans, supporting governments to implement the Sendai Framework, seek to generate knowledge on DRR in their thematic areas; support the design, finance and implementation of DRR policies, plans and programmes targeting Sendai priority groups; build the capacity of government and civil society for greater DRR engagement; ensure DRR stakeholders – women, youth, scientific community and CSOs – working on DRR and the humanitarian response are represented on DRR policy mechanisms; and engage globally on DRR.

Besides these common themes across plans, the group on gender links gender, DRR, CCA and migration in its work, while the science and technology group looks to mainstream DRR into Master's degree syllabuses in regional institutions. While results have varied, advocacy achievements at regional normative levels have been best, ensuring that science and technology issues, and the vulnerabilities and capacities of women, children, youth, older persons, people with disabilities, local communities, migrants and displaced people, were addressed in the deliberations and outcomes of regional meetings.

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232 UNDP, 2018a.

233 UNESCWA and others, 2017a.

234 Ibid.

235 Ibid.

236 IPCC, 2014.

237 World Bank, 2014.

238 National Centers for environmental Information, Climate at a Glance, Global time series. Available at <https://www.ncdc.noaa.gov/cag/global/time-series/africa/land/12/12/1998-2016>.

239 AGEDI, NCAR and the Climate Change Research Group, 2015.

240 Dilley and others, 2005

241 UNDRR and African Union, 2018.

242 Made up of experts/organizations who organized themselves to support governments in implementing the Sendai Framework and the Arab Strategy for Disaster Risk Reduction 2030. They complement government efforts to achieve the outputs in the prioritized action plans. In 2021, the groups will revise their voluntary commitments to support implementation of the upcoming Prioritized Action Plan 2021-2024, and deliver them at the Fifth Arab Regional Platform for DRR. The groups are the Arab Science and Technology Group (chaired by CNRS), Gender Equality and Women's Empowerment in Disaster Risk Reduction, Climate Change and Migration (originally chaired by UN Women and now co-chaired by UN Women/AWC), Children and Youth (chaired by United Nations Major Group for Children and Youth/Children and Youth International), Civil Society (co-chaired by RAED and HelpAge), and Red Cross Red Crescent Group (chaired by IFRC). See <http://www.undrr.org>.

## Box 4.1 Somalia's Recovery and Resilience Framework 2018

In February 2017, with half the population – 6.2 million people – in crisis, Somalia's drought was declared a national disaster. The Recovery and Resilience Framework (RRF),<sup>a</sup> developed the following year, recommended long-term solutions that address the root causes of drought and famine. The RRF promoted integrated policies and strategies for recovery, resilience and DRM, encompassing development priorities that are climate-smart, environmentally friendly, gender-sensitive and address the drivers of displacement.

Interventions included: (i) increased productivity in agriculture by enhancing access to inputs, rehabilitated infrastructure, markets and finance; (ii) reversal of drought-related vegetation loss and soil erosion, improved household food, energy, water, sanitation and health security, including through rehabilitated/constructed infrastructure, emergency response and immunization of children and pregnant women; (iii) gender and social inclusion; (iv) access by displaced people and migrants to socioeconomic support and integration services; and (v) reduced exposure to disaster risks via pre-positioned emergency supplies and access to DRM information and early warning. The strength of the RRF lies in its integration across prioritized sectors, preventive focus on resilience building and immediate rehabilitation and recovery, better data, and the development of government capacity to manage a recovery programme, while at the same time engaging with affected and vulnerable communities to incorporate their priorities into the Drought Impact and Needs Assessment (DINA) and action plan.

a Somalia, Government of Somalia, 2018a.

The aforementioned groups, and their priorities and capacities, are often excluded from policies, programmes and budgets, leaving them further behind, their pre-existing inequalities and vulnerabilities exacerbated in climate crises. But they have also demonstrated an ability to cope, recover and reconstruct their lives and communities. They deploy their local knowledge, values, perspectives, skills, leadership styles and social networks to survive, mitigate, adapt and develop resilience to climate change and disasters.

### 1. Women and girls

Anchored in gender roles and trait stereotypes, with gender relations weighted against them, women and girls bear disproportionate impacts of climate change and disaster risks relative to men and boys. These largely diminish women's contribution to climate risks, but also reduce their climate-disaster resilience compared with men. Gender interacts with other inequalities privileging men, but also among women, based on age and well-being, race/ethnicity, location, civil, household, economic, nationality and migration status.<sup>243</sup>

Arab countries rank last in the World Economic Forum's Gender Gap Report.<sup>244</sup> Arab women's economic participation – 25 per cent in 2015 – is the lowest globally.<sup>245</sup> In 2017, the aggregate rate of women's unemployment in the region was 18.9 per cent versus 7.6 per cent for men. Women's labour force participation rate was 21 per cent, compared with 74 per cent for men,<sup>246</sup> with 38 per cent of women workers in vulnerable employment,<sup>247</sup> and excluded from social insurance. Women are overwhelmingly employed in agriculture, which is more exposed and sensitive to climate change and disaster risks. In Egypt and Iraq, women now exceed 37 per cent and 50 per cent, respectively, of the agricultural labour force,<sup>248</sup> in Morocco and the Sudan the share is 60 per cent, and in Mauritania, 54 per cent.<sup>249</sup> The percentage of female agricultural holders is less than 7 per cent across the region.<sup>250</sup>

243 D'Cunha, 2018.

244 World Economic Forum, 2017.

245 ILO, 2018a.

246 Calculated by the ILO Regional Office for Arab States. See <https://ilostat.ilo.org/topics/unemployment-and-labour-underutilization/>.

247 Regional values calculated by UN Women based on the latest available country information. According to the ILO, vulnerable employment includes own-account work, and contributing family labour. See <https://spring-forward.unwomen.org/en>.

248 FAO, 2019c; UNESCWA and FAO, 2017.

249 FAO, 2019b.

250 UNESCWA, 2020b. p. 74.



In their roles as domestic nurturers, small-scale low-emission subsistence farmers and livestock raisers, gatherers of forest products for subsistence, producers, providers and managers of food, water and natural resources, and consumers with lower-carbon lifestyles, women contribute less than men to the depletion of the ecosystem, greenhouse gas emissions and human-created disasters. However, their location at the lower ends of value chains in agriculture, manufacturing and other sectors, and disproportionate marginalization from material and non-material resources, diminishes their climate-disaster risk-migration resilience relative to men.<sup>251</sup>

For example, Yemeni women perform 60 per cent of farm labour, 90 per cent of livestock rearing and 10 per cent of wage labour but own less than 1 per cent of agricultural land, and earn 50 per cent less than men in comparable jobs.<sup>252</sup> In the 2008 tropical storm that hit Yemen, women lost crops, land and daily wage jobs when 22,902 acres of cultivated agricultural land and 51,455 acres of uncultivated land were damaged.<sup>253</sup> Some 3,413 camels, 54,988 sheep, goats and cattle, and 309,000 beehive cells perished in floodwaters.<sup>254</sup> Women-headed households, and small, landless farmers rearing livestock to compensate for poor land-based returns, suffered disproportionate impacts, including lost milk and meat,<sup>255</sup> women and children with meagre earnings from fishing, lost nets, boats and incomes. Further, women engaged in small non-farm livelihoods such as henna decoration, knitting, food processing, kitchen gardening and basket weaving, lost raw materials, equipment, products, stock, animal feed and fertilizers when their homes were extensively damaged. This would have increased production costs the following season.<sup>256</sup> The floods following the tropical storm pushed rural poverty above 40 per cent, especially in the hard-hit Hadramout and Al-Mahara governorates,<sup>257</sup> with starker impacts on women. In the Syrian and Somalian droughts, women's negative coping included selling household and personal items,<sup>258</sup> and undertaking the worst forms of work.<sup>259</sup>

Time spent by Arab women on unpaid work is four to seven times greater than that for men.<sup>260</sup> Combined with paid work, this places a heavy workload on women, affecting their health and well-being, including through time lost for leisure and more productive work. These workloads are intensified by climate and disaster risk impacts. For example, women in 48 per cent of households in drought-impacted Somaliland and 43 per cent of drought-affected households in South Central and Puntland regions became primary breadwinners as men lost jobs, incomes or migrated for better work.<sup>261</sup> In Djibouti, Somalia, the Sudan and Yemen, the loss of forest, water scarcity, desertification and drought have made it more burdensome for women to provide for their families. Women and girls are compelled to walk longer and riskier distances; for example, up to 4 km in the Sudan's West Kordofan State.<sup>262</sup> In Yemen, this additional work has forced girls to drop out of schools, with implications for their overall development and perpetuating gender-based poverty.<sup>263</sup> Nursing and caring for family members with illnesses triggered by floods and droughts further increases women's unpaid care work.

In the 2006–2010 drought in the Syrian Arab Republic, food loss and the increase in food and fuel prices forced negative food-based coping. Food intake for those who were already poor was reduced, especially among all but pregnant women, who were expected to prioritize children and family. The daily diet of bread, tea and sugar provided only 50 per cent of energy and 45 per cent of protein requirements.<sup>264</sup> Acute lack of macro and micronutrients, and drinking water containing high levels of nitrate increased malnutrition and anaemia, especially in women-headed households and older women.<sup>265</sup> Disasters, conflict and displacement have undermined already inadequate health care, including sexual and reproductive health and immunization services in affected countries, and increased the spread of infectious disease and the risk of life-threatening complications for women and girls. Droughts and flooding cause significant diseases and women have contracted cholera, diarrhoea, skin problems, malaria and dengue fever. Maternal mortality ratios driven by bleeding, infections and hypertension during pregnancy are high, with a regional average of 142 deaths per 100,000 live births in 2015, twice the global SDG target.<sup>266</sup> With one of the highest maternal mortality ratios worldwide,

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251 D'Cunha, 2018.

252 FAO, 2018a.

253 Yemen, Government of Yemen and others, 2009.

254 Ibid.

255 Ibid.

256 Ibid.

257 Ibid.

258 United Nations, 2009.

259 Fanning, 2018.

260 UNESCWA, 2020b, p. 17.

261 Fanning, 2018.

262 UNDP, 2018a.

263 Assad, 2010; IRIN, 2009; World Bank, 2011.

264 United Nations, 2009.

265 Ibid.

266 UNESCWA, 2020b.

Somalia's drought placed more than 130,000 pregnant women at critical risk.<sup>267</sup> Further, an initial assessment by UNFPA and partners in 2019 indicated that damage and poor access to health facilities and gender-based violence one-stop centres after severe flooding across the country left more than 17,000 expectant mothers, and 20,000 women and girls exposed to violence at risk.<sup>268</sup>

Some Arab countries have shown progress, with more women than men enrolled in university programmes,<sup>269</sup> including in non-traditional subjects. But data from the Arab League Educational, Cultural and Scientific Organisation (ALECSO) put the regional illiteracy rate at about 21 per cent, against the global average of 13 per cent. Female illiteracy is 26 per cent, the highest globally.<sup>270</sup> The gender gap in Internet use in 2017 was 17.3 per cent, 50 per cent more than the global gap.<sup>271</sup> This excludes women from accessing climate-disaster-related early warnings, and household/community preparedness, mitigation and adaptation information. Gendered socialization also increases women's vulnerability. Dress codes, restricted mobility and participation in sports, and limited social interaction with non-familial men prevents women from accessing public information on disasters in public spaces, and from physical activity to save themselves and their children evacuating without male family escorts, or accessing relief items and markets. This impacts female-led households the most as aid and reconstruction asset allocation is often carried out by men to male household heads. At times, local men also hinder aid and development workers from approaching women. All such distinctions, exclusions and restrictions exclude women from equal access to disaster preparedness, and humanitarian and development assistance, reducing their resilience at best, their survival chances at worst.<sup>272</sup>

In the region, as elsewhere, violence against women and girls is an assertion of male power and authority. An estimated 37 per cent of ever-partnered women in some Arab countries have suffered physical and/or sexual intimate partner violence at some point.<sup>273</sup> Child marriage,<sup>274</sup> "honour" crimes<sup>275</sup> and female genital mutilation (FGM) are rife in many countries.<sup>276</sup> Violence increases significantly in disasters and conflict with a disintegration of traditional support systems and rule of law. For example, in the 2016–2017 Somalia drought, the incidence of gender-based violence (GBV) increased 9 per cent between January and April 2017, including cases of physical and sexual assault, and child sexual abuse.<sup>277</sup> Over three quarters of the survivors were internally displaced persons. In the Somalia floods in 2019, cases of rape and sexual assault made up approximately 30 per cent of the total reported incidents between January and September.<sup>278</sup> Hunger and economic desperation in the 2011–2016 Somalia drought and the heightened risk of sexual violence, including in drought-conflict sites, encouraged the perception that child marriage offered girls better protection than parents could provide.<sup>279</sup>

Women are rarely included in public leadership and decision-making on climate change and disasters at regional, national or community level. Nor are different categories of affected women represented on institutional mechanisms for climate and disaster-oriented policy design and implementation. While disaster-related work has typically been perceived as a male domain, this coincides with regional trends in women's leadership and decision-making. Women held 8.3 per cent of managerial positions in 2015,<sup>280</sup> and 19.4 per cent of parliamentary seats in 2018, though the regional average remains relatively low compared with other regions.<sup>281</sup>

But women and girls are also active agents of development. Women's specialized local knowledge of ecosystems – especially rural and indigenous women – can effectively reduce sensitivity to climate and related hazards, by contributing to biodiversity conservation, community resilience and effective adaptation. Tunisia's arid and semi-arid mountainous region of Béni Khédache in Zammour, Tunisia, is vulnerable to drought in summer and heavy winter rains, yet women's conventional practices and knowledge on land use and natural resource management have improved the

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267 Somalia, Government of Somalia, 2018b.

268 Somalia, Government of Somalia and World Bank, 2020.

269 Ibid.

270 Romdhani, 2019.

271 ITU, 2017.

272 D'Cunha, 2018.

273 WHO, 2013; UN Women, 2018, covers four, Egypt, Iraq, Jordan and the State of Palestine, as well as Iran (Islamic Republic of).

274 UNESCWA, 2020b, p. 74.

275 UNDP, 2013.

276 Dockery, 2018.

277 Somalia, Government of Somalia, 2018b.

278 Ibid.

279 Development Initiatives, 2019.

280 UNESCWA, 2020b, p. 120.

281 Ibid.

adaptive capacity to climate change and reduced the risks of desertification, drought, water stress and landslides.<sup>282</sup> They have been involved in projects to: increase vegetation planting that has enhanced food availability and reduced carbon emissions; collect rainwater and conserve water through stone-pocket planting,<sup>283</sup> construct small dams on valley slopes and underground brick storage tanks that have reduced water stress; and restore and plant local species of fruit trees, preventing soil erosion and landslides, and preserving mountain ecosystem biodiversity. Likewise, rural women in the southern region of the Syrian Arab Republic possess valuable knowledge on indigenous plants and herbs, and their uses in food or for medical purposes, including for illnesses related to climate change and disasters.<sup>284</sup>

Urban and rural women as formal and voluntary health workers, unpaid and paid caregivers, are front-line responders in natural and human-made disasters and pandemics. During the COVID-19 crisis, the majority of health and social service workers at the forefront of the medical response have been women in the MENA region,<sup>285</sup> and the Arab States as a whole. In the MENA region, most of the female workforce is in nursing. Women comprise 90 per cent of the nursing staff in Egypt, and 80 per cent in Lebanon.<sup>286</sup> As unpaid caregivers and paid domestic workers, including migrant domestic workers, women look after family members with COVID-19 or other health issues, and older persons at home.

Arab governments have since 2008/2009 increasingly recognized women's vulnerabilities and capacities in climate adaptation in nationally prioritized sectors, such as water, energy, agriculture, food security, and waste reduction and management. National assessments, research and dialogue between women's organizations and government ministries were supported by the International Union for Conservation of Nature (IUCN) and UNDP. Gender concerns are being incorporated in climate policy and action, as recognized in the Arab Framework Action Plan on Climate Change developed by the League of Arab States.<sup>287</sup>

The Global Gender and Climate Alliance, IUCN and the Council of Arab Ministers Responsible for Environment have promoted instruments to mainstream gender in climate action and encouraged integrating national gender concerns in UNFCCC negotiations and its Conference of the Parties (COP).<sup>288</sup> Countries such as Bahrain, Egypt, Jordan and the State of Palestine have mainstreamed gender issues into adaptation policies, while many Arab countries have referenced gender in national communications to the UNFCCC.<sup>289</sup> Jordan, in partnership with IUCN, was a front runner in the region, incorporating gender in climate policy in 2011 with a framework for action and practical policy guidelines on gender mainstreaming and integrated responses.

In Somalia in October 2017, UN Women convened a consultation with women's organizations working in agriculture, disaster resilience, malnutrition, health, child development, peace, humanitarian assistance and protection to ensure women's priorities informed the gender chapter of the Drought Impact and Needs Assessment (DINA), undertaken by the government of Somalia in partnership with the World Bank and the European Union.<sup>290</sup>

The consultation resulted in a Women's Common Charter of Demands that identified key priorities and made recommendations for gender-responsive disaster resilience and drought recovery.<sup>291</sup> Most priorities were well reflected in the DINA, including the collection and use of sex-age-disaggregated data and gender analysis tools and promotion of gender responsive governance, women's leadership and participation, and ensuring gender equality in DRR, economic and livelihood development, and targeted responses to GBV. Further, the Somalia RRF, which was informed by the DINA, identified "gender and social inclusion", as a high-priority sector intervention,<sup>292</sup> with a dedicated budget line of \$20.4 million (or 2.5 per cent of the overall budget of \$810.2 million).<sup>293</sup>

The initiative generated knowledge on gender equality and women's rights in post-disaster policy and planning, including: (1) women and girls are badly impacted by the drought but play key roles in immediate and long-term recovery. A rigorous quantification of drought impacts on women was challenged by sex-age-disaggregated data

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282 UNDRR, 2008.

283 A traditional method of water conservation in which planting is done in stone pockets, which studies have shown reduces evaporation of irrigation water.

284 Kaisi and Alzoughbi, 2007.

285 Boniol and others, 2019.

286 UN Women, 2020a; UN Women, 2020b.

287 Verner, 2012.

288 Ibid.

289 Ibid.

290 UN Women, 2017.

291 Ibid.

292 All sectors listed were deemed high priority sectors.

293 Somalia, Government of Somalia, 2018a.

deficits at minimum, on a variety of key indicators in normal times and during drought; (2) active participation and influence of local women's groups from diverse sectors is critical so priorities of all those affected are embedded in post-disaster resilience and drought recovery strategies; (3) recovery interventions favour displaced women and girls, thus adequate attention must be paid to affected communities who did not migrate so their equally or more pressing priorities are addressed and further internal displacement and livelihood loss avoided; (4) recovery interventions must strike a balance between providing immediate relief and longer term resilience building, especially with respect to resilient livelihoods and entrepreneurship; (5) protection services must go beyond sexual and gender-based violence to protect women's ownership, access and control of resources, especially for women farmers;<sup>294</sup> and (6) costing women's recovery priorities in the DINA and the Somalia RRF, and influencing related budget allocations, are essential to make recovery for women work.

Woman-targeted community-based water management has brought positive multiplier community impacts, including for children. In arid Yemen, as elsewhere, water scarcity and polluted drinking water has disproportionate negative impacts on women and girls, who bear the responsibility for household water management, nutrition and health, and on children. Male urban and cross-country migration as a coping strategy has further increased work burdens on women. In 2008 the German Agency for Technical Cooperation (GTZ), supported a woman-focused community-based water management project in Amran district.<sup>295</sup> It trained more than 7,000 women in water conservation and purification, sand filter use, cleaning and maintenance. Sand filters were widely distributed to schools and mosques, and to NGOs, with the Yemini Women's Union playing an important role in raising widespread awareness on their health benefits. Women's capacity to take part in water management decision-making was built, and young women ran women's literacy classes after being trained to teach adults.

The project registered several positive impacts, including:<sup>296</sup> (a) reducing water-borne diseases affecting children, and health expenditures; (b) women's active participation in the 38 community-led water committees; (c) sensitization of men and religious and community leaders to gender inequalities in climate change, disasters and water-related issues; (d) greater male acceptance of women on these committees and improved interaction between women and men; and (e) addressing the needs of the water sector and raising awareness on cistern management and use via women's participation in committees, which encouraged some women members to take part in local council elections, increasing their access to decision-making.

## 2. Arab children and youth

Children and youth from poor families are more likely to be multidimensionally poor.<sup>297</sup> There are few child- and youth-oriented social assistance schemes, and socioeconomic policies do not normally invest in child development and protection.<sup>298</sup> The share of children at risk of poor development varies, from 78 per cent in Djibouti to 55 per cent in Yemen, 23 per cent in Egypt and 15 per cent in Morocco.<sup>299</sup> Most infants under six months are not exclusively breastfed,<sup>300</sup> causing the highest estimated percentage loss in gross national income (0.98 per cent in Arab and neighbouring countries) due to cognitive deficits in infant feeding practices.<sup>301</sup> Stunting affects 37.6 per cent of under-fives in the Arab LDCs, 22.3 per cent in Egypt in 2014 and 27 per cent in 2009 pre-conflict Syrian Arab Republic.<sup>302</sup> Wasting among children ranges from 3.3 per cent in the Maghreb to 16 per cent in the Arab LDCs.<sup>303</sup> More than 16 million children across the region are out of school, including 10 per cent of primary school-age children, and 32 per cent of upper secondary-age children.<sup>304</sup> More than 18 per cent of Arab youth (10 per cent of males and 27 per cent of females) are not in employment, education or training (NEET).<sup>305</sup> The share of youth with basic ICT skills is less than 20 per cent in LDCs, such as Djibouti and the Sudan.<sup>306</sup>

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294 United Nations Entity for Gender Equality and the Empowerment of Women, 2017.

295 Verner, 2012.

296 Augustin and Assad, 2010.

297 A household, and so all its members, is multidimensionally poor if it is deprived in one third or more of the weighted indicators. See <http://hdr.undp.org/en/content/what-makes-individual-multidimensionally-poor/>.

298 UNICEF, 2017; UNESCWA and others, 2017b.

299 UNICEF and Countdown to 2030, 2019.

300 Victora and others, 2016.

301 Rollins and others, 2016, the regional country grouping is in line with reference.

302 UNESCWA, 2020b. p. 26.

303 Ibid.

304 Calculated by UNESCO, see <http://data.uis.unesco.org/>.

305 ILO, 2017.

306 UNESCWA, 2020, p. 64.

These indicators have deteriorated amid widespread crises. A higher incidence of malnutrition, anaemia and diarrhoea among under-fives was reported in hard-hit drought-affected Syrian governorates in the period 2006–2010. Stunting rose to 35 per cent and acute malnutrition to 23 per cent.<sup>307</sup> More than 360,000 children were malnourished in the 2017 drought in Somalia.<sup>308</sup> Children, youth and others had higher, aggravated levels of acute respiratory infections and eye irritations due to dust storms in the Syrian Arab Republic,<sup>309</sup> and of malaria, bilharzia and diarrhoea in water-scarce Yemen.<sup>310</sup> Yet with the highest unemployment rates in the world, Arab youth, as other groups, lack access to formal health insurance to pay for rising care and medication costs.<sup>311</sup>

Enrolment in some schools in drought-affected eastern Syrian Arab Republic decreased by 70–80 per cent from 2008 to 2009, due to financial hardship, transport costs and distance, migration and child labour. Girls are often the first to be taken out of school.<sup>312</sup> For similar reasons, in the Somalia drought of 2011–2016, the school dropout rate over six months in one site in Hargeisa district was 33 per cent, while in Togdheer and Mudug only 9 per cent and 8 per cent of households, respectively, reported sending children to school.<sup>313</sup> In the 2019 Somalia floods, and 2008 Yemen tropical storm, the destruction of schools, and their use as shelters and for storing relief materials, interrupted education.<sup>314</sup>

Risky and exploitative child and adolescent labour, such as in construction or transporting goods, increases in affected contexts. As women undertake paid work, girls, particularly, take on more domestic work and are more often left on their own, placing them at increased risk of violence.<sup>315</sup> Protracted drought and conflict in Somalia, put children in Baidoa and Beledweyne at risk of abduction, abandonment and violence, including sexual violence. Children from poorer families were more at risk, including when adults spent time away from home foraging for food. In response, families migrated or sent children to safer locations. Migration is a long-term strategy for Somali youth,<sup>316</sup> and those from other Arab countries.

## Box 4.2 *Child-centred disaster risk reduction in the League of Arab States*

A framework for child-centred DRR (FCCDRRLAS) was adopted in 2015 by the Department of the Family and Child of the League of Arab States, working with Save the Children Fund, via decree 799 D35.<sup>a</sup> The FCCDRRLAS aims to integrate DRM and child protection into several priorities, with related activities across prevention, mitigation, preparedness, response and recovery. These include: (1) assessing the vulnerability of children to disasters; (2) developing institutional, administrative and legal frameworks for child-centred DRR (CCDRR); (3) building and improving resilient infrastructure affecting children's safety, education and health; (4) integrating children's needs, capacities and vulnerabilities into regulations, land-use planning and urban planning; (5) raising awareness and building capacity on CCDRR; (6) integrating children's needs and vulnerabilities, and their capacities, into preparedness, early warning, response, recovery and reconstruction plans; (7) mainstreaming children's participation in meaningful activities; (8) adopting a risk governance framework that applies to all CCDRR strategies, policies and activities; (9) reviewing legislation on protecting and promoting the children's rights; and 10) developing child protection mechanisms.

While addressing the entire disaster cycle, the framework emphasizes corrective risk management strategies for DRR and risk governance, including participation in decision-making related to risk management. Anticipated results include: (1) strengthened child protection pre, during and post disaster; (2) enhanced disaster resilience of education and health sectors, including schools and hospitals; (3) reduced disaster



307 United Nations, 2009.

308 FSNAU, 2017.

309 United Nations, 2009.

310 Assad, 2010; World Bank, 2011.

311 UNESCWA, 2020b, p. 44.

312 United Nations, 2009.

313 Fanning, 2018.

314 Somalia, Government of Somalia and World Bank, 2020; Yemen, Government of Yemen and others, 2009.

315 Fanning, 2018.

316 Development Initiatives, 2019.



losses, including child mortality, injuries, livelihoods and assets; (4) improved development and sustained gains; (5) reduced regional inequality; (6) improved governance and participation in decision-making, especially for vulnerable groups, including children; (7) improved capacity to respond to and recover from disasters; (8) improved capacity for CCA; (9) progress in implementing international frameworks such as the Sendai Framework, SDGs and Convention on the Rights of the Child (CRC); and (10) creating a generation of children moving into adulthood conscious of the links between development, disaster risk, child rights and protection, and the related challenges and opportunities.

a League of Arab States, 2015.

A regional consultation with children and youth on DRR raised their issues with governments in the Middle East and North Africa, and globally. At least 1,800 children and youth were consulted in nine countries (Egypt, Iran (Islamic Republic of), Iraq, Jordan, Lebanon, Libya, Morocco, the State of Palestine and the Sudan) on building resilience amid disasters, climate change and conflict-related displacement. The resulting messages were endorsed at the regional Platform on Disaster Risk Reduction in September 2014, and the contributions were integrated into the Sendai Framework at the World Conference on Disaster Risk Reduction (WCDRR) in Sendai, Japan, in 2015. The initiative was led by the Coalition of Children in a Changing Climate, UNICEF, Save the Children International, World Vision, IOM and WHO.<sup>317</sup>

### 3. Older persons

Religious and cultural codes in the region emphasize honour, respect and affection for parents and largely influence intergenerational support. Older persons provide a safety net to adult children and their families, often extending financial support to their children. About 34 to 40 per cent of older persons in Algeria, Lebanon and the State of Palestine help with child-raising and domestic tasks,<sup>318</sup> dispelling perceptions they are dependent, passive recipients of care. Normal-time policy initiatives do address abuse and social insurance, but the distinct priorities of older persons in climate crises are largely overlooked,<sup>319</sup> beginning with scant data and analysis.

Ageing, especially for women, the self-employed and informal workers, exacerbates financial insecurity in the absence of universal or comprehensive old age pensions,<sup>320</sup> which accounts for 34 per cent of the Arab workforce.<sup>321</sup> Age-associated chronic diseases such as hypertension, heart disease, cancer, diabetes, arthritis, back pain (as high as 40 per cent in many Arab countries),<sup>322</sup> osteoporosis, anaemia, malnutrition and visual, hearing and mobility problems, especially among the elderly poor, challenge health-care access. Precarious safety nets and economic insecurity force approximately 37–65 per cent of men aged 60–69 years, and 24–47 per cent of women aged 70–79 years in Egypt, Jordan, Lebanon, the State of Palestine and Yemen to continue working,<sup>323</sup> largely informally. Employers or credit institutions specify an upper age limit or demand full physical ability for job or credit access, even if these are not strictly needed for the job, compounding discrimination and economic insecurity for older people with disabilities. Maltreatment prevalence rates among older adults of 1.2 per cent in Lebanon and 5.1 per cent in the State of Palestine,<sup>324</sup> and 42.4 per cent for neglect, 5.7 per cent for physical abuse and 3.8 per cent for financial abuse in a rural community in Egypt,<sup>325</sup> with women more likely to be abused than men.

Normal-time poverty, physical decline, age discrimination and inadequate services impact older people in distinct ways during disasters. The loss of meagre assets, informal jobs, incomes, homes and basic necessities exacerbate poverty. The lack of comprehensive data for the region notwithstanding, data for other countries show a disproportionate number of disaster casualties among older persons<sup>326</sup> and persons with disabilities, especially women. Deficits in age-sensitive

317 Egypt, League of Arab States and United Nations Office for Disaster Risk Reduction, 2014.

318 Kronfol, Rizk and Sibai, 2015.

319 UNESCWA, 2017d.

320 UNESCWA, 2018a.

321 Robalino and others, 2005.

322 UNESCWA, 2017d.

323 Yount and Sibai, 2009

324 League of Arab States, Pan Arab Project for Family Health, "Analysis of survey data", 2008.

325 Abdel Rahman and El Gaafary, 2012, pp. 532–537.

326 HelpAge International, 2019.



DRR planning and action are contributory factors, which HelpAge International says manifest in particular ways.<sup>327</sup> Early warning and information dissemination, often written in small print, exclude those with low levels of literacy and visual problems. Also, many frail older people are reluctant or unable to evacuate, migrate or protect themselves in disasters; they may be raising orphaned, abandoned or left-behind grandchildren alone, simply find it more convenient to stay or lack the means to move. Evacuation planning often excludes their needs, such as elderly identification, arrangements to carry their assistive devices, medicines, appropriate transport and assistance for mobility and other disabilities. For example, when people, en masse, moved as a result of the Syrian 2006–2010 drought, the small stay-behind population largely consisted of old persons and children.<sup>328</sup>

Older persons suffer theft, dispossession, and physical and sexual abuse. The distress and disorientation caused by loss of family, home and livelihood, and sudden changes in social status, cause trauma.<sup>329</sup> Cash and particular nutritional and health needs, such as soft digestible food and supplements for malnutrition, are often not met in general relief and reconstruction efforts. An Oxfam study of 5,577 households across 28 sites in Somaliland and other parts of Somalia in the 2011–2016 drought noted that 28 per cent of households reported women were more likely to be excluded from aid, compared with 22 per cent for men.<sup>330</sup> Older people find it difficult to queue or walk to relief distribution points, or use transport and access structures with steps, especially if they also have other disabilities. Disrupted social networks limit their access to survival and recovery resources, and they are more likely to be excluded from decisions that will affect their future.<sup>331</sup>

But older people constitute a sizeable part of communities and make crucial socioeconomic contributions, including in times of crisis. As survivors of previous disasters, their local experience, knowledge, skills and insights can be very useful in local assessments that incorporate the strengths and needs of older people, ensuring inclusivity. As traditional knowledge-holders, they can provide valuable information on local hazard, risk profiles and sustainable community-based mitigation strategies. As older people may not be as engaged in routine economic activity, they can spend more time on DRR actions and facilitate greater community engagement. They are often a key support to family members, grandchildren and other vulnerable groups, including as caregivers. Moreover, they are strongly motivated to build a safer world for their grandchildren.

These capacities are exemplified in the crisis in the Sudan, where older people, among others, lost jobs, forcing them to rely on aid. Now, rather than simply receiving food or medicine, some are working with HelpAge International and nine partner organizations to ensure aid gets to the neediest older people in communities, by overseeing a network of committees. As well as constructing shelters and water pumps, and registering older people, residents collectively lobby the local government. According to one HelpAge International staff member running a course on participatory planning for 25 NGOs in the Sudan, “strengthening older people to control their lives is key to long-term change”.<sup>332</sup>

## 4. Persons with disabilities

The Arab region is largely inaccessible for persons with physical, mental, cognitive or sensory disabilities, despite noteworthy initiatives to improve usability and address stigma and social exclusion.<sup>333</sup> While a sense of social and religious responsibility to persons with disabilities tend to characterize family and clan culture, in Somalia, for example, larger environmental obstacles prevail.<sup>334</sup> Data gaps on persons with disabilities in normal times and in disasters are acute.

In 9 of 10 Arab countries with available data, the employment rate for persons with disabilities is approximately 14 per cent for women, and 34 per cent for men, but frequently far lower.<sup>335</sup> Literacy rates are lower for persons with disabilities regionally, at all education levels, especially post-primary. In Oman, for example, 87 per cent of persons without disabilities are literate compared with 31.2 per cent of persons with disabilities.<sup>336</sup> Women and girls with disabilities are

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327 Ibid.

328 ACSAD and UNDRR, 2011.

329 HelpAge International and UNHCR, 2000.

330 Fanning, 2018.

331 HelpAge International, 2019.

332 HelpAge International and UNHCR, 2000.

333 UNESCWA, 2018b.

334 Development Initiatives, 2019.

335 UNESCWA, 2018b.

336 Ibid.

even more excluded from education, especially in rural areas. Students with disabilities face discriminatory treatment, poor transport and road infrastructure, and inaccessible educational facilities and content.<sup>337</sup> Special and different health-care needs are inadequately addressed. Access challenges intensify with other intersecting inequalities, including those affecting migrants, refugees, rural populations and others. Costs and data deficits on available services exclude persons with disabilities from health care.<sup>338</sup> Region wide, they face physical barriers to mobility, including narrow doorways and high curbs limiting public access, which entrench their exclusion.

Qualitative evidence highlights the priorities of persons with disabilities in climate crises and migration, given data deficits. According to the Center for Disaster Philanthropy, early warning systems are seldom disability-sensitive and more focused on audio-video or televised messages without sign language, captions or audio descriptions for those with hearing, visual or other disabilities.<sup>339</sup> Evacuation planning often excludes their needs; for example, identification, arrangements to carry their assistive devices, service animals, medicines, appropriate transport and assistance.<sup>340</sup> In Somalia's 2011–2016 drought, persons with disabilities were often left behind when others fled as they could not move on their own and families often lacked the strength or means to assist them. Even when humanitarian assistance arrived in south central Somalia, those surviving were not reached in time. Local leaders would sometimes withhold information about their food allocation entitlements, and as many of the caring families dispersed, people were left without support. Some fleeing families lied to persons with disabilities who could not be easily transported, saying they would explore transport for them.<sup>341</sup> Where food and humanitarian assistance reached them, as in Beledweyne and Kismayo, it was stolen. The situation was worse for those persons with disabilities in IDP camps or those who belonged to minority groups or who were separated from families. One third of households said that physically disabled women and widows were likely to be excluded from distributions versus 25 per cent of men. Persons with disabilities, especially women and children, were also more vulnerable to violence due to their reduced ability to defend themselves.<sup>342</sup>

High poverty rates limit the ability of persons with disabilities to prepare for disasters. Shelter infrastructure may not be disability sensitive, lacking mobility features, sanitation infrastructure, refrigeration for medicines and power to charge assistive devices, while access to drugs, daily living assistance, basic hygiene and mental and health care for chronic conditions may be interrupted. Damage/needs assessments and reconstruction efforts tend to exclude their needs, including assistive devices, rehabilitation services, accessible shelter, housing, food, water, medical emergencies and mental health services.<sup>343</sup> Exclusions can increase abuse, mortality or morbidity rates for persons with disabilities. Carers and persons with disabilities coped differently in the drought in Somalia. Those with mental challenges were hidden from outsiders or shielded from stressful events.<sup>344</sup>

Despite this, there were also good community-based practices. In Kismayo and Beledweyne, for example, community groups ensured that information, and humanitarian assistance and services reached persons with disabilities.<sup>345</sup>

## 5. Migrants

In 2017, women constituted 32.8 per cent of the migrant and refugee population in the region, almost half in the Mashreq region (49.7 per cent) and Arab LDCs<sup>346</sup> (48.3 per cent), 35.3 per cent in the Maghreb and 27.6 per cent in GCC<sup>347</sup> countries. This reflects the proportionally higher number of men who migrate to work in the Gulf and the Maghreb, in contrast with the more conflict-induced displacement in the Arab LDCs and Mashreq, which is more evenly gender-distributed. For example, in Jordan and Lebanon, which host huge refugee and displaced populations from the State of Palestine and the Syrian Arab Republic, women represented 50 per cent and 52 per cent of these groups, respectively. More than 84 per cent of forced migrants in the drought in Somalia were women and children under 18 years. In GCC countries, however, the number of women migrants range from 16 per cent in Oman to 32 per cent in Kuwait. Working-age men and women aged 25 to 64 years were 49 per cent and 19 per cent, respectively, of all migrants and refugees in

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337 UNESCWA, 2020b.

338 Baroud, 2017.

339 Center for Disaster Philanthropy, 2020.

340 Ibid.

341 Development Initiatives, 2019.

342 Ibid.

343 Center for Disaster Philanthropy, 2020.

344 Development Initiatives, 2019.

345 Ibid.

346 Including Comoros, Djibouti, Mauritania, the Sudan and Yemen.

347 Including Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and the United Arab Emirates.

the region. Children aged 0–14 years and young people aged 15–24 years represented 18 per cent and 12 per cent of the region's migrant and refugee population.<sup>348</sup>

Migration in the region happens for a variety of reasons, marked by greater or lesser degrees of freedom or force of circumstance along a continuum. This is best exemplified in the case of poor communities, whose decisions to move are mediated by multidimensional poverty and other related factors. That said, the past 15 years show a clearer link between climate change, disasters and migration, underscored by an investment deficit in resilient development.<sup>349</sup>

Depending on the context and nature of hazard, migration trajectories vary in terms of length of time (very short-term, temporary, cyclical, long-term), autonomous or familial (male migration, women moving independently or with children, or entire families) and internal or international (to cities in-country or across national boundaries).<sup>350</sup> In the Sahel sites of Mauritania each major drought has triggered large-scale migration to cities. Nomadic households have moved in droves to Nouakchott and Nouadhibou, where deeper wells reach the groundwater; between 1970 and 2000, Nouakchott's population jumped from 40,000 to more than 700,000.<sup>351</sup> In the Syrian Arab Republic, seasonal male migration for jobs occurred yearly, while women propped up household and rural economies at home. The multi-year Syrian droughts made migration within or across the country semi-permanent or permanent, with men, for instance, migrating to Lebanon and Jordan as construction or agricultural workers, and women moving independently to western Syrian Arab Republic as vegetable packers,<sup>352</sup> or with families migrating semi-permanently or permanently to Syrian cities such as the outskirts of Damascus.<sup>353</sup> Somalia's protracted drought pushed some four million people into urban areas, semi-permanently or permanently.<sup>354</sup> More than 84 per cent of these people were women and children under 18 years. Between October and December 2019, floods displaced 410,000 people, who returned to previous communities or IDP settlements but required immediate support.<sup>355</sup> Under the clan system of Somalia, migration indicated a failure to protect members and diminished ties. The migrant people were therefore exposed to greater risks except where remittances from employment were forthcoming.<sup>356</sup>

Impacts vary for different segments of migrants and those left behind. Women are more marginalized from access to information and pre-departure training, or they are subject to policies and/or social norms that deter, or face age, country or occupation-based restrictions on their out-migration, thus enhancing trafficking and exploitative recruitment. Traffickers have intentional strategies and gender profiles of poor men and women, and scour climate-disaster sensitive, underdeveloped migrant sites for "clients". Women have no assets, or fewer assets than men, to pay for migration costs and tend to move and pay later, thus falling more easily into debt bondage. There are fewer legal and decent jobs for women at destination sites. Domestic work, often not legally or socially recognized as work, employing a critical mass of poorly skilled women, violates their human rights. Contract substitution, appropriation of travel documents, non-payment of wages already lower than those paid to men, lack of access to health care, restrictions on mobility and interactions, sexual and other forms of violence at all stages of migration, and the lack of women-sensitive reintegration policies and remittance and productive investment policies affect both men and women migrants, with disproportionate impacts on women. Where men migrate and women are left behind, they become the de facto head of household and the sole on-site providers for families. Their workloads and stress increase in a difficult context. If remittances are never sent by men, or sent irregularly, women are even more precariously placed. But many times, the new roles they have to play enhance women's self-esteem, confidence and decision-making, and if sustained can potentially transform gender relations.<sup>357</sup>

Quick onset disasters forcing unplanned large-scale movement to urban settlements or IDP camps strain resources and the job market at host sites already affected by existing refugees, such the one million Iraqi refugees who fled to the Syrian Arab Republic. It also places the left-behind older people and children in dire straits. In spontaneous settlements in western Syrian Arab Republic inhabited by climate migrants, many lived in tents. Weak services and basic necessities continued to threaten the health and lives of children and other vulnerable groups already suffering from poor nutrition and disease, and also the privacy, safety and security of women and girls. In new settlements, children worked with

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348 UNESCWA and IOM, 2020.

349 D'Cunha, 2019.

350 Ibid.

351 United Nations Human Settlements Programme, 2017b.

352 United Nations. 2009.

353 Ibid.

354 UNDP, 2018a

355 Somalia, Government of Somalia and World Bank, 2020.

356 Development Initiatives, 2019.

357 D'Cunha, 2019.

their parents in the fields, most not attending school.<sup>358</sup> Research covering 5,577 households in 28 sites for internally displaced people across ten regions in Somaliland and Somalia showed that men affected by the drought commencing in 2015 struggled even to find physically demanding and hazardous jobs on construction sites, digging and breaking stones, or shining shoes or selling khat in new sites. Women and girls found jobs as domestic and laundry workers, cleaners, street hawkers, cooks, tailors, garbage collectors and construction workers in new sites that they moved to, while they continued to bear the responsibility for unpaid care work. In some instances, for lack of options, women had to succumb to the worst forms of labour and trafficking.<sup>359</sup>

Settlements for internally displaced persons are often not woman or child friendly. They are frequently most at risk, with incidence of sexual and gender-based violence and trafficking linked to poverty, congestion and poor camp security, as well as long distances between food, water and sanitation facilities. For example, in Somalia, additional protection risks for children include family separation and child recruitment, arbitrary arrest, early marriage, lack of education access or drop out, hazardous child labour and elevated exposure to forms of GBV, including assault, trafficking and psychosocial distress.<sup>360</sup>

However, many women migrants have overcome experiences of violation and joined with migrant NGOs, thereby developing self-esteem, confidence and the ability to negotiate public policy and decision-making on their rights and entitlements.<sup>361</sup> The monies migrant women have saved have served as social safety nets, contributed to family and community well-being, enhanced human capital and contributed to poverty reduction.<sup>362</sup>

Good migration governance across the migration cycle, coupled with gender-responsive sustainable development, can enhance the resilience of women migrant workers and those from male migrant households who remain at home, and benefit their families and communities, and the countries of origin and destination. Over the past 15 years, several Arab governments have, for example, introduced some form of protection for women migrant workers. These range from policies, decrees, instructions, reforms in labour law and codes, to contracts protecting the labour rights of women migrant workers, notably domestic workers, including changes to the kaffala system that monitors migrant workers and regulations for recruiting agencies. Programmatic initiatives such as PPPs in e-recruitment systems, pre- and post-arrival information dissemination, job competency standards for domestic workers, wage protection systems, flexi visas and online remittance transfers are at varying stages of design and implementation in the Gulf countries.<sup>363</sup> Evidence shows, however, that policy-practice gaps exist.

Climate-smart government strategies for rural women and youth, including migrant households, in the High Atlas region of Morocco, have empowered these groups. The region largely has smallholder farms and is increasingly exposed to climate-related temperature and rainfall changes. While men have migrated for seasonal work in herding and trade, women have always done unpaid care work and half of the agricultural work. With men's increasing and longer term migration, the women have been left to manage the fragile climate-sensitive mountain ecosystem.<sup>364</sup> The Ministry of Agriculture is now working to empower them, and draw on their capacities. The 2020 Rural Development Strategy, which focuses on recognizing women farmers "as producers and managers of ecosystems", has been enhancing women's skills, promoting the use of biogas and solar energy rather than wood-fuel and training them to dig wells with manual pumps. This has improved agricultural practice, reduced workloads, helped diversify their livelihoods and increased their incomes.<sup>365</sup> In semi-arid south Morocco, where households also own small land plots, the ministry has drawn on local knowledge and practice, effectively enabling youth and women to improve livelihoods and earnings through the value-added production of the pear cactus, an ecosystem preserver with nutritional, medicinal and cosmetic properties. Its Green Morocco Plan has expanded the cultivation area, and trained women to produce cactus jam and extract oil for use in highly priced cosmetics. The small-scale production of pear cactus is assuming industrial proportions, raising women's incomes and status, with multiplier impacts for their children and communities.<sup>366</sup>

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358 United Nations, 2009.

359 Fanning, 2018.

360 Somalia, Government of Somalia and World Bank, 2020.

361 Cross-Regional Centre for Migrants and Refugees, see <http://crossregionalcenter.org/>.

362 D'Cunha, 2020.

363 Ibid.

364 Messouli and Rochdane, 2011.

365 Ibid.

366 Ibid.

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## E. Gaps in mainstream interventions

Despite progress, mainstream interventions on climate change, disasters and migration are marked by a spectrum of gaps.

### 1. Treating communities as homogenous

Communities are largely regarded as homogenous, with inadequate attention paid to the specific concerns of priority population segments, such as women, children, youth, persons with disability, older persons, indigenous persons and migrants, as highlighted in the Paris Agreement and the Sendai Framework.

### 2. Lack of disaggregated data on Sendai priority groups related to climate change and disasters

Disaggregated data and analysis exist on climate-sensitive and disaster hotspots, vulnerable economic sectors, and to some extent, broader population groups within these sectors, such as poor rural people and herders/pastoralists. However, there is a lack of readily available disaggregated data in national and regional statistical databases<sup>367</sup> or research by governments and/or international organizations in the region on the specific concerns of priority groups highlighted in the Sendai Framework. For example, while the global average of women being 14 times more likely than men to die in disasters is widely cited, data disaggregated by sex and age at minimum on disaster deaths in Arab countries and regionally is unavailable. Likewise, damage and loss databases related to physical, socioeconomic and other assets and infrastructure lack data disaggregated by sex, age and other indices of marginalization.

### 3. Policies, programmes and budgets inadequately informed by specific priorities of vulnerable groups

The region has important regional policy frameworks on climate change and DRR. These include the Arab Framework Action Plan on Climate Change for 2010–2020 to ensure climate-resilient development, and the ASDRR 2030.<sup>368</sup> At national level, 16 countries have updated their national biodiversity strategies and action plans, 21 have some form of climate policy, regional and national policies or plans and programmes on climate change, five have DRR strategies,<sup>369</sup> and others have migration strategies. But these national policies and plans are unevenly developed across the region and inadequately informed by the specific priorities and differential needs of women, children, youth, persons with disability, older persons, indigenous persons and migrants. They often lack feasible targets, indicators and robust budgets, and are seldom anchored in sustained institutionalized consultations with vulnerable populations and their support groups. Where they do address the priorities of marginalized groups, as in the field of climate change, key groups such as persons with disabilities and older persons continue to be excluded, coverage of groups such as vulnerable women does not always address critical priorities, and implementation falls short for a slew of reasons. Finally, it is not clear from the review of national DRR strategies how many countries have addressed the priorities of women, let alone other priority groups highlighted in the Sendai Framework.

### 4. Silo approach to addressing vulnerable groups within these agendas

Although the Paris Agreement, the Sendai Framework, the SDGs and the UN Global Compact for Migration (UNGCM) have reiterated the need for synergies, the related national and subnational policy and programmatic formulation and implementation regarding vulnerable groups have been pursued in silos. For example, while development plans in most countries cover agricultural and pastoral production, few specifically address climate change and environmental concerns. Seldom are the specific priorities of migrants, including women migrants, addressed in national adaptation plans on climate change or national disaster laws and strategies. Similarly, seldom are climate adaptation and mitigation provisions for women, for instance in agriculture, reflected in national disaster strategies, or vice versa.

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367 Case studies, or smaller more localized research, notwithstanding.

368 UNDP, 2018a.

369 Communication by Arab governments at 5th Arab Partnership Meeting, organized by UNDRR, November 2020.



## 5. Inadequate engagement of vulnerable groups in multisectoral and multi-stakeholder collaboration

There is a lack of adequate vulnerable group engagement in multisectoral and multi-stakeholder collaboration. For example, several countries have multi-ministerial mechanisms to design national climate adaptation plans, national determined contributions, national DRR strategies or migration policies and plans. Often, however, national women's machineries are not a member of these mechanisms, although women: (a) play a central role in food, water, energy and natural resource management; (b) are themselves migrants, or hold up household and fragile economies and ecosystems when men have migrated; (c) are disproportionately impacted by climate change, disasters and distress migration; and (d) are often front-line service providers. Moreover, stakeholder groups tend to either be climate change or DRR specialists, decision-makers and practitioners to the exclusion of broader development actors working on gender equality and children's, youth, disability, older people, indigenous groups and migration issues. This undermines any amplified and coherent impact.

## 6. Inadequate attention to mitigating drivers of vulnerability and risk as preventive approaches

Interventions tend to be reactive responses, with inadequate attention to preventive approaches that address structural roots of vulnerabilities, and that build the resilience of those most at risk. For example, interventions tend to focus more on community-based climate adaptation, which is important, but less on mitigation at all levels and sustainable management of ecosystems and natural resources; or on disaster response and less on risk prevention, risk reduction and reduction of risk drivers.<sup>370</sup> For example, 21 Arab countries submitted nationally determined contributions in line with the Paris Agreement, including both mitigation and adaptation measures. Seven countries did not include emissions reduction targets in their submissions.<sup>371</sup> Moreover, there is relatively little investment in much needed sustainable development that provides choices to distress migration, and on interventions preventing rights violations against migrants.

## 7. Scaling up promising community interventions

Promising community-based interventions tend, on average, to be small scale and localized, often unlinked to meso and macro processes, and projectized. Additional effort should be directed at increasing investments in the sustainability and scaling up of these promising community interventions.

## 8. Implementation and accountability deficits

Even where sound policies exist, the gaps between policy, implementation and accountability are large. For example, even if there are drought and flood warning systems, these may not effectively reach all segments of rural populations at scale. The Paris Agreement, the Sendai Framework, the SDGs and the UNGCM have provisions and mechanisms for monitoring and reporting on national and regional implementation. There is a need for more accountability and corrective action on reducing structurally determined risk and vulnerability, especially of the most vulnerable to climate change, disasters and forced migration.

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## F. Conclusion

Climate change and extreme events are among the biggest threats to development in the Arab region, and globally. The structural drivers of vulnerability to climate change and disaster risk, and their impacts, including distress migration, are intrinsically embedded in the sustainable development paradigm.

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<sup>370</sup> Including poverty, inequality, unchecked urban expansion, environmental degradation and weak risk governance.

<sup>371</sup> World Resources Institute, 2019.



While migration in the region occurs for diverse reasons, there are also clear links between climate change, disasters and migration, underscored by investment deficits in resilient development. Where direct links between these phenomena are less obvious, declining socioeconomic conditions, coupled with depleted ecosystems and long onset disasters, contribute to migration.

The Arab population is diverse, triggering a differentiated experience of inequality, poverty, climate change, disaster risks and migration among different vulnerable groups, rural or urban, including women, children, informal workers, youth, older and indigenous persons, those with disabilities, migrants and refugees. These groups, their priorities and capacities, are often excluded from policies, programmes and budgets, leaving them further behind. Pre-existing inequalities and vulnerabilities are exacerbated in disaster and climate crises. But these groups also demonstrate capacity to cope, recover and rebuild their lives and communities.

Transcending this situation requires: (a) data production and availability, disaggregated by age and sex/gender, and economic, health, ethnic, nationality and migration status, on the structural drivers and impacts of DRR, climate change and migration; (b) building the leadership of vulnerable populations prioritized in the Sendai Framework and ensuring their sustained representation on decision-making and implementation mechanisms on climate mitigation, and adaptation, reduction of risk and vulnerability to disasters, migration and development; (c) engaging vulnerable population groups and wider stakeholders in addressing implementation and accountability deficits in order to tackle disaster risk governance and CCA deficits and migration; (d) adopting a whole of government and society approach that forges collaborative and coordinated action and capacity development of relevant government ministries and departments and CSOs, for amplified impact; (e) drawing on disaggregated data and consultations with vulnerable populations prioritized in the Sendai Framework to review and reform existing policies, laws, plans, budgets on sustainable development, DRR, climate change, migration and humanitarian response from a nexus perspective; (f) investing in well-designed, sustainably financed, scalable community-based pilots linking disaster resilience, climate change, sustainable development and migration and the specific priorities of vulnerable groups prioritized in the Sendai Framework across these linked agendas.

# Urbanization trends and urban resilience in the Arab region

## 5.



### A. Introduction

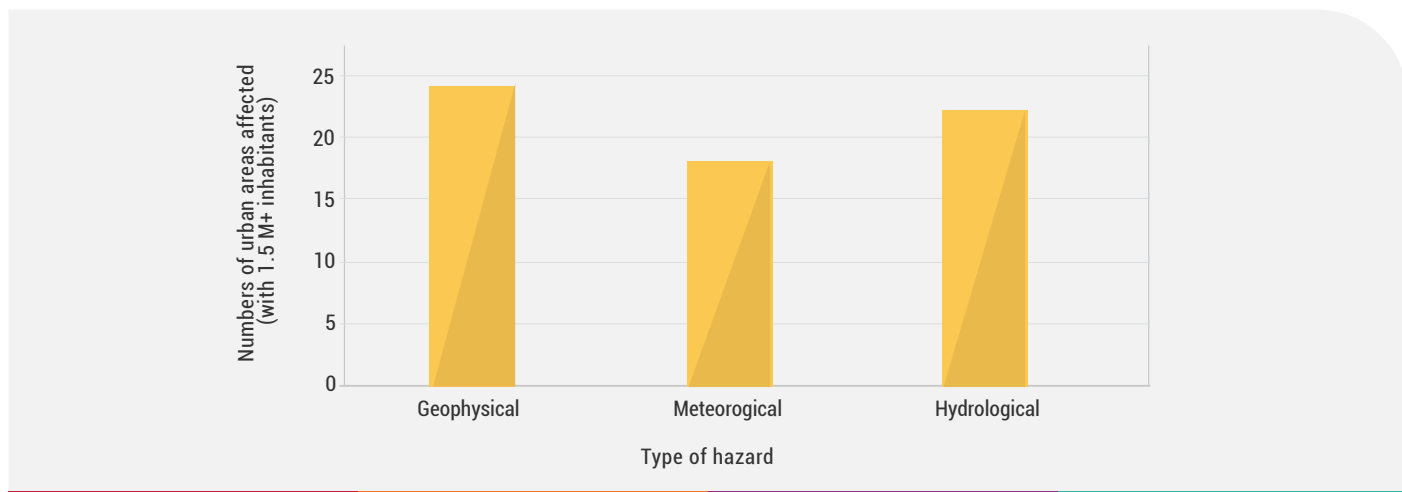
This chapter discusses the drivers of urbanization and the growing risks and vulnerabilities associated with the pace of urbanization and associated demands on infrastructure. Urbanization is reviewed from a DRR, climate change, sustainable development and urban resilience perspective. The extent to which cities in the region integrate DRR in their local urban development plans is considered, and the role of resilient urban infrastructure in DRR discussed.

### B. Urbanization trends and drivers and their interaction with other disaster risk drivers

Cities and urban areas in the region are faced with unprecedented rates of population growth, concentration of socioeconomic activities and growing rates of environmental hazards and social problems. Arab cities provide an array of potential advantages for improving living conditions and access to job opportunities and services but they are

increasingly exposed to a wide range of risks triggered by natural and human-made disasters (figure 5.1). The region's population has grown exponentially over the past 40 years, according to the revised 2019 World Population Prospects by the United Nations Department of Economic and Social Affairs (UN DESA). The total population was 165 million in 1980 and projections show that it had reached 428 million in 2020.<sup>372</sup> By 2050, the number of people is expected to rise to 676 million,<sup>373</sup> with 80 per cent of them projected to live in cities.<sup>374</sup>

Figure 5.1 Urban areas with populations exceeding 1.5 million exposed to hazards



Source: UN DESA, 2018.

The definition of what constitutes an urban area is not unified across the region. Many countries define cities in terms of their population threshold through statistical data coupled with their economic base and administrative significance in a national context. Cities are also classified in terms of the concentration of utilities, infrastructure, and goods and services. In Egypt, for example, the definition of urban areas is purely administrative, while Bahrain, Jordan, Kuwait, Lebanon, Mauritania, Qatar, Saudi Arabia, Somalia, the Syrian Arab Republic and Tunisia define them according to the administrative area and population size. In Algeria, the definition is based on population size, prevalence of non-agricultural activities, infrastructure and services. In the Sudan, it is based on population size, administrative area and localities of commercial importance.<sup>375</sup>

The region is characterized by significant urban growth in its major cities over the past few decades, including in Algiers, Amman, Baghdad, Cairo, Damascus, Jeddah and Riyadh. Many governments, in Egypt and Morocco, for example, have invested in new cities to absorb the increasing population and decongest overcrowded urban areas. Several countries have adopted national urban policies in coordination with multiple actors to guide future growth and spatial urban development, and develop a long-term vision for sustainable urbanization.

## 1. Urbanization rates

Generally, over the next few decades the region will continue to witness a major and rapid increase in urbanization. According to the United Nations Population Division, just over 58 per cent of the population lived in urban areas in 2016,<sup>376</sup> with this proportion expected to reach 80 per cent by 2050,<sup>377</sup> bringing new opportunities and challenges, including sustaining inclusive, resilient and safe settlements. The rapid pace of urbanization is underpinned by several factors, including continued population growth, economic transformation, increased encroachment on agricultural land, and rural-urban and international migration. There is a correlation between rapid – and often uncontrolled – urban growth and the increased exposure to vulnerabilities and urban risks, especially for the poor.

372 UN DESA, 2018.

373 AFED, 2017.

374 UNDP, Bahrain Center for Strategic and International Studies and Energy and UN-Habitat, 2020.

375 ILO, 2018b.

376 UN DESA, 2018.

377 UNDP, Bahrain Center for Strategic and International Studies and Energy and UN-Habitat, 2020.

## 2. Urban informal settlement rates

The spread of informal settlements has become a clear manifestation of inequalities in cities. Informal settlements are characterized by substandard physical structures, often in hazardous or unsafe locations in central areas, or on the outskirts of urban areas and lacking access to basic urban services, or in areas of unplanned urban expansion. The urban poor and vulnerable groups frequently suffer from compounded deprivation as they settle on land unsuitable for development, leading to tenure insecurity and enhanced vulnerability to eviction. The vulnerability of people living in informal settlements is associated with several factors, including socioeconomic inequality and marginalization, urban poverty, poor building standards, location in unsafe areas, exposure to environmental hazards, vulnerability to climatic shocks and stresses, and limited access to basic services.<sup>378</sup> Moreover, a large number of internally displaced persons find refuge in informal settlements in urban areas as an alternative to unaffordable formal housing.

The spread and growth rate of informal settlements varies across the region and the definition of informality is not standardized. For example, in large urban agglomerations such as the Greater Cairo area, informal areas in 2009 accounted for 65 per cent of the total urban area; in Jeddah, 35 per cent of the total population resided in informal settlements.<sup>379</sup> In Iraq, the proliferation of informal settlements is a relatively recent phenomenon, emerging after the 2003 Iraq war and increasing dramatically during the period 2013–2016. This was mainly as a result of the large influx of internally displaced persons, triggered by widespread security issues and the lack of affordable serviced land in urban areas. The population living in informal settlements in Iraq accounted for 12.9 per cent of the total population in 2017.<sup>380</sup> In Sana'a, Yemen, 35 informal areas were established in the 1990s, which by 2008 were home to 16.5 to 20.5 per cent of the city's total population.<sup>381</sup> Following the Syrian crisis, the number of people in informal settlements in Lebanon has increased enormously; for example, in the Bekaa governorate in 2018, some 197,000 inhabitants were living in 34,550 tents in overcrowded conditions.<sup>382</sup>

Poor living conditions and limited access to basic services and utilities continue to affect the well-being and health of those in informal settlements. The outbreak of COVID-19 in 2020 highlighted the entrenched inequalities in the region, exposing the vulnerability of dwellers to compound health risks. Informal areas are largely overcrowded and characterized by high population densities and poor access to adequate water and sanitation services. These challenges have made physical distancing impossible in many cases and accelerated the virus spread. Further, irregular incomes and unstable livelihoods, in tandem with the absence of social safety nets, have worsened the living conditions of many people amid lockdown policies.<sup>383</sup>

## 3. Interaction of rapid urbanization with other urban disaster risk drivers

### a. Poverty as an urban disaster risk driver

Across the region, some 18 per cent of the population lives below national poverty lines, with 38.2 million people experiencing acute poverty.<sup>384</sup>

There are wide disparities in the poverty rate across the GCC countries, and alarmingly high rates in LDCs. In 2016, a survey in 10 countries showed the number of people living in poverty was 116.1 million, or 40.6 per cent of the total population.<sup>385</sup> The percentage of people living in urban areas under the designated national poverty line varies in cities across the region; for example, in Jordan, 57 per cent of citizens living below the national poverty line are concentrated in Amman, Irbid and Zarqa.<sup>386</sup>

### b. Environmental degradation as an urban disaster risk driver

The connection between rapid urbanization rates in the Arab region and environmental degradation is clear, particularly with regards to biodiversity loss, water and air pollution, desertification, water scarcity and coastal erosion. Inadequate

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378 UN-Habitat, 2020.

379 United Nations Human Settlements Programme, 2017b.

380 UN-Habitat, 2020.

381 Yemen, Government of Yemen, 2016.

382 United Nations Resident and Humanitarian Coordinator for Lebanon and UNHCR, 2018.

383 Wahba and others, 2020.

384 Acute poverty is defined as severe deprivation, and measured through indicators on education, health and living conditions, see UNESCWA, 2017b.

385 The 10 countries surveyed were Algeria, Comoros, Egypt, Iraq, Jordan, Morocco, Mauritania, the Sudan, Tunisia and Yemen, see UNESCWA, 2017b.

386 UN-Habitat, 2012.

management of solid waste and improper waste disposal contribute to environmental degradation in addition to increasing exposure and vulnerability to health risks. For example, Bahrain is one of the highest per capita municipal solid waste generators in the world, with an estimated 1,400 tonnes of waste generated every day.<sup>387</sup> The population increase and limited land available for disposal sites has made solid waste management a highly problematic challenge for decision makers and municipalities.

### **c. Weak urban governance as a disaster risk driver**

Good urban governance is characterized by decentralization, sustainability, equity and participation. Limited coordination between central and local governments and urban development institutions in the region has resulted in a lack of effective urban planning and governance. The situation is compounded by fragmented and complex legal and institutional structures that hinder inclusive, sustainable urban growth in Arab cities. Further, urban governance remains highly centralized. It is often the urban poor who are disproportionately vulnerable to disasters because of their physical location and poor housing. This is compounded by their limited capacity and necessary resources to prepare, cope with and recover from disasters.

## **4. Rural-urban migration and climate change**

Rural-urban migration is a main driver of urbanization in the Arab region, fed by multiple so-called push and pull factors.<sup>388</sup> These include discrepancies in development between rural and urban areas, economic development through investment in urban activities and industries, and the livelihood opportunities offered by cities. The absence of efficient rural development policies, endemic water shortages, and intensifying natural resource constraints and droughts continue to push many rural residents to abandon agriculture-based livelihoods. As urban-rural disparities persist, large numbers of rural people, especially the young, move to large and medium-sized cities seeking a better quality of life, including greater access to employment opportunities and better services.

Migration to cities is also a response to environmental issues. Climate change has severely affected rural livelihoods, exacerbating rates of land degradation and water scarcity and weakening agricultural productivity and food security. This is highlighted in the previous chapter in the case of the Syrian Arab Republic that suffered prolonged drought from 2006 to 2010, leading to the large-scale migration of more than 200,000 people from rural areas to cities.<sup>389</sup> Moreover, the Arab region is vulnerable to sea level rise, which will have implications for major coastal cities already experiencing rural migration, including Alexandria, Algiers and Tunis, and some 43 port cities.<sup>390</sup>

Somalia is at risk from several natural hazards and climate change challenges, including drought and flooding. The Sima drought in 2016 and 2017 resulted in massive displacement, causing almost 1 million people to move from their homes.<sup>391</sup> Drought impact is exacerbated by violence and conflict, with internal displacement acting as a driver of rapid and unplanned urbanization. About 80 per cent of Somalia's 2.6 million internally displaced persons live in precarious conditions in urban and peri-urban settlements and camps. Some 642,000 new displacements were recorded between January and July 2018, with flooding the primary reason in 43 per cent of cases, followed by drought (29 per cent) and conflict (26 per cent).<sup>392</sup> In this regard, climate change is a significant characteristic inducing rural-urban migration, increasing the proliferation of informal settlements in cities and in many instances acting as both disaster risk driver and conflict driver.

## **5. Conflict, internal displacement and environmental hazards**

Multifaceted humanitarian crises, conflict and political turmoil in several Arab countries have led to large-scale displacement of people within and across borders. According to the Internal Displacement Monitoring Centre (IDMC), there were 15 million internally displaced persons in the region in 2017 (calculated for the period 2012–2017), 37 per cent of the world total, and mainly in Egypt, Iraq, Lebanon, Libya, Somalia, the State of Palestine, the Sudan, the Syrian

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387 Hoornweg and Bhada-Tata, 2012.

388 According to the OECD, the push represents the state of things at home, such as the strength of the economy; the pull is the situation in a migrant's target country, see OECD, 2009.

389 UNDP, 2018a.

390 UNDP, 2018b.

391 Figure includes people who had to move several times.

392 IDMC, 2020c.



Arab Republic and Yemen.<sup>393</sup> According to a 2020 report by UNESCWA and the International Organization for Migration, the Arab region, as a place of origin, transit and destination, is “witnessing unprecedented levels of migration”.<sup>394</sup> The massive influx of internally displaced persons into already overpopulated cities places pressure on service delivery systems. They move in search of security and to avoid camp settings that lack employment opportunities and access to services but struggle to integrate into host communities and often find themselves living in deepening poverty.

Conflict in the region has changed the demographic landscape dramatically. As well as conflict and instability in Libya, Iraq, Somalia, the Sudan and Yemen, a decade of war has led to the large-scale migration and displacement of more than 5.4 million Syrians, while Palestinians constitute the largest refugee population in the world.<sup>395</sup> The scale of displacement is a major stress on governments and local authorities and impedes their ability to manage sustainable growth in host cities, including DRR efforts.

## 6. Migrant workers

The region, considered a major destination for labour migrants, has been characterized in recent years by increasingly large flows of migrant workers to cities and urban areas. A large proportion is low skilled workers in the construction and hospitality sectors, who often live in substandard conditions.<sup>396</sup> In 2017, 23 million migrant workers were in the Arab region, 39 per cent of them women.<sup>397</sup> The GCC countries have more than 10 per cent of all migrants globally. Saudi Arabia is considered to host the third largest migrant population in the world, and the United Arab Emirates the fifth.<sup>398</sup>

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## C. Conflict and climate change pressures on urban infrastructure and basic public services

The multiple humanitarian emergencies and protracted conflicts have led to the physical destruction and deterioration of infrastructure, creating unprecedented pressure on basic services delivery. The cost of material destruction in the Syrian Arab Republic is estimated at \$67.3 billion.<sup>399</sup> Further, in 2011 the crisis led to a large influx of refugees to Jordan that has increased dramatically the demand for housing in camp and non-camp settings. In Lebanon, the government estimates that more than a million Syrian refugees live in rented accommodation or in informal settlements across 1,000 municipalities, accounting for 25 per cent of the total population of host communities.<sup>400</sup>

A large number of refugees and internally displaced persons live in unsafe conditions with no access to sustainable shelter solutions, posing challenges to social cohesion and integration in their urban settings in view of their limited resources and capacities. Building resilience is becoming a priority for national and local governments as they respond to mounting demands for adequate and durable housing solutions and services, and to create an enabling environment to reduce the vulnerabilities of displaced populations, strengthen capacities for restoring damaged infrastructure and facilities, and secure resources to meet the needs of host and displaced populations.<sup>401</sup>

Concentrated urbanization and socioeconomic development in areas prone to climatic shocks and stresses make Arab cities among the world’s most vulnerable to the effects of climate change, including: (i) sea level rise threatening coastal communities; (ii) urban areas and settlements situated in flood-prone areas; (iii) exacerbated extreme weather events; (iv) water scarcity and extreme drought; and (v) increased temperature levels and exacerbated frequency of extreme heatwaves, where changes in land surfaces caused by urban development, land use and concentration of human activities have resulted in “urban heat island” effects. Studies have shown the region is especially vulnerable

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393 UNESCWA and IOM, 2020.

394 UNESCWA and IOM, 2020.

395 United Nations Human Settlements Programme, 2017b.

396 ILO, n.d.

397 Ibid.

398 Ibid.

399 UNDP and Syrian Centre for Policy Research, 2016.

400 Ibid.

401 Kirbyshire and others, 2017.

to such effects, with major risks for the public health of urban populations.<sup>402</sup> Climate change is exerting additional pressures on the already weakened urban infrastructure and public services, and widening the financing gap needed to develop sustainable and climate-resilient infrastructure networks. Addressing the urban resilient infrastructure gap, including financing, is becoming increasingly central to building urban resilience in the region.

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## D. Urban resilience, climate change, SDGs and disaster risk reduction

### 1. Definitions of urban resilience

The notion of resilience is related to the capacities of individuals and institutions to cope and adapt to different shocks and stresses. UNDRR defines resilience as “the ability of a system, community or society exposed to hazards to resist, absorb, accommodate, adapt to, transform and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions through risk management”.<sup>403</sup>

The IPCC defines resilience as “the ability of a system and its component parts to anticipate, absorb, accommodate, or recover from the effects of a hazardous event in a timely and efficient manner, including through ensuring the preservation, restoration, or improvement of its essential basic structures and functions”.<sup>404</sup> Resilience has become an integral and essential part of sustainable urban development and a prerequisite of sustainable urbanization. Urban resilience is defined by UN-Habitat as “the ability of any urban system, with its inhabitants, to maintain continuity through all shocks and stresses, while positively adapting and transforming toward sustainability”.<sup>405</sup>

### 2. The New Urban Agenda

The New Urban Agenda (NUA) adopted in 2016 is an action-oriented road map that mobilizes governments and key stakeholders to drive sustainable urban development at local level. In line with the 2030 Agenda and the SDGs, it contributes to implementing and localizing SDGs, including Goal 11 on making cities and human settlements inclusive, safe, resilient and sustainable. The NUA outlines a shared vision of adopting DRR and management for cities and human settlements to reduce vulnerabilities, and build resilience and responsiveness to natural and human-made hazards. The NUA sets goals for fostering mitigation and adaptation to climate change<sup>406</sup> and commits to supporting the development of DRR strategies and periodical assessments of disaster risks caused by natural and human-made hazards through environmentally sound urban and territorial planning, infrastructure and basic services.<sup>407</sup>

### 3. Building urban resilience and DRR in cities in the Arab region

Arab cities and urban areas are increasingly becoming natural disaster hotspots. But they also have great potential for reducing risks and improving risk management. Further, disasters provide opportunities for sustainable recovery and reconstruction based on building back better principles.<sup>408</sup> This would ideally necessitate an enabling environment for DRR at local level and an efficient urban governance system for resilience building in cities and urban areas. Multi-stakeholder engagement is needed for building urban resilience, including central and local governments, city leaders, local communities, the private sector, civil society, NGOs and academic and research institutions.

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402 UNDP, 2018b.

403 United Nations, General Assembly, 2016a.

404 IPCC, 2012a.

405 UN-Habitat Disaster Risk Management, Sustainability and Urban Resilience, 2018.

406 UN-Habitat, 2016b.

407 United Nations, 2015.

408 UNDP, 2018b.

## Box 5.1 Building resilience through spatial planning interventions, the State of Palestine

While growing at a rapid pace, Palestinian urban centres are reeling under immense environmental, socioeconomic, and geopolitical pressures. Almost 77 per cent of the population is urban, living in less than 40 per cent of the territory effectively under direct Palestinian jurisdiction. The rest are living under full Israeli control in semi-urban and rural communities in the West Bank, including Area C and Hebron H2, at the heart of the city. East Jerusalem has been occupied by Israel since 1967, and the Gaza Strip is besieged. The high urban growth rate is accompanied by random spatial development; cities and communities have expanded in a poorly planned manner, encroaching on surrounding agricultural land, with weak infrastructure and growing demand for jobs, services and housing.

Significant progress has been made by UN-Habitat in supporting participatory spatial planning for Palestinian communities in occupied East Jerusalem and Area C that contributed to freezing the eviction and displacement process for 55,000 Palestinians, provided shelter for more than 700, with a specific focus on vulnerable and disadvantaged women in Hebron and Gaza, and prepared 56 multilayered plans with communities, fostering a sense of resilience and community cohesion. UN-Habitat also supported spatial planning processes to build back better in the Gaza Strip, especially after the many cycles of conflict. The spatial planning interventions included establishing de facto planning committees in Area C, such as Barta' area (Jenin), to ensure Palestinians are represented during the planning processes. UN-Habitat also supported urban-rural linkages in six city regions (Qalqiliya, Tubas, Jericho and Northern Jordan Valley, Ramallah and Al-Bireh, Hebron, and Jerusalem), critically linking governors and mayors, and benefiting more than 1.9 million Palestinians. UN-Habitat continues to support the National Spatial Plan, focusing now on the preparation and adoption of the National Urban Policy.

### 4. Urban resilience frameworks

Several tools have been introduced to assess the resilience of cities around the world. For example, The City Resilience Index, developed by the engineering firm Arup and supported by the Rockefeller Foundation,<sup>409</sup> serves as a tool for cities to understand and respond to urban challenges in a systematic way. The Disaster Resilience Scorecard for cities, developed by UNDRR with the support of the European Commission, technology company IBM and infrastructure consulting firm AECOM, is an assessment tool for local governments to measure their disaster resilience. The Balanced Scorecard, introduced by the Torrens Resilience Institute (TRI) for local communities, is a tool for assessing community disaster resilience using an all-hazards approach (figure 5.2).<sup>410</sup> The Urban system Model Approach developed by the UN Task Team on Habitat III identifies hazards and the main urban systems necessary for building and sustaining urban resilience (figure 5.3).<sup>411</sup> The City Resilience Profiling Tool developed by UN-Habitat assesses urban shocks and stresses and prioritizes actions allowing cities to capitalize on existing data.<sup>412</sup>

409 Rockefeller Foundation and Arup, 2016.

410 Ramsey and others, 2016.

411 UNDP, 2018b.

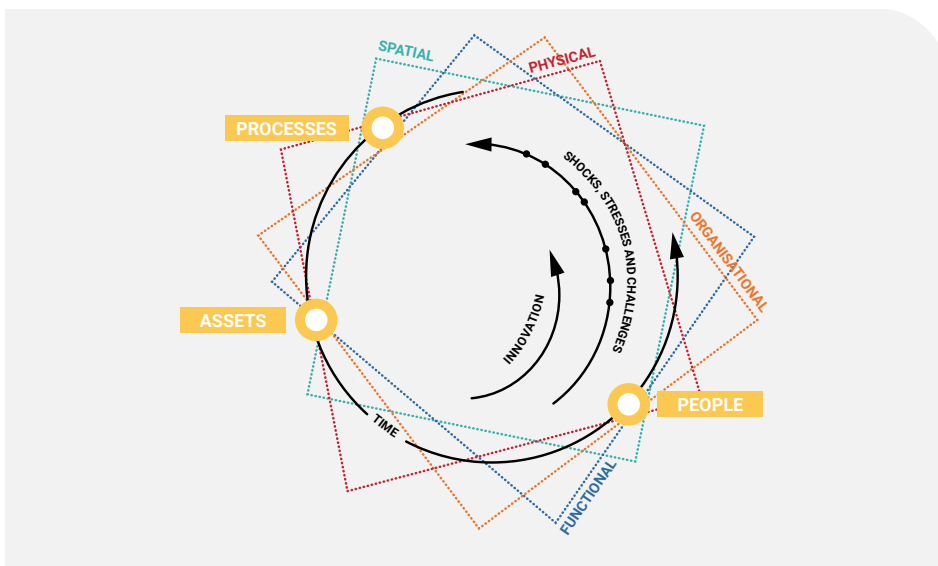
412 UN-Habitat, 2017a.

Figure 5.2 The four pillars of resilience assessed by the TRI\* scorecard



Source: Ramsey and others, 2016.

Figure 5.3 The five critical, interdependent dimensions of the urban system approach



Source: UN-Habitat, 2017a.

UNDRR developed the Ten Essentials for Making Cities Resilient to expedite local implementation of the Sendai Framework to build and maintain urban resilience as part of local DRR and urban development strategies. The essentials are: organizing for disaster resilience; identifying and understanding current and future risk scenarios; strengthening financial capacity for resilience; pursuing resilient urban development; safeguarding natural buffers to enhance the protective functions offered by natural ecosystems; strengthening institutional capacity for resilience; strengthening societal capacity for resilience; increasing infrastructure resilience; ensuring effective disaster response; and expediting recovery and build back better.<sup>413</sup> Over the past 10 years, the Making Cities Resilient Campaign has advocated the need for local government authorities to reduce risk and develop urban resilience. More than 4,350 cities have demonstrated their commitment by signing up.

413 Ibid.

Making Cities Resilient 2030 (MCR2030) Programme builds on the success and lessons of the previous work under the campaign. New partnerships and delivery mechanisms will be leveraged to gradually shift from advocacy to implementation support. MCR2030 will be a global partnership of actors with expertise in urban resilience, DRR, climate change and the SDGs. It will provide a resilience road map for cities, with defined commitments over time on how to improve local resilience. A suite of tools and knowledge guidance will be available from an existing pool with partners that cities can use to better reduce risk and build resilience. MCR2030 will promote regional networks of partners with strong links and implementation experience so cities are connected in a movement that can support resilience measures. By 2030, MCR2030 aims to have increased the number of cities committed to reducing local disaster/climate risk and building resilience.<sup>414</sup>

Despite significant progress in urban resilience frameworks and assessment tools, Arab cities are yet to localize and contextualize global frameworks and identify the set of indicators most relevant to their local context and specific risks.

## E. Urban governance and city resilience

UN-Habitat defines urban governance as: “The sum of the many ways individuals and institutions, public and private, plan and manage the common affairs of the city. It is a continuing process through which conflicting or diverse interests may be accommodated and cooperative action can be taken. It includes formal institutions as well as informal arrangements and the social capital of citizens.” With the range of systemic risks facing Arab cities and urban areas, enhancing governance is crucial for building urban resilience and addressing the growing challenges. There is a correlation between effective urban governance and the ability of cities to manage emerging risks, build their resilience capacities and recover from different shocks and stresses. The efficiency of the urban governance systems differs across the region, dependent on multiple factors, including the availability of resources and degree of fiscal autonomy, and the extent of accountability and inclusive participation in decision-making processes, authority and the capacity to provide and maintain public services.<sup>415</sup>

### 1. Centralization, lack of fiscal autonomy and associated local capacities

Urban governance systems vary widely. The most predominant management pattern is characterized by centralization, led by national governments and public institutions, with fiscal, administrative and political autonomy remaining limited at municipal level. This has limited the capacity of cities to identify and assess emerging risks and undertake the necessary precautions.<sup>416</sup> There is a growing need for local governments to prioritize DRR and resilience as part of their development agenda. UNDRR has identified 13 DRR actions that reflect local government powers and capacities, namely: developing a city vision or strategic plan following the concepts of resilience; establishing a single coordination point for DRR; undertaking risk analysis for multiple hazards; developing financial planning for resilience; developing urban plans with up-to-date risk information; updating building codes and standards and enforcing their use; protecting, conserving and restoring ecosystems for resilience; developing a critical infrastructure plan or strategy for resilience; strengthening institutional capacity for resilience; identifying and strengthening societal capacity for resilience; developing a disaster management and/or emergency response plan and protocols; developing or ensuring connections to early warning systems; and developing a strategy for post-disaster recovery and reconstruction that ensures building back better.<sup>417</sup>

#### **Box 5.2** *Local financing and partnerships for riverbank filtration units, Egypt*

UN-Habitat is championing an innovation aimed at providing water to vulnerable populations. One project, supporting innovation in water and sanitation in Egypt, explores, pilots and scales up solutions that complement ongoing efforts and extend water, sanitation and hygiene (WASH) services to all marginalized and vulnerable communities. Egypt has been suffering from water scarcity and, with a current yearly shortage



414 UNDRR, 2020d.

415 UNDP, 2018b.

416 Ibid.

417 UNDRR, 2019a.



of 23 billion m<sup>3</sup>, is considered water poor. Climate change is expected to cause significant variations in the flow of Nile water, the country's main renewable water resource.

Any change in the rainfall pattern in the Upper Nile countries will affect the annual Nile flood. This in turn will negatively affect the livelihood of millions of people, with an expected fall in agriculture production and drastic socioeconomic impacts in Egypt.<sup>a</sup>

Limited cooperation on transboundary water management, and the filling and operation of the Grand Ethiopian Renaissance Dam, threatens water flow and quality, particularly during prolonged periods of drought. Pollution of the Nile River with municipal and industrial waste, leakage of wastewater, inefficient use in households and irrigation systems, leakage from infrastructure networks due to poor maintenance and the uneven distribution of water in urban and rural areas further exacerbate the challenges.

Due to population growth, demand is expected to increase 60–75 per cent by 2050. Infrastructure coverage and access to potable drinking water has grown steadily over the past decades, reaching approximately 96.97 per cent of Egyptian households, but is not distributed equally in rural and urban communities; up to 98.1 per cent of Egyptian households in urban communities are covered compared with 95.52 per cent in rural communities.<sup>b</sup> Many diseases are linked to the consumption of untreated canal water or contaminated water from ground pumps. In Egypt, diarrhoea is the second leading cause of death among children under five. As a consequence of the COVID-19 emergency, water provision has become crucial to maintain basic hygiene and reduce the spread of the disease, especially in rural settings or informal areas.

Innovative technologies are used to enable clean water provision, improved sanitation services and increased capacity to address water and sanitation needs, based on a strong knowledge foundation and with the partnerships necessary to institutionalize models for long-term sustainability. At local level, green riverbank filtration (RBF) is a promising innovation that complements large-scale, costly and centralized water provision systems. Each unit is 5 per cent of the cost of a traditional water purification plant serving the same number of people. Further, water quality is not affected by river accidents (leaks of hazardous materials from tanks) and natural crises (flooding and water-level falls).

In 2017, UN-Habitat, in partnership with the Holding Company for Water and Wastewater, successfully implemented RBF technology in 10 sites across al-Minya governorate in Upper Egypt, providing access to clean water for more than 180,000 vulnerable inhabitants, with replicated implementation by the Minya Drinking Water and Sanitation Company. UN-Habitat also conducted national capacity building workshops and a feasibility study to explore potential implementation sites elsewhere in Egypt, which would benefit an estimated 500,000 inhabitants. Financing was also mobilized for a second phase to reach 400,000 additional inhabitants, funded by the Coca-Cola Egypt and Replenish for Africa initiative.

Partnerships have been established with research and academic institutions, such as the Faculty of Engineering at Ain Shams University (ASU) and the Housing and Building Research Center (HBRC), to ensure experts are involved and research and development available in a local context, and that the technology is included in national codes of practice.<sup>c</sup>

a Smith and others, 2013.

b Central Agency for Public Mobilization and Statistics, "Percentage of Housing Units Connected to the Public Water Network", 2017.

c UN-Habitat and Minya Drinking Water and Sanitation Company, 2017.

## 2. Enabling conditions for private sector participation

Financing challenges have created a gap in service delivery and infrastructure development that in many cases is filled by the private sector and CSOs. A growing number of PPP initiatives have also emerged in the region for infrastructure delivery and investments. Their success depends largely on an enabling environment and an institutional framework for such mechanisms. GCC countries, including Kuwait, Saudi Arabia and the United Arab Emirates, have achieved considerable success implementing resilient infrastructure projects in the water and energy sectors through PPP models.<sup>418</sup> Other countries, with more challenging fiscal space, often require capacity-building, at all levels, to improve the enabling conditions for multi-stakeholder engagement with the private sector, vulnerable communities and civil society.

### **Box 5.3** *Building disaster risk governance capacity in Ain Draham, Tunisia*

Tunisia is among the most disaster-prone climate change hotspots in the Mediterranean region, with increasingly frequent and severe floods leading to loss of lives and damage to infrastructure. Over the past three decades, Tunisia has reported about 2,495 disasters, with 1,075 deaths and \$756 million in economic losses. Ain Draham city is highly vulnerable to recurrent floods given its high annual rainfall rates and snow falls, while lacking proper DRR capacities for effective, inclusive, urban resilience.

UNDP supported Ain Draham to join the Making Cities Resilient campaign to encourage 12 other cities in Tunisia to replicate the DRR best practice it had initiated. UNDP also helped enhance the city's risk governance capacities, including through a city-to-city exchange programme with Dutch cities. Exchange visits helped provide exposure to international experiences of flood monitoring, forecasting and management, including early warning systems for urban resilience, and enabled officials to design disaster risk governance arrangements with designated roles and responsibilities for effective prevention, preparedness and response at the municipal level.

UNDP assistance laid the foundations for a vulnerability assessment, which informed measures to build city disaster risk governance capacities to prevent loss of life and minimize economic loss. Stakeholder consultation forums were established, engaging the private sector and teams of volunteers, and land-use regulations were introduced to ensure risk-informed development and protect critical infrastructure. A vulnerability assessment of schools was carried out, and the city municipal department rehabilitated buildings deemed vulnerable. Activities to raise community awareness were designed and implemented to ensure effective preparedness and response to disaster risks.

### **3. Accountability and inclusive participation**

Institutional responsibility and accountability for developing and implementing DRR strategies, in an inclusive participatory manner, is crucial for context-specific and local DRR planning. Effective risk governance mechanisms are lacking in Arab cities, with little reported progress on community participation at local level.

### **4. Downscaling local resilience and sustainable development through multiscale, multilevel holistic approaches**

Development can only be sustainable if it is comprehensive, which necessitates that it is also local with the engagement of multiple stakeholders. Further, local resilience-building initiatives are most likely to succeed when they address the contextualized risks and development needs of communities, and where these risks and needs are assessed in a participatory manner. The human security approach, mainstreamed in the Sendai Framework, was used to promote such principles.

### **Box 5.4** *Enhancing community resilience and human security in urban settings through the Sendai Framework, Mauritania*

Mauritania is particularly vulnerable to natural hazards, which include drought, landslides, flooding, storms, silting and coastal and dune erosion, seawater infiltration, locust invasions and wildfires. With 77 per cent of the total land consisting of desert, and more than 60 per cent of inhabitants reliant on traditional agriculture and raising livestock,<sup>a</sup> the population remains in a state of chronic vulnerability due to unpredictable seasonal rains and climatic conditions. The risk profile and rapid population growth, coupled with social and political vulnerability, puts Mauritania among the poorest LDCs in the world.

With UNDRR backing, beneficiary cities of the project "Enhancing community resilience and human security of vulnerable communities in urban settings through the implementation of Sendai Framework for Disaster Risk Reduction 2015–2030" undertook people-centred, multi-stakeholder, multisectoral local self-assessments to gauge resilience, human security and disaster risk drivers. In-depth risk assessments in Tervagh Zeina, Rosso and Kaedi identified various natural hazard risks, such as floods, overflow of ocean waters, fires, epidemics,



sandstorms and high winds, desertification, marine pollution, locust invasion, food/nutritional crisis and drowning, and industrial risks. Socioeconomic characteristics of the three cities were identified, including poverty and employment rates, health and education service quality, and information provided on rural-urban migration trends. Trade-offs were recognized between drought, food security and nutrition crises and between flood mitigation measures that may affect floodplain irrigation zones, which, in turn, will affect the poorest in the city and the country (for example, Oualo agriculture workers).

This innovative approach paves the way for addressing the long-term effects of hazards on human dignity, and the interaction of disaster losses and impacts with disaster risk drivers and violent extremism risk drivers (for example, the rise in displacements, potential forced relocations, chronic or multidimensional poverty, socioeconomic exclusion, inequality). The assessments analysed the linkages between categories of threat (political, economic, food and environmental). Alongside the results of UNDRR's Disaster Resilience Scorecard for cities, they also guided the development of three local resilience action plans that integrated the human security principles of being people-centred, multisectoral, comprehensive and context-specific, prevention-oriented and focused on protection and empowerment.<sup>b</sup>

a FAO, "Family Farming Knowledge Platform". Available at <http://www.fao.org/family-farming/home/en/> (accessed on 5 May 2020).

b UNDRR and UNDP, 2020.

## F. Disaster risk reduction and urban resilience in local development plans

Addressing the multiple risks and vulnerabilities facing Arab cities requires effective policies and planning strategies to foster resilient and sustainable urban development that enables cities to manage and reduce current risks and to strengthen their capacities to anticipate and address future ones.<sup>419</sup> This necessitates integrating DRR principles and urban resilience considerations in local development plans across all sectors, and investments in DRR activities.

The Sendai Framework calls for risk-informed urban planning and management "to promote the mainstreaming of disaster risk assessments into land-use policy development and implementation, including urban planning, land degradation assessments and informal and non-permanent housing, and the use of guidelines and follow-up tools informed by anticipated demographic and environmental changes".<sup>420</sup> Capacities at local level to address and integrate DRR in development plans are limited but there are a number of cases where DRR considerations have been mainstreamed at city level. Lebanon has developed local-level resilience plans, and mainstreamed DRR considerations in local development plans,<sup>421</sup> and Jordan has directed significant attention to urban disaster resilience in a number of cities, especially Aqaba and Petra. The United Arab Emirates has also advanced resilience building at local level; for example, Dubai municipality has developed an institutional framework that enables different stakeholders to prepare a comprehensive risk assessment and mobilize resources for DRR.<sup>422</sup>

### Box 5.5 Land-use planning for effective urban resilience, Aqaba, Jordan

Jordan is one of the world's most water-scarce countries, with drought and climate change threatening to accelerate long-term resource insecurity, intensify water insecurity, exacerbate ecosystem fragility and increase social vulnerability. Reports show that drought has devastated about 80 per cent of the Badyia ecosystem, affecting Bedouins, and rural farmers and pastoralists, with significant impact on their livelihoods. Flash floods are also increasing in frequency, given rapid urbanization trends and exposure to climate risks, with ineffective drainage capacities, particularly across wadis. Jordan also lies along the Dead Sea Fault, with major cities, including the capital Amman, plus Aqaba and Petra, located close by.



419 United Nations Human Settlements Programme, 2017b.

420 United Nations, 2015.

421 UNDP, 2018b.

422 El-Kholei, 2019.

A comprehensive disaster risk assessment in 2011 identified earthquakes and floods as the main disaster risks in Aqaba. Supported by UNDP, with funding from the Swiss Agency for Development and Cooperation (SDC), Aqaba has built resilience against disaster risks. UNDP helped mainstream DRR into the city development and land-use planning process. A DRR Unit (DRRU) was established within Aqaba Special Economic Zone Authority (ASEZA), along with a disaster management committee to ensure appropriate stakeholder coordination for effective disaster preparedness and emergency response. The city has successfully integrated present and future disaster risks, including climate-related risks, into the city development plan. Major DRR infrastructure, including flooding diversion systems and bridges, were developed. Building and seismic codes were established by ASEZA along with licensing and construction permit processes to ensure risk-informed land-use planning. A partnership was established with the Jordanian Engineers Association to review permits and designs of new buildings, and to verify compliance with safety standards. Further, ASEZA has partnered with the private sector to ensure new infrastructure meets the specified building and seismic codes, conducted awareness-raising campaigns on DRR, and strengthened staff technical capacities for DRR. A network of community-level response volunteers has also been set up to ensure access to an adequate and effective disaster response.

### **Box 5.6** *Integrating resilience into city development plans, Saida City, Lebanon*

The coastal city of Saida and its centres of unique cultural heritage are at high risk of flooding, from riverbanks and flash floods, and from drought and earthquakes. Major economic sectors, including agriculture, and the industrial units that line the coast are exposed. A large percentage of Syrian refugees have also settled in disaster-prone areas, ill-protected against flash flooding and earthquakes, their vulnerability exacerbated by unplanned urban expansion and poor enforcement of building codes and land-use regulations. Like other Lebanese cities, Saida has weak DRR capacity. This is due to the lack of an effective coordination system and a deficient early warning system, and limited community awareness and preparedness to address the drivers of disaster risks. Managing disaster risks at local level remains weak, lacking in adequate institutional, technical and budgetary allocations.

UNDP has helped set up a dedicated DRRU to plan and manage disaster risks in Saida and to strengthen its technical capacities to coordinate mitigation, preparedness, response and recovery at city level. In collaboration with the SDC, and through the Arab Cities Disaster Resilience Project, UNDP supported the development of a DRR strategy and resilience action plan with its focus on protecting the old city and its cultural heritage. It has also helped integrate resilience into local development plans. The DRRU established a financial mechanism to implement the Resilience Action Plan (RAP) enhancing disaster response and recovery activities through the establishment of the Disaster and Solidarity Fund.

A vulnerability assessment of old buildings informed the development and implementation of restoration plans for historical sites. In addition, UNDP helped provide multipurpose small-scale equipment to improve the resilience of the old architecture against flooding along the riverbanks. With UNDP Support, the Saida DRRU initiated a partnership with the private sector and community-based organizations to mobilize community engagement in disaster response and recovery. The unit also worked with the Ministry of Health to conduct emergency and evacuation drills. Campaigns have been held to raise awareness and enhance local community preparedness against disaster risks.

### **Box 5.7** *Dubai resilience strategy 2020–2030*

Dubai faces many different types of risks corresponding to natural hazards that may challenge its development and prosperity. Further, substantial industrial activity, and the huge construction projects that extend throughout the city, result in various forms of industrial and technological risks. Like other cities around the world, Dubai is also exposed to unconventional forms of security risk, such as cybersecurity.



It developed a resilience strategy 2020–2030<sup>a</sup> with the aim of becoming a model city in the field of resilience; a comprehensive concept towards reducing all types of risks and supporting capabilities to expedite recovery and building back better. The strategy was based on a resilience assessment conducted by multi-stakeholders within different sectors using the Ten Essentials criteria of UNDRR's Making Cities Resilient Campaign. Developed so its strategic goals and objectives are aligned with the relevant post-2015 global agendas, the strategy seeks to achieve many related international commitments stipulated in the Sendai Framework, the SDGs and Paris Agreement. The strategy's vision, mission and strategic goals are consistent with local and national plans and priorities, including the Dubai Plan 2021, Dubai Cyber Security Strategy (2017–2022), Dubai Health Strategy (2016–2021) and Dubai Industrial Strategy (2030).

The strategy ensures the engagement of all stakeholders, such as Red Crescent, the private sector and civil society, among others, in its resilience programme. More specifically, the plan outlines actions to be taken in coordination with multiple stakeholder groups, including (a) a comprehensive all-hazards assessment of the risks in the city and their likelihood, including long-term modelling and prognosis; (b) an analysis of budgets in local government and the main agencies involved in DRR and resilience; (c) assessment of the capabilities and capacity of critical infrastructure available and needed for prevention and mitigation; (d) development of a standard for comprehensive planning to meet the needs of post-event recovery and economic restart, and ensure development of the required plans; and (e) development of a standard model for evaluating the response and an in-depth investigation of root causes, and an assurance that lessons learned after each event will be implemented.

a Dubai Police Force, 2020.

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## G. Conclusion

Arab cities face numerous challenges and increasing vulnerabilities associated with patterns of urbanization and unprecedented population growth interacting with urban disaster risk drivers. Understanding the nature of urban vulnerabilities and building resilience to reduce disaster risks must take account of multiple factors and challenges, including: urban governance and political commitment to prioritize resilience and allocate resources to enhance it; support from many relevant stakeholders; local capacities for resilience-building, including vulnerable groups in DRR; and an enabling environment in which vulnerable groups can participate, including women, youth, the elderly, people with disabilities, and refugees and internally displaced persons.

The lack of urban risk-disaggregated information is a main impediment to advancing risk-informed, sustainable urban development in an efficient yet safe manner. Weak multi-stakeholder and multisectoral coordination hinders efforts to address the urban risk-disaggregated information gap. Securing finance for city resilience building remains a significant challenge, and stronger engagement by cities and international actors with private sector actors is clearly required.



## The disaster- conflict-fragility nexus

# 6.



### A. Introduction

The Sendai Framework highlights the dynamic and complex systemic risks from which disasters materialize. It emphasizes the need to move beyond a hazard-by-hazard approach towards multi-hazard and comprehensive risk management. This underscores the need for an integrated, multisectoral and whole-of-society approach to reducing existing and future risks.<sup>423</sup>

This chapter analyses the interface between disasters, conflict and fragility, and outlines the challenges and opportunities for developing and implementing DRR policies and actions. It presents examples highlighting the complex relationships at regional and national levels. A brief overview of disasters, conflicts and fragility in the region defines the overlaps in drivers and consequences, and the compound, mutually reinforcing effects when disasters and conflict unfold concurrently. Specific thematic areas are examined, including identification of regionally and nationally relevant policy hooks between DRR and conflict policy architecture, opportunities and constraints in strengthening the traction

423 UNDRR, 2019a.

of traditional DRR with national stakeholders, ways to increase collaboration between peacebuilding and DRR actors, the importance of understanding typologies of conflict in identifying strategic opportunities, and the central role of data in ensuring an evidence-based approach.

## 1. Fragility as a systemic interaction between human, financial and political systems with environmental systems

The global fragility landscape has worsened since the turn of the century, impacting both low- and middle-income countries.<sup>424</sup> More than 80 per cent of the world's extremely poor are expected to be living in fragile contexts by 2030,<sup>425</sup> and the trend is expected to continue. Inequality and marginalization, weak economic performance, high unemployment rates and social fragmentation continue to characterize fragile and conflict-affected settings. Combined, these intensify enduring grievances and increase community vulnerability to shocks and crises.<sup>426</sup> More nuanced manifestations of fragility are also emerging, with countries that are not in crisis still unable to deliver sustainable and inclusive development gains.<sup>427</sup> As fragility – and our understanding of it – evolves, these realities intersect with risks caused by climate change, technological advancement and globalization to create complex and highly integrated systemic risk. This growth in multidimensional fragility demands that DRR efforts are catalysed to deliver the necessary reductions in disaster risk in line with Sendai Framework priority areas.

## 2. Fragility, conflict and disaster risk drivers

Alongside the worsening fragility landscape, in the past 10 years, there has been an upsurge in the total number of armed conflicts.<sup>428</sup> These are frequently protracted and complex, involving many actors and against a backdrop of deep domestic grievances. The conditions that appear in fragile contexts are also present, and amplified, in times of armed conflict. This includes the lack of socioeconomic opportunities, marginalization and discrimination, poor governance and weak rule of law, rapid and often unchecked urban expansion, environmental degradation and poverty. These conditions combine with damaged or poorly maintained basic infrastructure and weak or disrupted service provision to accentuate the risk and impacts of disasters. Diverse conflict types, actors and intensity levels are important factors in shaping disaster risk, complicating the creation of responses that are effective across different conflict settings and undermining efforts to blend DRR approaches.

## 3. Policy and operational guidance to understand the disaster-conflict nexus

With disaster risk defined as a function of hazard, vulnerability, exposure and capacity, it seems obvious that fragile and conflict-affected settings have amplified systemic risk. Communities living through conflict and fragility have increased vulnerabilities, lower levels of resilience to shocks and weak or impeded coping mechanisms. In recognition of this, the DRR community has gradually come together around an evolving body of evidence that centres on understanding risk when disasters intersect with conflict and fragility. In the Arab region, this was confirmed by the inclusion of a special session on conflict at the 2018 ministerial-level Africa-Arab Platform on DRR, where the Tunis Declaration broadly acknowledged the conflict-disaster nexus. It was also affirmed at the global level by the 2019 Global Assessment Report on DRR, or GAR, which included an opening first chapter dedicated to DRR strategies in fragile and complex risk settings.

However, there continues to be little policy or practical guidance to lead the implementation of DRR activities in contexts of conflict and fragility. This limits the capacity of States and communities to understand how systemic risk evolves and mitigates its impacts. The negative repercussions are stark. Natural and human-made hazards have a disproportionate impact on fragile and conflict-affected countries and vulnerable populations.<sup>429</sup> More than 55 per cent of disaster deaths occur in the world's 30 most fragile States.<sup>430</sup> Without enhanced DRR efforts, disasters are expected to increase in severity and frequency in fragile and conflict-affected contexts.

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424 OECD, 2018.

425 Ibid.

426 World Bank, 2020.

427 OECD, 2018.

428 Strand and others, 2019.

429 Peters, Eltinay and Holloway, 2019.

430 Peters and Budimir, 2016.

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## B. Disaster–conflict–fragility situational overview

### 1. Conflict, fragility and disaster profile in the Arab region

The Arab region is one of the most fragile and conflict-affected in the world.<sup>431</sup> An estimated one in five battle-related deaths occurred in the region in 2019,<sup>432</sup> with one in five people in the Middle East and North Africa region living near a major conflict.<sup>433</sup> As a consequence, humanitarian needs have increased exponentially. As of 2020, 63 per cent of the region's population, or 266 million people, were said to be living in countries at high risk of experiencing a humanitarian catastrophe. Further, 6 of the 20 most fragile countries globally are in the region, with four in the top eight positions.<sup>434</sup> Fragility and conflicts have eroded State, community and individual capacities to prevent, prepare for and cope with the impacts of hazards.<sup>435</sup> There are multiple examples where conflict and fragility exacerbate the impact of hazards, including when people affected by conflict are forced to flee to areas prone to hazards, reducing expenditure on all aspects of DRR, and limiting access to disaster-affected areas and humanitarian assistance.<sup>436</sup>

The region is also prone to natural and human-made hazards. For example, between 2009 and 2019, floods triggered 64 per cent of the total disaster displacement in Arab States.<sup>437</sup> Severe weather conditions during winter generate cold snaps and snowstorms, in addition to floods and flash floods. Like the more commonly reported hazards, these winter phenomena can trigger displacement, which heightens vulnerability among affected populations and can create new disaster risks in displacement-affected areas. They also affect other vulnerable populations, including those already displaced, such as internally displaced persons, or those displaced across borders, including refugees. Displaced people often reside in precarious locations with high hazard exposure. The combination of hazards affecting the region increases the complexity and extent of risk, as shown in 2019, when Somalia and the Sudan were affected by widespread flooding in some areas and drought in others.

More than 270 disasters have occurred in the region during the past 30 years, causing an estimated total of 150,000 deaths and affecting about 10 million people.<sup>438</sup> The combined effects of conflict and disaster include population displacement, disease outbreak, food insecurity, heightened inequality and a worsening socioeconomic outlook,<sup>439</sup> all of which drive fragility or exacerbate conflict. Across the region, 886,000 displacements associated with disasters were recorded in 2019.<sup>440</sup> In fragile and conflict settings, disasters shock overburdened and often underprepared governments and communities, placing unmanageable stress on response systems.<sup>441</sup> This can deepen pre-existing vulnerabilities and grievances, increase tensions and cause violence, laying the foundation for extended and more complex crises.<sup>442</sup>

### 2. Climate change and conflict

In fragile and conflict-affected settings, climate change acts as a threat multiplier, with the severity and frequency of climate-related disasters impeding capacities to adapt to shocks and manage disaster risks. Studies show that climate change has influenced 3 to 20 per cent of all armed conflicts over the past century,<sup>443</sup> with the effects expected to intensify. If projections of a 4°C warmer world by 2100 hold true, a fivefold increase in the influence of climate on conflict dynamics is predicted, with a 26 per cent increase in substantial conflict risk.<sup>444</sup>

In 2019, data from the Internal Displacement Monitoring Centre (IDMC) for the Sudan showed that 272,000 new displacements were triggered by floods in the White Nile River basin over a few weeks, with more than 16,500 homes destroyed across the state. People without social or family networks struggled to find shelter, with reports of families

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431 IEP, 2018.

432 Uppsala Conflict Data Program (UCDP) 2019. Available at <https://ucdp.uu.se/>.

433 Corral and others, 2020.

434 The Fund for Peace, 2020; OECD, 2018.

435 Peters, Holloway and Peters, 2019.

436 Ibid.

437 IDMC, 2020b.

438 UNDRR, 2013b.

439 League of Arab States, 2010.

440 IDMC, 2020d.

441 OECD, 2018.

442 Ibid.

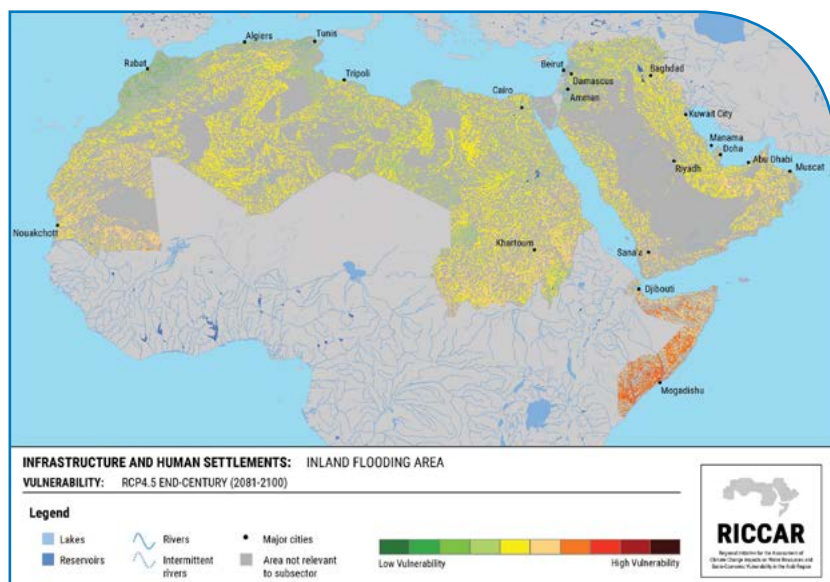
443 Ryan, 2019.

444 Ibid.



having to sleep in the open air. The disaster took place on top of a major political transition and high levels of political turmoil and economic fragility. The president of three decades, Omar al-Bashir, was deposed in April 2019 following protests over the economic crisis. A transitional government was put in place in August, at the height of the floods, which impacted coordination of response efforts. The Sudan's Humanitarian Aid Commission (HAC) activated the flood steering committee and task force, but it was unable to cope. The United Nations and CSOs had to provide emergency support for those affected. Almost all of those displaced by the floods remained displaced as the year concluded.<sup>445</sup>

Figure 6.1 End-of-century inland flooding exposure for RCP 4.5\*



Source: UNESCWA and others, 2017a.

Notes: \* RCP, or representative concentration pathway, is a greenhouse gas concentration trajectory adopted by the IPCC with RCP 4.5 an intermediate stabilization pathway, see [https://www.ipcc-data.org/guidelines/pages/glossary/glossary\\_r.html](https://www.ipcc-data.org/guidelines/pages/glossary/glossary_r.html); the designations employed and the presentation of material on this map do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

Flood risk is projected to increase over the coming years,<sup>446</sup> which will increase flood-related displacement if not mitigated. From 1985 to 2005, only 2 per cent of the region's landmass was at high risk of flooding, however, by the mid-century exposure is projected to increase to 16 to 18 per cent of the region. In a worst-case scenario, by the end of the century, 31 per cent of the region's landmass is projected to be at high risk of flooding (figure 6.1).<sup>447</sup> Concurrently, slow-onset natural hazards, such as rising sea levels, could devastate major cities located in low-lying coastal zones across the region.

### Average annual displacement (AAD) risk – riverine flood displacement risk in the Arab region (IDMC)

Historical data shows that floods are the hazard causing most displacement in Arab States. Looking backwards will not be enough to assess and reduce the risk of displacement, however. Risk models are useful in estimating the level of damage and loss of future disasters, and provide valuable information for decision-makers and planners that could support risk reduction efforts. Even though disaster risk modelling is well developed and applied, few models have looked at the likelihood of displacement in the context of disasters. In 2017, IDMC, working with partners, developed a unique riverine flood displacement risk model that estimates how many people future floods could displace. The data is disaggregated by urban and rural areas, allowing a better understanding of the implications for towns and cities.<sup>448</sup>

445 IDMC. 2020d.

446 The UNESCWA study is based on the flood prone areas indicator, selecting all areas with low or greater flood potential. This includes 32 per cent of the area of the Arab region.

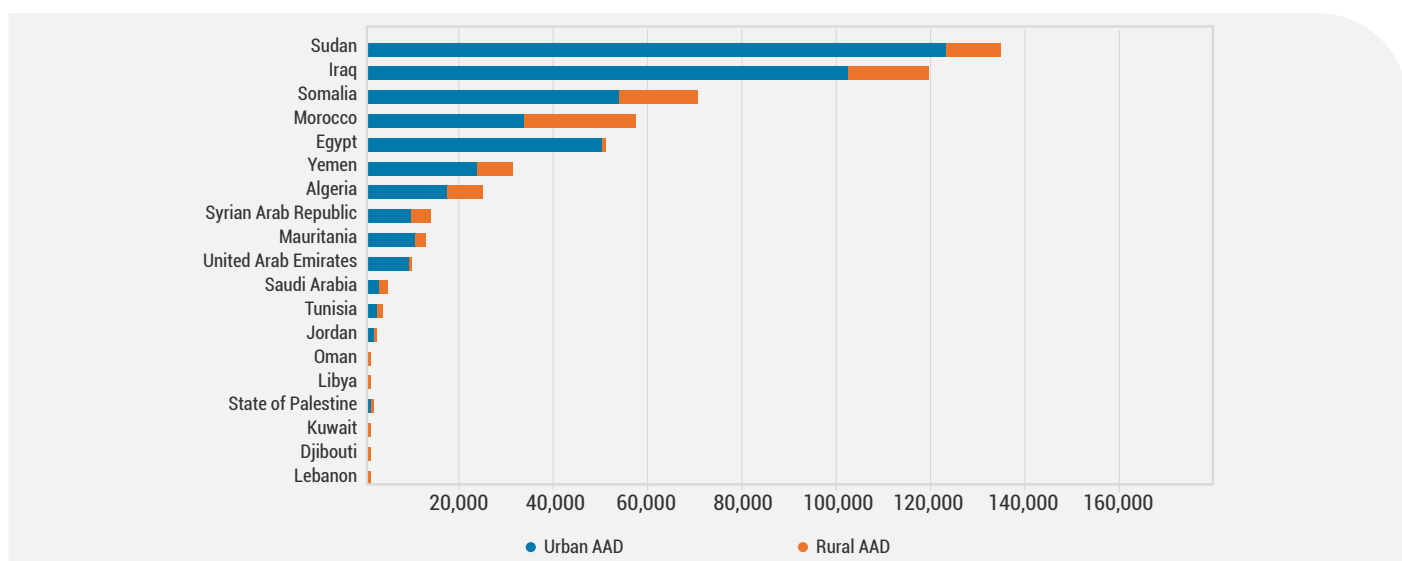
447 UNESCWA and others, 2017a.

448 The datasets for human settlements can neither distinguish between different types of land use (residential, commercial, industrial, etc.), nor account for vertical intensity of development (building height etc.). The derived grid population data will overestimate population in cells where floor space is predominantly industrial or commercial. Population density may be overestimated in areas where structural density (floor-to-area ratio) is low, underestimated where it is high. The allocation of population within the grid cells of an administrative area is, however, a valid approximation at aggregate level. See OECD, *Rethinking Urban Sprawl: Moving Towards Sustainable Cities* (Paris, 2018).

On average, riverine floods could displace 538,000 people in any given year.<sup>449</sup> Results also show that 82 per cent of the total people at risk of flood displacement in the region will be located in urban and peri-urban areas. This average annual displacement risk (AAD) should be considered conservative. It takes data on population exposure as of 2018 and the way displacement risk may increase or decrease will depend, therefore, on how cities grow in the coming years.<sup>450</sup> In addition, the model looks only at riverine floods, not urban floods. The likelihood of flood displacement can increase due to inadequate drainage and water management systems, informal urban expansion, and lack of absorption capacity in cities, among other factors not included in the model.

Despite being cautious, the results show the challenge that lies ahead is considerable and will have different implications for the countries affected; for example, countries currently affected by conflict, including Iraq, Somalia and the Sudan, are among those with the highest AAD figures. Most of the AAD is also concentrated in urban and peri-urban areas (figure 6.2).

Figure 6.2 Riverine flood displacement risk (annual average displacement), Arab States



Source: European Commission, Global Human Settlement Layer. Available at <https://www.un.org/dgacm/en/content/editorial-manual/footnotes/chap-04#L> (accessed on 15 March 2021).

When assessed against a series of social and development factors at national and local levels, the data produced by the model could be used for urban and national sustainable development planning, and for putting in place DRR measures, including crisis prevention and management tools, contingency plans and early warning systems. Making internal displacement risk part of the equation would also mean such interventions could support durable solutions and displacement risk reduction in the years to come.

Climate change has also increased exposure to hazards not ordinarily associated with the region, such as tropical cyclones. Although most States are not prone to cyclones, countries including Comoros, Djibouti, Oman, Somalia, the United Arab Emirates and Yemen have been affected. Between 2018 and 2019, nine tropical cyclones caused approximately 70,000 displacements in the six countries;<sup>451</sup> half were triggered by Cyclone Sagar that formed in the Gulf of Aden in mid-May 2018. The consequences in coastal areas of northern Somalia are still being felt today. Many people lost their livestock and crops, and were displaced for several months. The gradual deterioration in livelihoods increased the need for humanitarian assistance and pushed some to seek refuge elsewhere.<sup>452</sup> Cyclone Kyarr, the most powerful storm to hit the Arabian Peninsula in 12 years, impacted Yemen in October 2019, followed by Cyclone Maha in November 2019 and Pawan in December 2019.<sup>453</sup>

449 IDMC, Global Internal Displacement Database. Available at <https://www.internal-displacement.org/database/global-displacement-risk-model> (accessed on 10 March 2021).

450 European Commission, Global Human Settlement Layer. Available at <https://www.un.org/dgacm/en/content/editorial-manual/footnotes/chap-04#L> (accessed on 15 March 2021).

451 IDMC, 2020d.

452 Ibid.

453 Ibid.



## Box 6.1 Disasters in areas most affected by conflict-related displacement, the Syrian Arab Republic

The north-western parts of the Syrian Arab Republic have been particularly affected by ongoing military hostilities, with harsh impacts on civilians and damage to public infrastructure, including health-care and education facilities. This has created protracted displacement, with informal and formal accommodation frequently overcrowded; the density of internally displaced people in certain locations in Idlib governorate, for example, is four times more than the intended capacity. In 2020, there were more than 1.8 million new displacement movements across the country as a result of conflict,<sup>a</sup> most either within Idlib governorate or towards it.

The Syrian Arab Republic is also highly vulnerable to climate change impacts that manifest as extreme flooding, increased storm frequency and severity, changes in rainfall patterns, sea level rise and increased droughts, and disease outbreaks.<sup>b</sup> The areas most affected by the floods of 2018 were in the northwest, mainly in the governorates of Hassaka and Idlib.

The following year, the country faced the worst flooding in a decade, ravaging Hassaka. More than 118,000 people witnessed their homes being destroyed and livelihoods shattered as a result of these extreme climate events, with camps hosting the resulting wave of internally displaced populations disproportionately affected.<sup>c</sup> Of the 27,000 people who were internally displaced as a result of floods, 12,000 were in Idlib. This trend has led to increased disaster displacements in northwestern parts of the country and was maintained throughout the following year. In 2019, the totality of new displacements resulting from floods within the country was reported in Idlib and was estimated at more than 17,000 people.

a There were 1.8 million new displacements recorded in 2020, approximately the same as in 2019, a slight increase on the 1.6 million recorded in 2018, see <https://www.internal-displacement.org/countries/syria>.

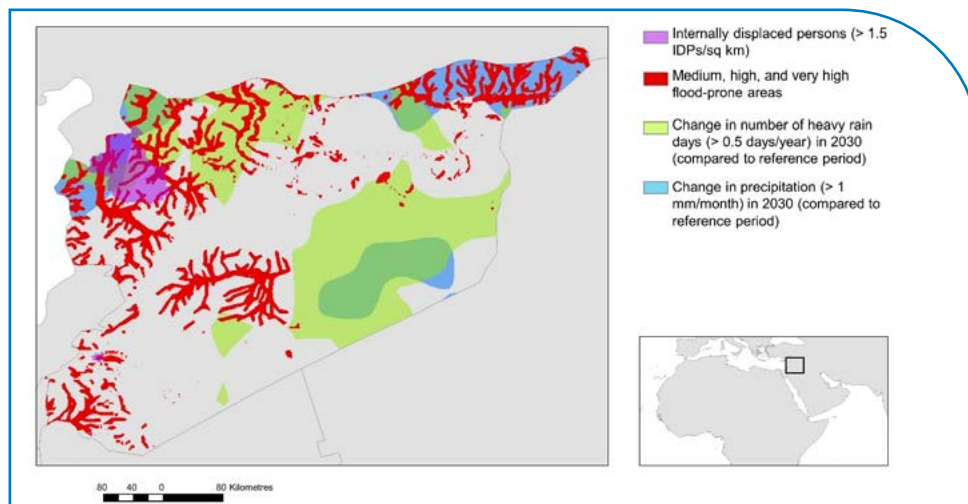
b Ibid.

c Syria: Floods - Mar 2019. Available at <https://reliefweb.int/disaster/fl-2019-000031-syr>.

To project seasonal changes in extreme weather indices, rainfall variation and other climate parameters, ESCWA, working with UNDRR and 10 other partners, has been implementing the Regional Initiative for the Assessment of Climate Change Impacts on Water Resources and Socio-economic Vulnerability in the Arab Region, or RICCAR. The project has established an Arab domain for generating regional climate projections for various sets of climate parameters (for example, temperature and precipitation) and used those projections to run two regional hydrological models to generate projections for several hydrological variables (for example, evapotranspiration and run-off) under various emission scenarios, spatial resolutions and time periods. Building on the integrated assessment methodology and the data layers and modelling outcomes generated under RICCAR, a country analysis for the Syrian Arab Republic was undertaken. This identified regions with the highest projected vulnerability to climate disasters, with implications for the most vulnerable, notably those forcibly displaced as a result of the ongoing conflict and their forecasted social and economic effects. The disaster analysis focused on flash flood potential, with the outcomes generated used as a predictor/proxy for the likelihood of flooding events. Extreme climate indices studied included the annual number of days when rainfall is greater than 10 mm (R10). In addition, the modelling outcomes related to projected changes in rainfall volume were used to provide complementary information on the regions with an increased likelihood of floods across the study area.<sup>454</sup> The climate parameters were mapped, showing an increase in R10 and rainfall in the year 2030 (computed as an average for the 2025–2035 period), compared with the reference period (1986–2005), of 0.5 days/year and 1 mm/month, respectively, or greater (figure 6.3).

454 RICCAR regional climate modelling ensembles project increases in precipitation intensity over northwestern parts of the Syrian Arab Republic.

Figure 6.3 Flood-prone areas and internally displaced persons



Source: UNESCWA and others, 2017a.

Note: The designations employed and the presentation of material on this map do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

Flash flood potential indicators were coupled with two other indicators to determine hotspots. Overlaying these indicators reveals hotspots in the northwestern sector of the country. The findings are corroborated by historical records, which show the area is highly prone to the threat of floods.<sup>455</sup> The governorates that would be particularly impacted include Idleb and its surroundings. In 2020, Idleb was the target destination for the largest share of IDPs within the country.

### 3. Climate change, water stress, fragility and conflict

World Bank data suggest that climate change will continue to drive water stress in Iraq, Jordan, Lebanon, Somalia, the Syrian Arab Republic and Yemen, all countries that are either directly or indirectly affected by conflict.<sup>456</sup> Increasing water scarcity can cause significant socioeconomic impacts and can catalyse fragility and conflict.

In Iraq, a complex water crisis in the south continues to have implications at humanitarian, socioeconomic, security and social levels. With 85 per cent of the water withdrawn used in agricultural activities, shortages stress water management systems, increasing civil unrest and intercommunity tensions.<sup>457</sup> This comes against a backdrop of turbulence ongoing throughout 2019, driven by youth unemployment, perceptions of inadequate resource management and deficient access to quality basic services. In July 2019, the International Organization for Migration (IOM) identified 21,314 persons from the central and southern governorates who were displaced due to lack of water associated with high salinity or outbreaks of waterborne disease. Simultaneously, the Syrian Arab Republic, in its tenth year of conflict, had the worst recorded droughts in living memory between 2007 and 2012. More than 75 per cent of the Syrian land area, predominantly in the northeast, is used for agriculture. This region has faced consecutive and severe droughts over the past decade, the effects of which have been exacerbated by water scarcity and increasing land tenure insecurity. More than 60 per cent of cultivated land is in this northeastern region, which is also home to approximately 58 per cent of the country's poor. Studies show that water scarcity and drought negatively impact economic stability and drive social and cultural separation. Desertification and land degradation also contribute to inequality, vulnerability and instability. While further research is needed to better understand these dynamics at the regional level, sustainable land management and ecosystem restoration good practice have already been documented in Lebanon, Morocco and Tunisia.

It remains likely that the combined impact of conflict and slow-onset disasters, caused or amplified by climate change, will contribute to making many communities uninhabitable, and compel increasing numbers of people to migrate

455 For more information on the DesInventar database, see <https://www.desinventar.net/DesInventar/>.

456 World Bank, 2018, 2019c, 2019d.

457 Al-Ansari and Knutsson, 2011.

internally or internationally in search of new livelihoods. Although this type of migration falls outside the classification of “displacement”, there is a fluidity between migration and displacement in a changing climate, and moving for many is clearly a necessity, rather than a choice. Migration driven by climate change will likely increase. This highlights the need for increased policy coherence and the creation of policy architecture that harnesses migration as a potential positive force for CCA. For example, regional and national policies and strategies can integrate provisions to enable the management of safe and voluntary internal and/or international migration as a positive coping strategy or adaptive response that reduces disaster risks and strengthens resilience for vulnerable persons.

#### 4. Disaster and conflict in urban settings

As discussed previously, almost 70 per cent of the region’s population lives in cities and towns, with up to 80 per cent expected to be urban by 2050.<sup>458</sup> The movement of people to urban centres concentrates disaster risk. Seventeen of the 25 most fragile cities in the world are located in the region, six in both Yemen and Iraq, three in Somalia and two in the Syrian Arab Republic. Much of the conflict and displacement in the region has unfolded in towns and cities,<sup>459</sup> such as Aleppo, Idleb and Raqqa in the Syrian Arab Republic, Aden, Hodeidah and Taiz in Yemen, Benghazi and Tripoli in Libya, Mosul in Iraq and Mogadishu in Somalia. Some are sites of ongoing conflict but among those that have stabilized, reconstruction and recovery challenges persist. In contexts where urban community participation in planning and decision-making around local development and DRR is limited, there can be vulnerability and exposure to hazards. For example, urban centres are often a preferred destination for conflict-displaced populations due to the inaccessibility of humanitarian aid and services in rural environments. These populations often settle in informal settlements that historically have been viewed as temporary and thereby not factored into national and/or city-level risk reduction and development plans and strategies. Settlements often lack adequate infrastructure and basic services to meet the needs of the host community, let alone those newly arrived, which can lead to tension. Additionally, as displaced people congregate in informal urban settlements they are often exposed to new hazards. For example, when living arrangements are poorly designed and crowded, this increases exposure to human-made hazards, such as fire outbreaks and structure collapse, and biological hazards, in particular epidemics and pandemics such as COVID-19. Combined, these increase pre-existing vulnerabilities and risks, often resulting in secondary displacement.

#### **Box 6.2** *Disaster and conflict in urban settings, Mosul*

In Mosul, urban disaster and conflict collided. People fleeing the city in northern Iraq during the offensive in May 2017 were suffering both disaster and conflict impacts. Under heavy bombardment, Mosul residents were seeking safety but the flooding of the Tigris cut off all the crossing points between the east and west of the city, with the military forced to dismantle the makeshift bridges linking the two sides. Exhausted families risked their lives escaping in small fishing boats, which could hold only about five people; they also needed to pay extra money for the boat ride. This slowed their flight from the besieged city, and left many waiting in peril on the riverbanks.<sup>a</sup>

a IDMC, 2020d.

Urban areas have become the epicentre of forced evictions. They exacerbate vulnerabilities, drive secondary displacement and push displaced populations into even more precarious housing situations. In Somalia, more than 686,000 people, primarily internally displaced persons, were evicted between 2016 and 2018. Forced evictions continue to increase as relative peace returns to urban centres across the country and landowners begin to develop their land.<sup>460</sup>

Housing, land and property issues, which are sometimes combined with poor social protection policies and an unequal distribution of land also push the poor into more vulnerable situations.

458 UNDP, Bahrain Center for Strategic and International Studies and Energy and UN-Habitat, 2020.

459 IDMC, 2020a.

460 IDMC, 2020d.

### Box 6.3 Urban profiling to understand post-conflict reconstruction, Iraq

Since the liberation of east Mosul in January 2017 and west Mosul in July 2017, international aid actors have been providing assistance for the rehabilitation of infrastructure and public facilities. Several, including Ninewa governorate, have expressed concern that reconstruction without a coordinated strategy is inefficient and may complicate long-term development. It was noted that the city's recovery and reconstruction would benefit from a risk-informed recovery framework that considers emerging needs within greater Mosul, and the fast-changing reality on the ground.

To address this, in 2018, a multidisciplinary team from UN-Habitat and UNESCO developed an Initial Planning Framework (IPF) for the Reconstruction of Mosul to support local government with reconstruction and risk-informed recovery. This IPF defines recovery priorities and seeks a comprehensive reconstruction and planning approach for the greater Mosul area, with special focus on the Old City. It aims to provide concrete actions for the revival of the entire Mosul metropolis, supported by desk research, fieldwork and data, and recommendations for implementing the suggested actions.

The IPF is based on consultation with Mosul's technical directorates, local leaders, and CSOs, and drone imagery analysis of structural damage and satellite analysis of urban developments. It hopes to help citizens become key players in the reconstruction of their city, supporting accountability to affected populations.

*Source: UN-Habitat and United Nations Educational, Scientific and Cultural Organization, 2018.*

## 5. Disaster displacement, protracted conflict and secondary displacement

Globally, combined, sudden-onset disasters and conflicts have resulted in the largest displacement crises in recorded history, with an estimated 79.5 million people displaced from their area of origin as of 2019.<sup>461</sup> Displacement also drives increased risk, heightening the physical, social, psychological and economic vulnerabilities of affected communities, including among host populations.

The Arab region hosts some of the largest displaced populations in the world. At the end of 2019, there were 17.3 million internally displaced persons in the region, representing almost 40 per cent of the total global number of people internally displaced by conflict and violence.<sup>462</sup> Figures illustrate an overall increase in new displacements regionally over the past decade (figures 6.4 and 6.5).<sup>463</sup> In 2019, there were 2.8 million new displacements triggered by conflict and violence, approximately 30 per cent of the global total. An additional 885,000 new displacements were caused by disasters, most due to flooding, drought and storms.<sup>464</sup>

In fragile and conflict settings, disaster displacement has received less attention than conflict displacement. Databases often provide conservative estimates and are marred by data gaps. This can be due to several reasons, including insecurity impeding access to and collection of relevant data and/or a lack of willingness or capacity among governments and partners, who often experience significant resource constraints and must balance competing priorities related to the maintenance of peace and security. Further, there is almost no data on the intersection of disaster and conflict in relation to displacement figures, with data treating them as largely separate. This is despite the fact that disaster displacements often unfold in locations where displacement from conflict is already happening. To date, there is also no regional data that explores the relationship between slow-onset natural hazards and displacement.

Across the region, displacement is no longer a short-term phenomenon. More than half of the 6.6 million internally displaced persons in the Syrian Arab Republic in 2020 had been displaced for more than five years. There is almost no investigation into the relationship between the length of displacement and level of exposure to disaster risk, yet those experiencing protracted displacement continue to comprise the bulk of displaced persons. In areas experiencing community tension, large flows can destabilize both the disaster-affected area and the host area, creating compound

461 UNHCR, 2020.

462 IDMC, 2020d.

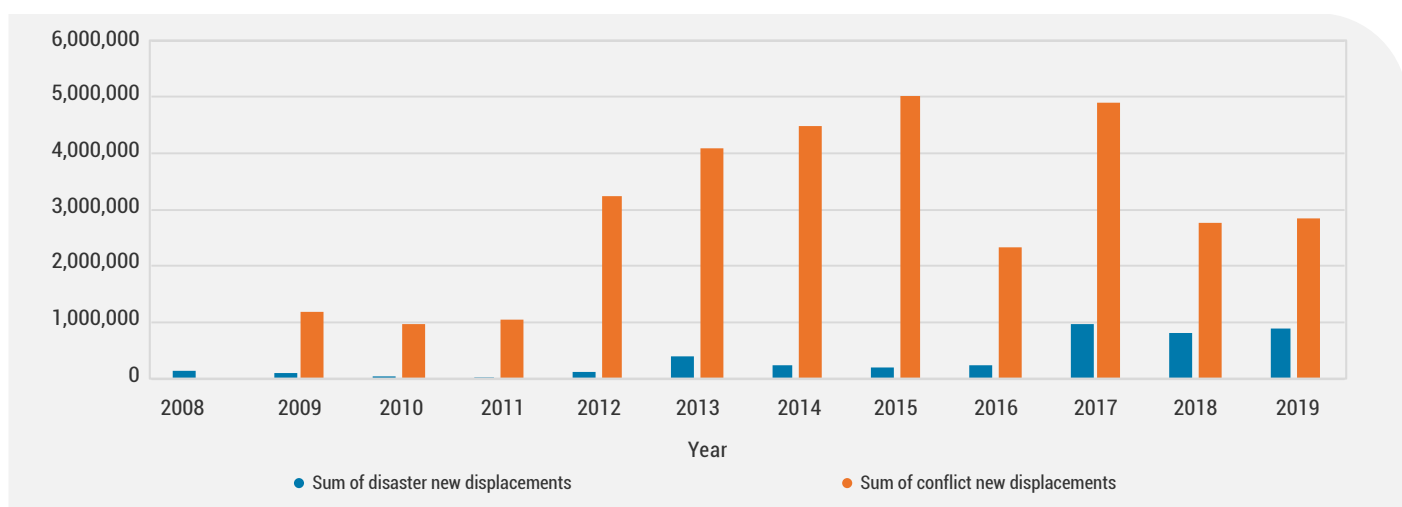
463 Data presented covers the 22 Arab States recognized by the League of Arab States, including Algeria, Bahrain, Comoros, Djibouti, Egypt, Iraq, Jordan, Kuwait, Lebanon, Libya, Mauritania, Morocco, Oman, the State of Palestine, Qatar, Saudi Arabia, Somalia, the Sudan, the Syrian Arab Republic, Tunisia, the United Arab Emirates and Yemen.

464 IDMC, 2020d.

risks and heightening pre-existing vulnerabilities. Although most of those displaced by disaster remain within their own country,<sup>465</sup> this dynamic has cross-border dimensions when people seek safety in neighbouring States.

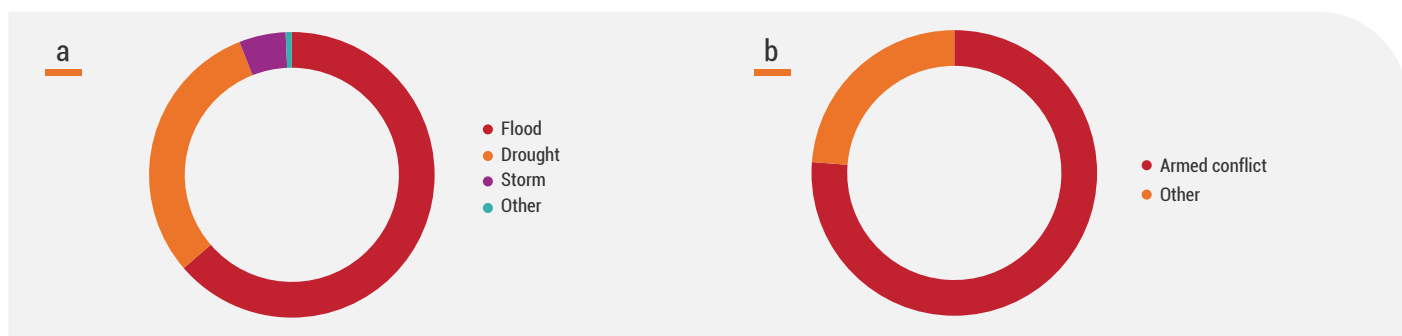
The reality in several Arab countries is that many new displacement flows are secondary or tertiary; people are forced to flee multiple times due to attacks or threats of violence but also because of hazardous events. Over recent years, the Syrian Arab Republic has faced repeated floods. Camps for internally displaced persons were severely hit by flooding across the north of the country in March 2019. Some 14,000 people in Hassaka province were impacted, with a further 40,000 reported as being affected across 14 camps in Idleb.<sup>466</sup> The latest flood occurred in December 2019, in northern areas of Idleb, which host the highest number of internally displaced persons in the country. In the midst of a fierce military offensive, as their tents flooded and became uninhabitable, 2,850 people were forced to move again.<sup>467</sup> A similar situation was observed in Iraq, where widespread flooding on 22 and 23 November 2018 affected 35,000 internally displaced persons in Ninewa and Salah ad-Din governorates. This included the secondary displacement of families unable to find security where they were first displaced and making the prospect of a durable solution to displacement more remote.<sup>468</sup>

**Figure 6.4** *New displacements triggered by conflict, violence, and disasters across the Arab region, 2009–2019*



Source: IDMC, 2020b.

**Figure 6.5** *New disaster displacements in the region by hazard type, 2009–2019 (a), and by conflict, violence and disasters, 2016–2019 (b)*



Source: IDMC, 2020d.

Note: Other disasters include wildfire, wet mass earthquake, extreme temperature and movement.

465 Nansen Initiative, 2015.

466 The New Arab, 2019.

467 Save the Children, 2020.

468 United Nations Office for Coordination of Humanitarian Affairs, 2018.



The impact of displacement is extensive for both disaster risk and fragility. Large-scale displacement has the potential to shock already weak national and local governance structures in receiving locations, while also overloading basic infrastructure and services in areas characterized by limited service provision. This can increase intercommunity tension in locations where peace is already fragile. Once displaced, the average annual cost of providing every person with support for housing, health care, education and security, and their lost income, based on seven Arab States, is \$554.<sup>469</sup> Applied to the total number of displaced people recorded in the region at the end of 2019, this places the overall economic impact of internal displacement at nearly \$10 billion (table 6.1).<sup>470</sup> When hazards unfold, valuable resources that could be directed towards preparing the response and the response itself are already absorbed in responding to ongoing displacement crises.

**Table 6.1** Economic impact of internal displacement, Arab States

Country	Economic impact (\$) per IDP for one year of displacement	Total economic impact for 2019 (\$)	Percentage of GDP
Iraq	715	1.1 billion	0.5
Libya	441	199 million	0.4
State of Palestine	743	181 million	1.2
Somalia	383	1 billion	21.5
Sudan	379	911 million	2.2
Syrian Arab Republic	869	5.6 billion	14.0
Yemen	348	1.3 billion	4.7

Source: GDP based on World Bank data for the last year available (all countries have data for 2018, except the Syrian Arab Republic, where it is 2007), see <https://data.worldbank.org/indicator/NY.GDPMKTP.CD>.

Note: Estimates given only for countries where humanitarian response plans were available for 2019.

## 6. Migration

Beyond displacement, other types of migration are also prominent across fragile and conflict-affected countries in the region. Drivers and patterns across the region are complex, with the distribution of migrants varying significantly across subregions. Over the past decade, the number of international migrants has grown significantly. This is in parallel with an increase in rural-urban migration, often driven by people seeking a better living and livelihood opportunities. Slow onset hazards, often linked to climate change, have increased migration as access to livelihoods and employment changes in areas of origin. When conflicts and disasters unfold in areas with large numbers of migrants, their specific needs, vulnerabilities and whereabouts are often overlooked in the crisis response. This is especially apparent when dealing with large migration flows across borders.

Conflict can also result in increased migration, which can generate significant socioeconomic repercussions and spikes in fragility. This was exemplified by the two Gulf wars, where the return of thousands of migrant workers to their countries of origin generated significant spikes in unemployment rates and a decrease in remittance. For example, the percentage of Yemeni remittances dropped from 54.8 per cent of GDP in 1987 to 15 per cent in 2002.<sup>471</sup>

469 IDMC, 2020d.

470 Ibid.

471 League of Arab States, n.d.

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## C. Key thematic areas

### 1. Policy architecture: displacement as the common denominator

Achieving the priorities of the Sendai Framework requires consideration of conflict dynamics in the design and implementation of DRR interventions. The DRR community must isolate appropriate “hooks” within policy architecture that lie on the disaster-conflict-fragility nexus. This is no easy task. Although the Sendai Framework initiated the transition towards addressing systemic risk via a shift to outcome-based indicators (which include some conflict drivers such as poverty, inequality and environmental degradation), it did not explicitly reference conflict.<sup>472</sup> The same holds true for the subsequently developed definitions of disaster and disaster risks.<sup>473</sup> One approach to locating policy hooks is to identify common drivers of both disaster risk and conflict that are present at regional and national levels. For fragile and conflict-affected settings in the region, this approach naturally lends itself to viewing displacement as a common denominator. This includes internal displacement, the bulk of displacement in the region, and to a lesser extent, cross-border displacement.<sup>474</sup>

The United Nations 1998 Guiding Principles on Internal Displacement (GPID), the 2010 Inter-Agency Standing Committee (IASC) Framework on Durable Solutions for IDPs, the Nansen Initiative’s 2015 Protection Agenda for Disaster Displacement and the Sendai Framework of 2015 highlight common agenda-setting focused on addressing the root causes of vulnerabilities heightened during displacement and reducing exposure to hazards as a means to reduce risks. To date, there is little focus on how human mobility, specifically displacement, is accounted for in DRR planning and interventions and how to effectively integrate displaced communities into DRR activities.

While the Sendai Framework does not directly reference the IASC framework or the GPID, the use of displacement-related terms is notable, specifically in the preamble, and priority areas one and four. This is compared with just one reference in the preceding Hyogo Framework for Action.<sup>475</sup> It provides multiple pegs for policy and interventions to address displacement as a consequence of disaster and driver of risk.<sup>476</sup> The Sendai Framework acknowledges that approaches to DRM aim to protect “persons and their property, health, livelihoods, and productive assets, as well as cultural and environmental assets, while promoting and protecting all human rights”. It also emphasizes the need to reduce asset and housing damage and destruction, tacitly encouraging the avoidance of key drivers of displacement from the outset.

This rights-centred approach finds common ground with durable internally displaced persons/refugee policy architecture, including the IASC framework and GPID. It provides an important entry point for potential DRR integration.<sup>477</sup> For durable solutions for internally displaced persons specifically, the Sendai Framework is harmonized with several criteria listed in the IASC framework, which are used to determine the extent to which a durable solution has been achieved. These include access to: (i) long-term safety, security and freedom of movement; (ii) an adequate standard of living, including access to adequate food, water, housing, health care and basic education, at a minimum; (iii) employment and livelihoods; (iv) effective mechanisms to restore housing, land and property or provide compensation; (v) necessary personal and other documentation; and (vi) participation in public affairs at all levels on an equal basis with the resident population.

Attempts to recognize the regional impact of disasters were initiated with the ASDRR 2020, which was adopted in December 2010. An updated version for 2030 to implement the Sendai Framework with a programme of work was adopted by the League of Arab States and endorsed by Arab leaders at the Arab Summit in April 2018. Interestingly, it measures the impact of disasters by the number of the displaced people, stating that 3.5 million people in the region have been forced to flee their homes over the past 35 years. As with the 2010 policy, it refers to displacement as a driver of risk, with informal settlements in urban centres recognized as increasing disaster risk. The 2030 strategy also points to the need to address the vulnerability of internally displaced persons and to ensure their participation in economic, social, and political life, while identifying Member States as the main party responsible for implementation at national level. Efforts are yet to be effectively pursued.

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472 United Nations, 2015.

473 United Nations, General Assembly, 2016a.

474 Although cross-border displacement does occur, most disaster displacement continues to result in internal displacement within country of origin. This section focuses on internal displacement policy architecture with tertiary reference to refugee policy frameworks.

475 UNDRR, 2005.

476 IDMC and Norwegian Refugee Council, 2017.

477 Kalin, 2015.

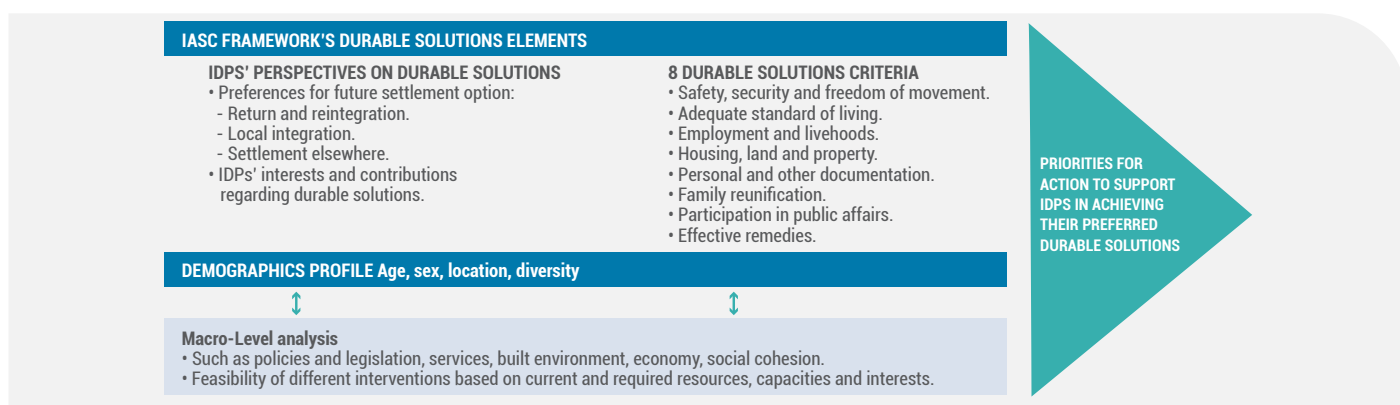
## National integration of displacement in disaster risk reduction strategies

At the national level, comprehensive policies on internal displacement enable States to establish mechanisms and institutions to prevent and respond to displacement and its by-products in a more coordinated way. Such policies create opportunities to address displacement associated with both conflict and disasters, and contain measures to prevent it, promote durable solutions and mitigate consequences on other affected populations. Promising examples of DRR policies that include disaster and conflict displacement are emerging across the region, and can be capitalized on. The DRR strategy implemented by Egypt from 2011 frequently refers to displacement; for example, understanding large population movements as a result of sea-level rise and the inundation of low-lying areas such as the Nile Delta.<sup>478</sup> Jordan's 2019–2022 strategy not only encompasses natural hazards such as severe weather, flooding and extreme temperatures as risk, but also external and internal conflicts. Conflict and conflict displacement in the region are understood as specific conditions to be considered in preventing risks and responding accordingly.<sup>479</sup>

Significant constraints continue to impede the implementation of potentially positive measures, however. In Yemen, legislation and policy frameworks relevant to displacement and DRR have been put in place, such as the policy on internal displacement drafted in 2013, but gaps remain in resource allocation and capacity.<sup>480</sup> In addition, escalation in the conflict in 2015, the split between different administrations and the associated deepening of the displacement crisis have left the policy largely unimplemented. The same can be said of Iraq's national policy on internal displacement, which remains unimplemented.<sup>481</sup> In 2009, the Government of the Sudan adopted the National Policy on Internally Displaced Persons but the lack of a fully functional government monitoring mechanism, and recognition of and attention to internally displaced persons outside camps and settlements, has meant implementation has been slow and the full extent of the impacts remains to be seen.<sup>482</sup> Continued implementation of national policies requires stronger support mechanisms. This should include a national oversight body, budget and specific provisions for protecting and assisting internally displaced persons.<sup>483</sup>

Approaches for achieving Sendai Framework priorities can also be strengthened through ongoing efforts to promote durable solutions at global and regional levels. This can be through integrating DRR policies in active ventures to resolve displacement vulnerabilities, such as the High-Level Panel on Internal Displacement, established in October 2019 by the United Nations Secretary-General.<sup>484</sup> The mandate is to increase global attention to internal displacement, while developing specific recommendations for Member States, the United Nations system and other relevant stakeholders. Currently engaging in multi-partner consultations before drafting recommendations, the panel offers an opportunity to better integrate DRR actions into any proposed resolution of common vulnerabilities. Its appointment builds on earlier efforts, such as the IASC framework, whose principles include helping to integrate displaced persons' perspectives in local development plans conducive to durable solutions, such as which settlement option to pursue (figure 6.6).

Figure 6.6 IASC analytical framework for durable solutions analysis



Source: Inter-Agency Standing Committee (2010). *Project on Internal Displacement*. The Brookings Institute, University of Bern. Available at: <https://www.brookings.edu/research/iasc-framework-on-durable-solutions-for-internally-displaced-persons/>

478 IDMC, 2020d; Yemen, Government of Yemen and UNHCR, 2013.

479 IDMC, 2020d.

480 Ibid.

481 IDMC, 2020d; Iraq, Ministry of Displacement and Migration, 2008.

482 A/HRC/23/44/Add.2.

483 Ibid.

484 United Nations Secretary-General's High-Level Panel on Internal Displacement.

## Box 6.4 Durable solutions to address displacement as a cross-cutting issue, Somalia

In Somalia, the federal and municipal governments have substantially advanced policy architecture to protect the rights of internally displaced persons and promote durable solutions. In 2019, the Mogadishu local administration created a policy on internal displacement and established a supporting Durable Solutions Unit under the mayor's office. Later the same year, a Durable Solutions Secretariat (DSS) was set up at federal level. The DSS included all ministries and federal institutions. A national policy, with a supporting national evictions guideline, was also rolled out at federal level, providing protection for the rights of displaced persons, and ensuring that any evictions are planned and legal. The Somali government also ratified the African Union Convention for the Protection and Assistance of Internally Displaced Persons in Africa (the Kampala Convention), a legally binding instrument that affirms the rights of internally displaced persons, and included provisions for internally displaced persons in its latest national development plan.

According to a 2019 research report, integrating human mobility into DRR policy and programming presents a strategic opportunity for increased “collaboration between operational agencies concerned with internally displaced persons and refugees, and issues of peace, conflict and disasters, to develop a holistic understanding of compound risk factors and vulnerability to disasters in conflict settings”.<sup>485</sup> This perspective helps identify strategically relevant opportunities where the capacities of mobile communities can be better leveraged in DRR responses. In conflict-affected settings, this ensures newly settled – and mobile – communities are better informed and protected from hazards as they make mobility decisions. It also shapes decisions around durable solutions. This builds on the International Organization for Migration's Progressive Resolution of Displacement Situations Framework, which “recognizes mobility as central to allowing people to preserve or increase available resources and opportunities, enabling them to save their lives, access basic assistance and/or to enhance livelihood opportunities” (figure 6.7).

Figure 6.7 IOM's objectives on disaster risk reduction and resilience, 2017



Source: IOM, “Disaster risk reduction and environmental degradation”. Available at <https://www.iom.int/disaster-risk-reduction> (accessed on 10 May 2020).

## Box 6.5 Diaspora engagement and community ownership in climate change adaptation, the Sudan

Across the Sudan's Red Sea State, climate change has contributed to new types of mobility. Seminomadic communities chiefly inhabit the eastern parts of the state, while the centre and west are home to sedentary agricultural communities. As the land in the east tilts towards the Nile River, decreasing rainfall and poor water harvesting techniques have resulted in water scarcity. This has increased the movement of nomadic-pastoralist communities and their livestock towards central and western parts of the state. This mobility shift is exacerbated in the summer when the communities seek water and grazing land, further straining already scarce resources.



485 Peters, Eltinay and Holloway, 2019.

To improve local capacity to adapt and respond to the impacts of climate change in the state, and to reduce sources of localized tension, the International Organization for Migration (IOM) implemented a multilayered intervention in Durdeb. To improve resilience to future shocks, it focused on improving the joint management of natural resources, developing innovative agricultural practices to promote socioeconomic development, and building awareness of climate adaptation plans and ecosystems management among local communities and authorities. Leveraging the value of mobility, IOM engaged diaspora communities in project implementation. With a large proportion of skilled professionals migrating to other countries, the Sudan has the potential to rebuild its capacity through the transfer of knowledge and skills of members of the diaspora.

By leveraging the social and cultural capital of the Sudanese diaspora and relevant technical skills, IOM was able to gain community trust and adapt the project to the local context. Based on information gathered during consultations with communities, an integrated farming and irrigation system across multiple family farms was identified to promote crop and livestock diversification. This will enable a shift towards less water-intensive crops, while also increasing resource sharing in response to changing population dynamics. A general community steering committee (GCSC) was established that included marginalized groups, such as women and youth, alongside local representatives from the judiciary, administration, economic and police divisions, further instilling community ownership.

Through community collaboration, 20 vulnerable families were identified to use the integrated farm for multi-crop farming. Similarly, several rounds of training were implemented from a 13-step curriculum designed around the community in Durdeb. Groups were assigned to present local operational problems, with brainstorming facilitated by experts to generate local solutions. A short session for local authorities, community leaders and representatives from the GCSC also researched environmental degradation and climate change, with participants collaborating to develop climate adaptation plans.

## **2. Advancing support for disaster risk reduction arguments with stakeholders in conflict-affected and fragile settings**

Research by the Overseas Development Institute (ODI) points out that orthodox methods championing DRR action and preparedness are less effective in conflict and fragile settings. Traditional arguments focused on the value of disaster risk and resilience investments have limited traction when governments face the types of resource constraints experienced in conflict, or when resources are themselves allocated towards the conflict. This can be due to several things, including the inability within the DRR community to articulate key messages to relevant stakeholders, the State-centric approaches that can negate the centrality of communities in DRR, and the excessive power of gatekeepers in policy and programming decision-making forums, something that is often amplified in conflict settings characterized by highly centralized governance systems.

State responsibilities, including providing protection to populations, are often skewed in conflict and fragile settings, particularly when the State actively excludes certain groups to advance their position in the conflict. DRR interventions and arguments must therefore relate to the setting. This includes refining arguments with national counterparts or local powerbrokers and making interventions that illustrate mutual benefits in contexts where incentives are unconventional. There is also a need to explore processes to decentralize DRR in non-permissive environments to engage localized actors, such as civil society, to be effective in pressing powerbrokers to both pursue relevant policies and play a role in DRR itself.

Mainstreaming DRR into ongoing humanitarian, development or post-crisis early recovery programming can be a cost-effective and politically appealing way to advance efforts. First, it is relevant to the immediate concerns and circumstances, and the emergent needs of governments and affected communities. Second, traditional DRR in conflict settings is often hampered by lack of political support, low availability of resources, ongoing security issues and access constraints, and restrictions imposed by donors on direct government support. There are examples of successful emergency preparedness, humanitarian response and early recovery programming in conflict settings that are used as entry points to integrate DRR interventions, such as in Lebanon and Somalia.



## Box 6.6 Integrating disaster risk reduction in ongoing humanitarian and development initiatives, Somalia

Somalia's hazard profile is complex. The first six months of 2019 were characterized by drought caused by below-average rainfall between April and June, which resulted in lower agricultural and livestock output. In subsequent months, heavy rainfall led to severe flooding along the Jubba and Shabelle river basins, and flash floods in Somaliland and Banaadir. Some 416,000 new displacements were recorded due to floods, and 150,000 to drought.<sup>a</sup> This was on the back of the drought in 2017 and Cyclone Sagar the following year, both of which displaced significant numbers of people.<sup>b</sup>

Conflict-induced displacement is interlinked with natural hazards, human-made environmental degradation and climate change. According to a study by the International Food Policy Research Institute (IFPRI) and the University of Leuven, drought in Somalia is predicted to increase the likelihood of conflict by 62 per cent.<sup>c</sup> In a separate study, a rise in temperature is forecast to increase the likelihood of conflict in sub-Saharan Africa by up to 54 per cent by 2030, mainly due to negative developments in the agricultural sector combined with poor governance.<sup>d</sup> In general, the impact of climate change can increase inter-clan tension, internal displacement and irregular migration, while also providing terrorist groups with the opportunity to play a role in local governance during disaster recovery.

The National Development Plan (NDP-9) 2020–2024 is a step towards addressing accumulated disaster and conflict risks. It stipulates that improving DRM in the country must centre on expanding government capacity. Further, it recognizes the need to develop a nationwide early warning system. To further increase the resilience of communities vulnerable to natural hazards, the NDP proposes strategic investment in crop and integrated water resource management and sustainable livestock, while pushing for economic diversification away from natural resource bases to increase resilience to environmental shocks.<sup>e</sup>

To mainstream DRR, the IOM incorporated DRR components into humanitarian and early recovery interventions in line with NDP priority areas. This included incorporating DRR mechanisms into camp coordination and management, WASH (water, sanitation and hygiene) services, and recovery and durable solutions programming. For example, at 67 sites for internally displaced persons in Baidoa, South West State, disaster-resilient infrastructure was built to mitigate any potential flooding events. In addition, reforestation was implemented in sites and around IOM-rehabilitated boreholes in arid regions of the country to prevent flooding and soil erosion. To further ensure the sustainability of humanitarian interventions, IOM ensures sanitation facilities built at sites for internally displaced persons, and host communities, are flood-proof, reducing the risk of damage to critical infrastructure.

a For additional information on UNHCR, Somalia, [Protection and Return Monitoring Network](#), see; UNOCHA, Somalia Flash Update, 1 November 2019;

b UNOCHA, Somalia Flash Update, May 2018.

c Maystadt and Ecker, 2014.

d Burke and others, 2009.

e Somalia, Ministry of Planning, Investment and Economic Development, 2020.

### 3. Increasing collaboration between peacebuilding and disaster risk reduction actors and integrating a conflict-sensitive perspective

Recognizing disasters are not conflict-neutral, the logical conclusion is that DRR policies and interventions have the potential to exacerbate social tension and conflict as much as resolve them.<sup>486</sup> When executed poorly, they can increase marginalization in communities when one or more groups feel excluded from project benefits, and in government if key authorities are not appropriately engaged in coordination, planning and implementation. They can also alter the dynamics in a negative way and/or entrench the power of one group over another.<sup>487</sup>

Across the Arab region, coordination and planning mechanisms to strengthen operational coalitions between peacebuilding and DRR actors are not adequately explored. Most organizations that implement emergency and

486 Twigg, 2015.

487 Peters, Eltinay and Holloway, 2019.

development programmes assimilate “do no harm” approaches in their institutional principles. There is no policy framework available to DRR practitioners who work in conflict or fragility, with limited evidence of engagement between DRR and peacebuilding communities.<sup>488</sup> A review of more than 50 vulnerability and capacity assessments and disaster recovery frameworks across international NGOs, the United Nations system and multilateral institutions, revealed no systematic documentation of conflict or fragility in a way that would enable inter-programme learning.<sup>489</sup> This leads to the underutilization of do no harm approaches and impedes integration of conflict sensitivity in DRR.<sup>490</sup>

Opportunities exist to remedy this and establish constructive connections. This includes DRR collaboration with humanitarian and peacebuilding actors in ongoing conflicts such as in Yemen and the Syrian Arab Republic. In these environments, DRR can be mainstreamed into humanitarian assistance activities, or map the relationship between localized hazards and conflict vulnerabilities to more explicitly support peacebuilding efforts. The Sendai Framework priority 4b, build back better, can support post-conflict recovery, rehabilitation and reconstruction plans alongside peacebuilding and post-conflict actors. Both scenarios would strengthen the integration of DRR into conflict and peacebuilding exercises, and support efforts to feature conflict analysis in the identification and rollout of DRR.

The United Nations system reform, with its shift towards stronger inter-agency collaboration and a prevention-focused agenda, offers such an opportunity to activate connections. There are examples of inter-agency partnerships on which to capitalize. These include the February 2020 joint UNDP-UNDRR statement of intent, which aims to integrate DRR measures into country planning and decision-making processes, thereby accelerating the implementation of the Sendai Framework and the United Nations Plan of Action on Disaster Risk Reduction for Resilience.<sup>491</sup> A further example is the Capacity for Disaster Reduction Initiative (the CADRI Partnership), which is integrating conflict sensitivity in its DRR diagnosis and planning tools and processes. Finally, UNDRR and its partners are working on an initiative for scaling up DRR in humanitarian action, with a checklist for integrating DRR into the Humanitarian Programme Cycle (for example, humanitarian needs overviews and humanitarian response plans). It is being tested in the Asia and Americas regions, with testing planned for the Arab region.<sup>492</sup>

### **Statement of intent between UNDP and UNDRR – purpose of collaboration**

UNDRR and UNDP have agreed to scale up collaboration on three priority areas of mutual interest to accelerate the implementation of the United Nations Plan of Action on Disaster Risk Reduction and the Sendai Framework. The partnership, signed in February 2020, creates opportunities to integrate DRR in planning and decision-making processes introduced by the United Nations Development System reform. The three priority areas are:

1. Sendai Framework monitor: support national reporting on implementing the Sendai Framework, including DRR-specific SDG indicators.
2. Sendai Framework target E and coherent agenda: achieve target E at the country level and ensure coherence with the climate change agenda and the SDGs.
3. Risk-informed Common Country Analysis and United Nations Sustainable Development Cooperation Framework: provide guidance and technical assistance to support risk-informed and sustainable development.

At national level, good operational practices in adopting a conflict-sensitive perspective could play a remedial role, and strengthen the integration of conflict sensitivity as a core DRR principle. Across the region, anecdotal evidence from multiple research projects suggests a store of knowledge on implementing DRR in fragile and conflict settings.<sup>493</sup> In Lebanon, advanced conflict preparedness, a focus for national and international actors due to the country’s history of civil unrest and the destabilizing effects of the Syrian conflict created a gateway for potential discussions of natural hazard preparedness,<sup>494</sup> and in Yemen, drought risk management has been used as a mechanism to reduce conflict drivers.<sup>495</sup> Lack of systematic knowledge management and quality assurance at programmatic level has, however, undermined the sharing of good practices.

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488 Mena, Hilhorst and Peters, 2019.

489 Ibid.

490 Ibid.

491 United Nations Plan of Action on Disaster Risk Reduction for Resilience.

492 UNDRR, 2021.

493 Peters, 2019.

494 Peters, Eltinay and Holloway, 2019.

495 Peters, 2019.

## 4. Context-specific interventions: conflict typologies and opportunities for disaster risk reduction along the humanitarian-development-peace nexus

A growing body of evidence suggests that different conflict intensity levels can create unique challenges and opportunities for DRR. In short, the setting in which a disaster evolves will significantly influence the available disaster response strategies, approaches and resources. A one-size-fits-all approach to conflict settings fails to recognize the nuances, impeding identification of strategic opportunities for DRR. In some cases, this can also cause harm. A deeper understanding of the dynamics and the intensity of conflict increases the capacity of DRR communities to identify the unique opportunities and limitations present in each setting. This improves the design of DRR strategies and interventions at national and local levels, and reconciles with broader global efforts through the New Way of Working (NWOW) to implement collective outcomes that bridge humanitarian, development and peace planning and synchronize actions where there is need and opportunity for different pillars to work collaboratively.

Subdividing conflict-affected environments into high intensity, low intensity and post-conflict scenarios illustrates key trends that can be applied across the region.<sup>496</sup> For example, in high-intensity conflicts – present across parts of Somalia, the Syrian Arab Republic and Yemen – the scale of violence can amplify governance fragility alongside access and resource limitations. This complicates the logistics of implementing DRR activities or responses to ongoing disasters. If the conflict is protracted, these access limitations will likely reduce a government's ability to maintain infrastructure, which can increase exposure to disaster risk.<sup>497</sup> In settings where high-intensity conflicts unfold, insecurity also reduces access, with actors increasingly forced to use remote implementation modalities that have significant cost and accountability implications.<sup>498</sup>

Low-intensity conflicts offer a different pool of opportunity costs. National governance systems are likely functional, though decision-making can be opaque and difficult to navigate. This can increase bureaucratic barriers, impact data collection and result in changes to action plans. State control in these settings is often fragile and contested by various actors, while parallel governance structures can emerge at a subnational level, forcing the DRR community to interact simultaneously with national and local authorities, and local powerbrokers, complicating implementation dynamics. The provision of aid and DRR support can be used by these actors to both garner support and damage the legitimacy and capacity of community groups, antagonizing structural inequalities and sources of tension. This can also result in powerbrokers deciding to restrict access to some communities, exaggerating sources of social tension and pre-existing vulnerabilities.

For efficiency gains, an improved effort to integrate conflict typology analysis into DRR governance is needed. This skill set will likely not come from the DRR community but will require the engagement of peacebuilding actors.

### **Box 6.7** Operationalizing the humanitarian-development-peace nexus, Somalia

After the 2016 World Humanitarian Summit acknowledged that humanitarian tools alone were insufficient to resolve protracted crises, there was a call for improved collaboration across the humanitarian-development nexus and a commitment to a New Way of Working to reduce needs, risk and vulnerability. This can be described as working over multiple years, based on comparative advantages, towards collective outcomes and reinforcing capacities and resilience at national and local levels. The same year, the United Nations General Assembly and the Security Council adopted twin resolutions on sustaining peace, which emphasized the significance of insecurity as a driver of vulnerability.<sup>a</sup> Efforts to prevent conflict and sustain peace should be carried out through the three pillars of United Nations engagement (peace and security, development, and human rights).

From September to December 2018, IOM identified case studies in Colombia, Mali, Nigeria, Somalia and Turkey to understand approaches to the humanitarian-development-peace nexus (HDPN) at country level. The Somalia study highlights good practices for successfully operationalizing the nexus and reducing vulnerabilities and systemic risk.

<sup>a</sup> The twin resolutions (General Assembly Resolution 70/262 and Security Council Resolution 2282) define sustaining peace as “encompassing activities aimed at preventing the outbreak, escalation, continuation and recurrence of conflict”.

496 Hillhorst and others, 2019.

497 Ibid.

498 Stoddard and others, 2017; Healy and Tiller, 2014.

### **a. Frameworks combining humanitarian and recovery are conducive to better coordination**

Joint frameworks bringing together humanitarian and development actors were seen to improve joint planning and programming. In Somalia, the planning process for the 2018 RRF was highlighted as a success. It built on the 2017 Disaster Impact and Needs Assessment that put the government in control from the beginning, further emphasizing the importance of government ownership in driving resilience and recovery initiatives.

### **b. Building integrated and localized analysis tools for humanitarian-development-peace nexus actors**

In Somalia, the United Nations Resident Coordinator's office, with the backing of the United Nations Peacebuilding Fund, piloted a multisectoral analysis combining humanitarian, development and peace data to inform the operationalization of the Community Recovery and Extension of State Authority and Accountability strategy. The tool examined all publicly available datasets to establish correlations that could be used for field-level analysis to better prioritize interventions through area-based approaches.

### **c. Localized context monitoring around disaster risk**

The Somalia Resilience Program (SomReP), a consortium of seven international NGOs, namely Action Against Hunger, the Adventist Development and Relief Agency (ADRA), Christian Action, Research, and Education (CARE), Cooperazione Internazionale (COOPI), Danish Refugee Council, Oxfam and World Vision, was formed in response to the 2011 famine. It has developed a system based on early warning committees trained to monitor indicators and develop contingency plans in their own communities for rapid-onset (floods, conflict) and slow-onset (drought, climate change) disasters. By linking community-level monitoring to regional early warnings from the Food Security and Nutrition Analysis Unit Famine Early Warning Systems Network (FSNAU-FEWS NET) through radio and SMS, consortium members have been able to analyse information and make faster decisions. SomReP has linked its monitoring system with a pooled funding mechanism for early action.

## **5. Data gaps in the disaster-conflict-fragility nexus**

There is an absence of data on disaster loss and damage due to gaps in availability, quality control issues and accessibility constraints. In disasters in fragile and conflict settings, data collection is inhibited by weak government capacity to operate evidence-based preparedness systems for intersecting risks and stresses. This has implications for DRR preparedness and response systems, undermining the potential to predict and, where possible, prevent disaster, impeding protection of the most vulnerable populations. The set of 38 global indicators included in the Sendai Framework Monitor provide a platform for national-level data collection and reporting progress towards the seven Sendai Framework targets.

One of the ways that conflict and civil unrest have come into the conversation surrounding the Sendai Framework Monitor is through considering them as societal hazards.<sup>499</sup> This was evident in a 2020 technical report on hazard classification and definition led by the International Science Council (ISC) and UNDRR, in which conflict falls under societal hazards. However, the report also notes the discourse is just beginning; a more scientific review of listings and hazard information profiles for those not routinely included in DRM, such as societal hazards, is necessary.

Progress in addressing the data gap could also be advanced by adopting a model approach to data collection. This could integrate the Sendai Framework monitor indicators into ongoing remote geospatial data collection processes, such as remote sensing, climate data, and agricultural and population statistics, creating an automated model that could help identify key trends and generate datasets to inform the monitor, such as the geospatial model quantifying the people affected by agricultural drought in Eastern Cape, South Africa.<sup>500</sup>

Implementing such a system would necessitate dedicated resources and enhanced data-sharing practices, alongside a data analysis and evaluation system at national or regional level to strengthen data applicability. Many countries still collect data on paper, which can be shared only by using systems like scanned PDFs. Switching to a more sophisticated analytical platform requires technical support to transfer data into filterable and calculable formats.

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499 Sendai Framework for Disaster Risk Reduction, 2018.

500 Walz and others, 2020.

Interoperable information would also go a long way to facilitating data entry and analysis. In the process of addressing and responding to disaster vulnerabilities and losses alongside displacement trends, data sharing is as important as its collection. Investment in new tools and technologies is critical for collecting data in areas with little or no mobile phone or Internet coverage. It would make the work of data collection teams and information managers easier, though the potential for this is limited in some countries; for example, in Somalia, carrying a smartphone or similar device for data collection is a punishable offence in areas controlled by al-Shabaab.

Data challenges, and in establishing consistency among stakeholders in related areas such as displacement resolution, are gradually being overcome. For example, a comprehensive monitoring framework for internal displacement in the Syrian Arab Republic has enhanced the understanding of stakeholders, including data collectors, policymakers and humanitarian and development organizations.

The integration of quality disaster displacement data can also mobilize resources and provide evidence for increased policies and action for DRR. This includes the collection and management of data on slow-onset disaster displacement, understanding displacement movement and flow, and monitoring the length of displacement. It necessitates the disaggregation of data by hazard type to better inform national planning for risk reduction, preparedness and response.<sup>501</sup>

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## D. Conclusion

Conflict dynamics and disaster risk reflect past and current trade-offs in the use of natural resources, and the unequal distribution of benefits, exposure, vulnerability, risks and losses emanating from this use, which defines the development pathway a country or a region decides on.

With the advent of climate change, this unequal distribution is further exacerbated, and with it the disaster risk drivers and conflict drivers become more acute. This requires improved efforts to integrate conflict dynamics in DRR and CCA strategies, and for both to be mainstreamed in sustainable development strategies. Notwithstanding existing guidance on displacement integration in national DRR strategies,<sup>502</sup> a main challenge hindering broader integration is weak capacity at national and local levels, which necessitates the development of clearer guidance, tools, definitions and approaches specific to programming DRR in conflict-affected and fragile settings.

There are multiple operational examples of DRR interventions being implemented across the region, in fragile and conflict settings. These do not all recognize conflict- and disaster-induced displacement as a strategic entry point for integrating DRR and conflict mitigation and recovery interventions. Indeed, integrating DRR policies into active ventures and policy architecture to resolve the vulnerabilities created during displacement can advance DRR in conflict settings. Further, at community level, engaging displacement-affected populations, including internally displaced persons and hosting communities, provides an opportunity to better integrate localized sociocultural and conflict dynamics into the design of DRR interventions, in an inclusive and transparent manner, using bottom-up and top-down approaches.

Adopting a broader approach to understanding systemic risks, as pioneered in GAR19 and the GRAF, is crucial in the Arab region, the starting point for the interaction of conflict drivers and conflicts with climate change drivers and impacts, with their cascading risks across health, environmental, financial, social and economic systems. Traditional arguments on the cost-benefit value of DRR need to be refined to make it applicable to current conflict contexts. In this regard, the case for the return on investments should build on the regional focus on climate change, to make the link with conflict over key issues such as water scarcity, flooding, sea-level rise and unsustainable temperatures.

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501 UNDRR, 2020b.

502 UNDRR, 2019b.



# Food security risks under growing water scarcity

## 7.



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### A. Introduction

The food and nutrition security situation in the Arab region is a concern. In 2019, nearly 13 per cent (55 million people) of the population suffered from hunger, continuing an upward trend since 2013. The relationship between food security and disasters is complex and arbitrary. Natural hazards and human-made disasters are among the main reasons for the continuing rise. In the region, water scarcity is a structural and prevailing condition, as well as a critical risk multiplier that exacerbates vulnerability and adversely impacts food security.

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### B. Disasters and food security

Over the past decades, the concept of food security has evolved and its scope widened. In 1996, the World Food Summit<sup>503</sup> provided a definition of food security that has become widely accepted. It states: “Food security exists when

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503 Nguyen, 2018.

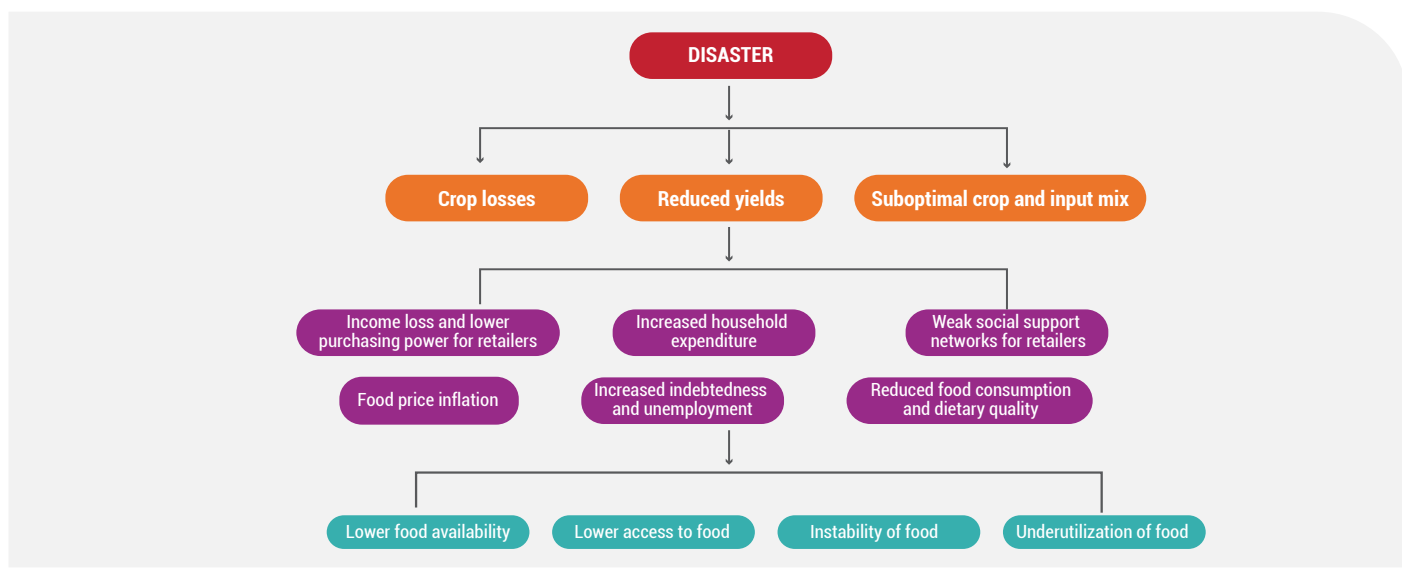
all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life.” From this definition four interrelated dimensions of food security are identified:

- Availability – of sufficient quantities of food of appropriate quality, supplied through domestic production or imports, including food aid.
- Access – by individuals to adequate resources (entitlements) for acquiring appropriate foods for a nutritious diet. Entitlements are defined as the set of all commodity bundles over which a person can establish command given the legal, political, economic and social arrangements of the community in which they live, including traditional rights such as access to common resources.
- Utilization of food – through adequate diet, clean water, sanitation and health care to reach a state of nutritional well-being where all physiological needs are met. This brings out the importance of non-food inputs in food security.
- Stability – where a population, household or individual must have access to adequate food at all times. They should not risk losing access to food as a consequence of sudden shocks (for example, economic or climatic crisis) or cyclical events (for example, seasonal food insecurity). The concept of stability can refer to both the availability and access dimensions.

Food security is deeply rooted in the “food system” concept, which encompasses the whole range of actors and their interlinked value-adding activities in the production, aggregation, processing, distribution, consumption and disposal of food products that originate from agriculture, forestry and fisheries, and are part of the broader economic, societal and natural environments in which they are embedded. As such, all factors affecting these value-adding activities affect food security in one way or another.

Natural hazards and human-made disasters have a direct impact on the dimensions of food security (figure 7.1). About 23 per cent of the damage and losses from natural hazards in developing and low- and middle-income countries – of which 26 per cent are climate-related impacts – are absorbed by the agriculture sector.<sup>504</sup> Damages and losses caused by natural hazards and human-made disasters disrupt physical and financial access to food, especially in vulnerable households, while economic shocks and disasters cause fluctuations in food prices that significantly disturb food stability, as shown by the world food prices crisis of 2007–2008. Natural hazards and human-made disasters contribute to unbalanced diets and restrict access to clean water, sanitation and health care that are required for the appropriate utilization of food. The increasing complexity of risk, overlaying and cascading impacts of hazards, and the increasing trend of low-intensity high-frequency events have significantly and steadily undermined resilience and food security, and pushed vulnerable people into poverty.

Figure 7.1 The impact of disaster on food security



Source: Adapted from FAO, 2015, 2018b.

In 2019, there were 821 million chronically undernourished people worldwide – largely due to conflict, climate variations and extremes, and economic slowdown – up from 811 million in 2018.<sup>505</sup> The region suffers from a double burden of malnutrition; in several countries, hunger, anaemia and stunting coexist with worrying levels of obesity and people being overweight. The situation is particularly worrying in countries affected by conflict and violence. These include Iraq, Libya, Somalia, the Sudan, the Syrian Arab Republic and Yemen, which accounted for 24 per cent of the total food insecure people worldwide in 2019,<sup>506</sup> with Yemen experiencing the worst food crisis in the world, three years in a row. In addition, regional water scarcity, climate change and extremes, transboundary animal and plant pests and diseases, and economic shocks pose significant constraints to agriculture. Subsistence farmers and smallholders and women in rain-fed agriculture sectors are the most affected by these complex and overlapping constraints. The region is the largest importer of food in the world and is, therefore, highly exposed to food price fluctuation, which affects food security, especially stability.

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## C. Water scarcity: a critical food security risk multiplier, interacting with conflict

Water plays a vital role in ecosystems and agriculture. Water scarcity is the lack of freshwater resources to meet standard water demand. It is fundamentally dynamic and varies over time, due to natural hydrological variability but mostly as a function of prevailing policies, planning and management approaches, and the capacity of societies to anticipate changes in supply and demand. The best indicator of national water scarcity is the level of water stress (SDG indicator 6.4.2 defines this as the ratio between total freshwater withdrawals by all economic activities and total available freshwater resources, after taking into account environmental flow requirements),<sup>507</sup> whereby a country is generally considered water stressed if it withdraws more than 25 per cent of its renewable freshwater resources.

With a basic imbalance in water supply and demand, the region is the most water scarce in the world. On the supply side, the annual per capita water availability is less than 800 m<sup>3</sup>, 20 per cent below the water scarcity limit of 1,000 m<sup>3</sup> per capita. The per capita availability has fallen by more than 66 per cent in the past 40 years, to about 10 per cent of the global average.<sup>508</sup> In 2014, the region's per capita renewable internal freshwater resources were estimated at 299 m<sup>3</sup>, compared with a world average of 5,933 m<sup>3</sup>.<sup>509</sup> Total renewable water resources are projected to fall by a further 20 per cent by 2050.<sup>510</sup> Climate change poses additional risks to water supply and exacerbates physical water scarcity through changing rainfall patterns.<sup>511</sup>

On the demand side, high population growth and rapid urbanization are increasing the pressure on already scarce resources, while weak institutional and governance capacities further aggravate the risk of water scarcity. The World Economic Forum's 2015 global risks report rates water crisis as the highest risk factor in the region.<sup>512</sup>

Water scarcity is a prevailing condition in the region, and therefore a critical risk multiplier – a factor, either linked to natural or human causes, that exacerbates existing risks – given the strong relationship between water scarcity and shocks related to climate and natural resources. Water scarcity is particularly important when discussing the impact of disasters on food security given that agriculture uses some 80 per cent of water withdrawals in the region, and more than 90 per cent in countries such as Iraq, Oman, the Syrian Arab Republic and Yemen. The multiple dimensions of water insecurity can affect agricultural production systems differently, with water stress acting as a limiting factor in irrigated agriculture and drought risk impacting rain-fed areas. Water scarcity not only adversely affects production in the region, but also contributes to other hazards, including land degradation and forest fires, and exacerbates many of the

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505 FAO and others, 2019.

506 135 million people in 55 countries are living in crisis conditions or worse (IPC 3 and above). The IPC, or Integrated Food Security Phase Classification, is a multi-partner, common global system for classifying severity and magnitude of the food insecurity and malnutrition situation. For additional information, see FSIN, 2020.

507 UNWater, "Step-by-step monitoring methodology for indicator 6.4.2". Available at <https://www.unwater.org/publications/step-step-methodology-monitoring-water-stress-6-4-2/>.

508 Ward, 2014.

509 For additional information on renewable internal freshwater resources, see <https://data.worldbank.org/indicator/ER.H2O.INTR.PC>.

510 FAO, 2019d.

511 UNESCWA and others, 2017a.

512 World Economic Forum, 2015.

water-related effects of climate change, including heatwaves. Drought aggravates water scarcity, with more withdrawals needed to overcome dry spells or decreases in rainfall. The latest report of AGIR provides evidence of changes in the occurrence of climate extremes during the past 50 years. Significant warming trends were observed across the region, combined with large increases in heatwaves, which is expected to put intense pressure on current water resources with major consequences on crop yields and food security.<sup>513</sup>

Regionally, drought is considered the most devastating natural hazard for agriculture, given the fact that rain-fed agriculture (croplands, rangelands and forests), representing approximately 439 million hectares, contributes some 70 per cent of production.<sup>514</sup>

Climate change is expected to exacerbate water scarcity in the Arab region; a 2019 study suggested that with global warming of 2°C, the regions most at risk of higher water stress are the Mediterranean, Middle East and large parts of South America and North America.<sup>515</sup>

### **Box 7.1** *Effective integrated water resources management*

Coordinated development and management of natural resources to maximize economic and social welfare in an equitable and sustainable manner is a pressing priority in the Arab region. It requires comprehensive assessments of water supply, demand and allocations, which could be carried out using water accounting and climate-smart agriculture approaches. In view of potential outcomes, two sets of recommendations are proposed:

- a. Supply management strategies that involve highly selective development, particularly of non-conventional water resources, including seawater and brackish desalination, reuse of drainage water, plus urban and treated wastewater for industries, provided specialized treatment is in place.
- b. Vigorous demand management, including reforms and actions aimed at optimizing the use of existing supplies and setting sustainable limits. Effective cross-sectoral coordination and policy coherence, enhanced capacities and use of innovations are essential prerequisites. Moreover, intraregional and interregional collaboration is critical, especially for better management of transboundary and shared water resources.

## **D. Significant hazards to food security in the Arab region**

Agriculture – crops, livestock, fisheries, aquaculture and forestry – provides livelihoods for 2.5 billion smallholders worldwide and contributes between 10 and 20 per cent of GDP in lower middle-income countries, and more than 30 per cent in low-income countries. Heavily reliant on weather, climate, land and water to thrive, agriculture is particularly vulnerable to natural hazards. One of the most direct ways these affect the sector is through reduced production, resulting in direct economic loss to farmers, which can cascade along the entire value chain, affecting agricultural growth and rural livelihoods. A review of 74 post-disaster needs assessments conducted in 53 developing countries over the decade 2006–2016 shows agriculture absorbed 23 per cent of all damage (cost of replacement and/or repair of physical assets damaged by disasters) and loss (changes in economic flows due to disasters) caused by medium- to large-scale climate-related disasters, such as floods, drought and tropical storms.<sup>516</sup> The main hazards affecting agriculture and food security in the Arab region are drought, floods and flash floods, land degradation, transboundary animal and plant pests and diseases, sand and dust storms and economic shocks.

513 League of Arab States, Arab Geographical Information Room, 2019.

514 Ibid.

515 Hofste, Reig and Schleifer, 2019.

516 FAO, 2018b.

## 1. Drought

Drought is an extended period – a season, a year or several years – of deficient precipitation, resulting in water stress.<sup>517</sup> It is the largest climate-related threat to agriculture, with up to 83 per cent of the damage and loss caused by drought absorbed by the sector. The livestock and rain-fed crop subsectors are the most affected by this slow-onset hazard, which accounts for 86 per cent and 15 per cent of all damage and loss to livestock and crops, respectively.<sup>518</sup>

Drought affects the dimensions of food security, especially availability, and poses a significant threat in the region. From 1990 to 2019, drought affected more than 44 million people,<sup>519</sup> while between 2000 and 2012, losses to rain-fed crops, rangeland, forest cover and land degradation were estimated at 143.17 million hectares, and approximately 32 per cent of total regional production. Assessment of economic losses in vegetation cover due to agricultural drought hazard and land degradation combined during the same period were estimated at 67.28 million hectares, with a value of \$11.51 billion, leaving about 22.79 million workers jobless, and \$59 billion required to create alternative job opportunities.<sup>520</sup> From 2006 to 2010, the region experienced one of its most severe drought cycles in the past century, leading to a loss of livelihoods, high food prices and a decrease in purchasing power for average citizens.

In the Syrian Arab Republic, the drought in the agricultural season 2007-2008 resulted in crop failure that affected 75 per cent of farmers and led to a 50 per cent reduction in livestock and a 39.8 per cent fall in wheat production in Hassaka, the largest producing governorate. Despite being drought-resistant, barley production during the period 2005–2009 also fell by 40 per cent.<sup>521</sup> Researchers have argued that drought contributed to the Syrian crisis.<sup>522</sup> Other countries in the region are also prone to drought, and have witnessed severe events in recent history. In 2011, drought led to food crises in Mauritania and Somalia, where approximately 100,000 people perished and 4 million were displaced, and in 2013 to significant agriculture losses in Algeria, Morocco and Mauritania. The Sudan has recorded 16 severe droughts since 1972, and in Somalia, between November 2016 and August 2017, close to 900,000 people were displaced due to drought.<sup>523</sup>

Drought has been a regular phenomenon in Tunisia, Jordan and the State of Palestine, with 1,222 events during the period 1980–2013.<sup>524</sup> In 2017, extreme heatwaves were recorded across the region, with Kuwait recording the hottest global temperature that year.<sup>525</sup>

### Box 7.2 Effective drought monitoring and early warning action systems

Effective monitoring and early warning action systems are crucial to minimize the impact of droughts on agriculture. Such systems should capitalize on technologies, such as satellite-based remote sensing, linked to forecast-based finance for early action, factor relevant variables affecting agriculture production, such as sowing dates and length of crop cycle, and take into account seasonal forecasts, El Niño predictions and socioeconomic vulnerabilities. One such system is the Agricultural Stress Index System (ASIS) developed by FAO with the Flemish Institute for Technological Research (VITO) and the Joint Research Centre of the European Commission.

Countries in the region are recommended to use appropriate systems and tools that use science and technologies for monitoring, preparedness, mitigation and response, with early actions as a common dominator cutting across all stages of the risk management cycle. Recommended actions include applying water harvesting techniques and using short-cycle drought-resistant crop varieties, respectively, when El Niño is expected. Weather-based agricultural insurance systems are measures that provide effective response and transfer the risk of droughts, encouraging farmers to produce in uncertain conditions.



517 National Drought Mitigation Centre, 2021.

518 FAO, 2018b.

519 UNESCWA, 2020b.

520 League of Arab States, Arab Geographical Information Room, 2019.

521 Saab, 2015.

522 Fountain, 2015.

523 UNOCHA, 2017.

524 UNDRR, 2017a.

525 UNDP, 2018a.



Introducing supplementary irrigation can be effective in reducing the effect of droughts and dry spells on rain-fed cereal and pulses systems. For livestock systems, securing fodder can be obtained by introducing aquaponics production systems that complete fodder requirements in case of extreme events.

The availability of open-source, open-access science-based risk information is instrumental in advancing cost-benefit analysis, transparent transactions, accountability and partnerships with stakeholders. For example, AGIR, established in 2015 by the League of Arab States and hosted by the AWC, addresses the information and analytical gaps to better inform decision-making and emphasize the interconnectedness of climate change with risk. It highlights the importance of understanding the multiple stressors of risk, creating opportunities for new insights and approaches.

## 2. Floods and flash floods

Floods can support the health of wetland areas, depositing nutrient-rich sediments that recharge the topsoil and make the land more fertile. Flooding can also replenish groundwater aquifers, benefit inland fisheries and create wildlife habitats. Some farming systems are highly dependent on spate, or flood-based, irrigation and recession irrigation along rivers and lake margins. In sub-Saharan Africa, an estimated 25 million hectares are irrigated with floodwater.<sup>526</sup> Spate irrigation is widely practised in Yemen, where in 2001 more than 217,000 hectares were cultivated using spate irrigation.<sup>527</sup> But floods can cause long-term economic hardship for food system actors due to lost livestock and crop production, and damaged food storage facilities, industries or commercial enterprises. After droughts, floods and flash floods are the second worst disaster, adversely impacting agriculture and food security; two thirds of all damage and loss during the period 2006–2016 was caused by floods in 53 countries, including some Arab countries.<sup>528</sup> With regards to subsectors, approximately 60 per cent of all damage and loss to crops was caused by floods, 8.4 per cent to livestock, 9.8 per cent to fisheries and 9 per cent to forestry. Post flooding, stagnant waters often render cropland useless and make it difficult to maintain livestock, which without proper shelter, veterinary care or adequate feed, can fall prey to disease or starvation. Floods are frequently associated with water contamination and can accelerate the process of land degradation, eroding topsoil from prime growing areas and causing irreversible habitat damage.

Despite being one of the driest regions of the world, the Arab region is frequently hit by floods and flash floods, which are increasing in intensity and frequency, while the timing of rainfall is altering due to climate change. Between 2013 and 2015, 96 flood and flash flood events occurred across the region, including 10 floods in both Somalia and the Sudan. These resulted in economic losses estimated at 0.43 per cent and 0.08 per cent of GDP, respectively.<sup>529</sup> In Jordan and Lebanon, flash floods are the second most serious hazard in terms of potential damage. In Lebanon, a study estimated that floods and flash floods could cause damage of up to \$330 million, and 83 per cent of the floods impact the agriculture sector.<sup>530</sup> Jordan has registered a major flood annually since 2008,<sup>531</sup> and flash floods are ranked the second highest priority risk after earthquakes.<sup>532</sup> A number of significant events over the past 10 years reveal the extent of damage and impact on agriculture, with Jordan, Lebanon, Saudi Arabia, Somalia, the Sudan, Tunisia and Yemen the most affected countries. In March 2020, an unprecedented wave of strong rains hit the region, causing flash floods in Egypt, Iraq, Lebanon, Oman, the Syrian Arab Republic, the United Arab Emirates and Yemen.

### Box 7.3 Flood management as a priority

In the region, most floods and flash floods are localized, and the damages and losses are not captured in national databases. Understanding the localized impacts, including in agriculture, is critical for early warning and context-specific preparedness and mitigation plans. On farms, raising awareness and flood preparedness measures, including storage, evacuation and elevation areas for livestock, are noticeably weak. Investment in flood management is a regional priority.



526 CGIAR, 2016.

527 FAO, 2008.

528 FAO, 2018b.

529 League of Arab States, Arab Geographical Information Room and Arab Water Council, 2019.

530 Abdallah and others, 2018.

531 Jordan, Government of Jordan, 2019.

532 Ibid.

Natural flood management measures as a tool for alleviating downstream floods risks are receiving increased attention in places such as Alexandria on the Nile Delta, where projected average annual flood losses in 2050 are expected to double compared with 2005 if current standards of defence are maintained. Interventions upstream would reduce flood inundation downstream rather than defend floodplains locally. Natural management would be one form of catchment-based management, and would consist of measures such as reducing run-off on hill slopes with soil and water conservation techniques, cascading water storage to capture high river flows, and limiting the connection between run-off sources and potential flood zones. However, when applying natural flood management, the potential for negative consequences must be considered – on the functioning of aquatic ecosystems, and the unexpected effect of water storage leading to increased demand.

Other mitigation measures include rehabilitating and expanding spate irrigation, creating temporary shelter for livestock and developing groundwater recharge ponds to use excess water to recharge aquifers.

### 3. Land degradation

Land degradation is a complex process in which the value of the biophysical environment is affected by a combination of inappropriate policies and unsustainable practices,<sup>533</sup> including overcultivation, overgrazing, land fragmentation, deforestation and inappropriate irrigation and cultivation methods. Up to 40 per cent of the world's agricultural land is seriously degraded, with devastating impacts on agriculture productivity, food security – by affecting food availability – and the environment. Wind or water erosion, organic carbon loss, nutrient depletion, salinization and sodium accumulation, soil sealing, loss of soil biodiversity and contamination, acidification, compaction and waterlogging are all increasing, and affecting the soil's productive capacity.<sup>534</sup> Land degradation affects the livelihoods of at least 3.2 billion people, and costs more than 10 per cent of annual global GDP in lost biodiversity and ecosystem services.<sup>535</sup> The United Nations Convention to Combat Desertification (UNCCD) put the loss to the global economy due to land degradation at \$23 trillion by 2050, which could be saved by immediate preventative action that would cost \$4.6 trillion.<sup>536</sup>

With deserts and unfertile land occupying about 70 per cent of its total area, the Arab region has the lowest per capita availability of arable land in the world. More than 86.7 per cent of the land is either desert or threatened by desertification.<sup>537</sup> Arable land constitutes less than 5 per cent of the total land in two thirds of the countries with 92 per cent of hyper-arid land and 73 per cent of arable land affected by land degradation.<sup>538</sup> The first report on efforts to combat desertification and achieve land degradation neutrality by the Arab Organization for Agricultural Development (AOAD) estimated that 60 per cent of the region's lands are degraded to varying degrees (26 per cent highly degraded, 43 per cent degraded, 25 per cent moderately degraded and 15 per cent lightly degraded).<sup>539</sup> A 2018 study by the AWC and World Food Programme showed regional variations in the coverage and severity of land degradation, the coverage ranging from 9.5 per cent in Lebanon to 83 per cent in Kuwait, and the severity from 3.6 per cent in Morocco to 69.3 per cent in Djibouti. Degradation is more problematic for rain-fed agricultural land in the region, which is estimated at 30 million hectares. The annual economic cost of land degradation is estimated at \$9 billion (2.1–7.4 per cent of the region's GDP).<sup>540</sup> Soil salinity reduces productivity and crop yields, causing annual economic losses put at \$1 billion.<sup>541</sup> The cost of milk and meat production due to land degradation of grazing biomass was estimated at \$0.6 billion in 2007 (the global cost is estimated at almost \$7 billion),<sup>542</sup> with grassland grazing providing only 28 per cent of the region's animal feed requirements.

The relationship between land degradation and disasters is non-linear and complicated. While land degradation contributes to some hazards directly (such as sand and dust storms), most hazards (such as drought) and disasters (such as conflicts) aggravate it. Degradation often leaves land devoid of vegetation cover, which makes the soil highly vulnerable to wind and water erosion. When rains fall on bare land upstream, water runs on the soil surface

533 Conacher and Conacher, 1995.

534 FAO and Intergovernmental Technical Panel on Soils, 2015.

535 Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, 2018.

536 <https://www.unccd.int/news-events/2018-year-review>.

537 Arab Center for the Studies of Arid Zones and Dry Lands (ACSAD) and UNEP, 2003, cited in Arab Organization for Agricultural Development, 2018.

538 UNESCWA, 2020b.

539 Arab Organization for Agricultural Development, 2018.

540 Hussein, 2008.

541 UNESCWA, 2020b.

542 International Food Policy Research Institute and University of Bonn, Center for Development Research, 2007.

at a higher speed and velocity, often resulting in heavy floods downstream. Forest fires as natural hazards, when occurring recurrently, lead to land degradation, as does human displacement from conflict and natural hazards. The land degradation hotspots that form around refugee camps and those for internally displaced persons are an example of the link between human-made disasters and land degradation.

### **Box 7.4** *Sand and dust storms: a growing hazard in the region*

Land degradation is a main cause of sand and dust storms, a significant hazard in the Arab region. Largely resulting from anthropogenic causes (in about 40 per cent of such storms), they generate 93.76 million tons of dust annually, 80 per cent of which is deposited within the area. The region, one of the most affected by storms, has witnessed an increase in their frequency, intensity, scale and geographical coverage in the past 15 years. The annual economic cost of storms has been estimated at \$13 billion. The countries most impacted include Algeria, Bahrain, Iraq, Jordan, Kuwait, Libya, Morocco, Oman, Qatar, Saudi Arabia, the Syrian Arab Republic, Tunisia and the United Arab Emirates.

Given the transboundary nature of these storms, effective and well-coordinated regional response measures are required. UNEP, the World Meteorological Organization (WMO) and the UNCCD developed a policy framework in 2017 to establish an integrated, DRR-focused global approach to manage sand and dust storms. It is based on five strategic actions, including: i) measures to reduce anthropogenic emissions through sustainable land and landscape management and climate change mitigation and adaptation; ii) physical protection of valuable assets; iii) monitoring, prediction and early warning systems, including mapping of trends and future scenarios of anthropogenic dust sources; iv) preparedness and response, including public awareness of risks, and mainstreaming sand and dust storms into DRR and emergency response measures; and v) policies, legal frameworks and action plans to support the actions.

### **Box 7.5** *Holistic sustainable land management*

The growing challenges related to land degradation in the region urgently require the adoption of holistic sustainable land management measures within the broader restoration framework. This includes policies to reclaim degraded land and reduce degradation of currently productive land. Analyses of the return on investment for sustainable land management indicate significant economic, social and environmental benefits. For example, in Jordan, if the traditional Hema practice of managing common land was adopted within the Zarqa river basin, it could result in net benefits of \$203 million to \$408 million through carbon sequestration, increased water infiltration and reduced sedimentation.

Holistic sustainable land management measures would help countries fulfil voluntary pledged targets for achieving land degradation neutrality to meet SDG 15.3, which seeks to prevent, halt and reverse degradation. Maintaining healthy natural resources, including land to provide ecosystem services, offers a buffer against natural hazards such as floods and landslides, regulates the climate and maintains the productivity of agricultural systems. Applying such measures, however, requires reliable data, including early warning and detailed studies on the effect of land degradation on crop and livestock production and people's livelihoods under different farming systems and agroecological contexts.

## **4. Transboundary animal and plant pests and diseases**

Transboundary animal and plant pests and diseases are highly contagious, and spread rapidly irrespective of political and administrative boundaries, resulting in significant damage and loss in the agriculture sector, impacting food security and the wider economy. The transboundary nature of these pests and diseases increases their geographical impact and necessitates regional collaboration in managing them.

## a. Transboundary animal diseases

Transboundary animal diseases, or TADs, result in an estimated 20 per cent reduction in animal productivity and, in the worst-case scenario, the death of animals, which are essential productive assets for smallholders. Zoonotic diseases<sup>543</sup>, or zoonoses, are diseases shared between animals – including livestock, wildlife, and pets – and people. They can pose serious risks to both animal and human health and may have far-reaching impacts on economies and livelihoods. Zoonotic diseases commonly spread at the human-animal-environment interface – where people and animals interact with each other in their shared environment. Zoonotic diseases can be foodborne, waterborne, or vector-borne, or transmitted through direct contact with animals, or indirectly by fomites or environmental contamination. TADs have a disastrous impact on trade in livestock and their products.

Droughts and floods are among the most common natural hazards, with strong and complex causal relationships with animal disease outbreaks. For example, vectors multiply faster and in higher volumes after flooding and heavy rains, leading to an increased risk of vector-borne disease outbreaks, such as Rift Valley fever, which is transmitted by mosquitoes. TADs often contribute to economic losses, especially among pastoralists, when traditional grazing areas and migratory routes become inaccessible, leading to increased density of animals and a higher risk of disease transmission. The most serious TADs in the region include the following:

- Foot and mouth disease, a viral animal disease that affects cattle, buffalo, sheep and goats. The cost burden in endemic regions such as the Arab region is estimated to be more than \$6.5 billion a year. Foot and mouth causes significant reduction in production as well as economic losses due to trade restrictions.
- Peste des petits ruminants (PPR), a highly contagious viral disease of wild and domestic small ruminants, such as sheep and goats, occurs throughout the Arab region and Africa. The annual global losses due to PPR are estimated between \$1.4 billion and \$2.1 billion, according to FAO.
- Middle East respiratory syndrome coronavirus (MERS-CoV), an emerging threat for public health, causing severe respiratory infection in humans. Dromedary camels are thought to be a natural reservoir of MERS-CoV. Globally, as of 2020, 2,507 human cases had been confirmed in 27 countries, including 11 in the Arab region,<sup>544</sup> with 902 recorded fatalities.
- Rift Valley fever (RVF), transmitted through several mosquito species and by contact with infectious animal material, affects ruminants and humans, and has a high impact on livelihoods (socioeconomic) and trade (restrictions). RVF is recognized as a priority disease in the Arab region and the Horn of Africa, largely because of the huge livestock trade. A FAO study showed significant incidents in Egypt, Mauritania, Saudi Arabia, the Sudan and Yemen.<sup>545</sup> The highest number of human deaths (598) was recorded in Egypt in 1977–1978, the most cattle deaths in Yemen in 2000–2001.

## b. Transboundary plant pests and diseases

FAO estimates that annually between 20 and 40 per cent of global crop production are lost to pests. Each year, plant diseases cost the global economy about \$220 billion, and invasive insects about \$70 billion.<sup>546</sup> The most serious transboundary pests in the region include:

- Desert locust (*Schistocerca gregaria*), the oldest and globally one of the most dangerous migratory pests. Desert locust swarms are highly mobile, covering up to 150 km a day, and ravenous eaters of food crops and forage. A square kilometre of adult swarm has the capacity to consume the same amount of food in a day as 35,000 people, posing a significant threat to food security.<sup>547</sup>
- Fall armyworm (FAW, *Spodoptera frugiperda*), an insect that feeds on more than 100 plant species, including maize, rice, sorghum, sugarcane and several vegetable crops, and causes yield losses of up to 100 per cent. A new pest in the region, it was first reported in the Sudan in 2016, and then in other countries, including Yemen and Egypt. It has been predicted FAW could cause up to \$13 billion per year in crop losses throughout sub-Saharan Africa, threatening the livelihoods of millions of poor farmers.<sup>548</sup>

543 WHO, FAO and World Organisation for Animal Health, 2019.

544 Including Algeria, Bahrain, Egypt, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Tunisia, the United Arab Emirates and Yemen.

545 Mariner, 2018.

546 FAO, 2018c.

547 <http://www.fao.org/locusts/en/>.

548 Harrison and others, 2019.

- Red palm weevil (RPW, *Rhynchophorus ferrugineus*), which has caused the loss of tens of thousands of palm trees regionally, mainly in the Mediterranean basin, with a value of €483 million (\$588 million, current 2021).<sup>549</sup>
- Fruit flies (*Bactrocera zonata*, *Bactrocera dorsalis* and *Drosophila suzukii*), which attack fruit crops, causing serious damage. For example, the cost in the region due to *Bactrocera dorsalis* alone is estimated at €320 million (\$390 million, current 2021).<sup>550</sup>

Of the transboundary plant diseases, *Xylella fastidiosa*, a pathogenic bacterium, is one of the most dangerous plant bacteria in the region, and worldwide. Affecting more than 300 plant species, it poses remarkable risks to food security, livelihoods and economies. A 2019 assessment of the socioeconomic impact in the MENA region suggests Morocco, Lebanon, the State of Palestine and the Syrian Arab Republic are most exposed to the risk, and indicates declining yields, production, profitability, employment and exports, and increasing imports, with the highest impact on olives, then citrus and grapes.

Invasive weeds are a third category of plant transboundary pests and diseases, which cause yield losses ranging from 30 per cent to 70 per cent, reaching up to 100 per cent of some crops. They include Water hyacinth (*Eichhornia crassipes*) and Paulownia tree or Kebreet tree (*Ailanthus altissima*), which grow rapidly, outcompeting many other plant species for light and space. Toxins that inhibit the growth of other plants are also produced, seriously impacting on forest trees.

### Box 7.6 The desert locust emergency

The desert locust is considered the most dangerous migratory pest in the world. Desert locust poses a serious threat to crop and livestock production in countries already highly food insecure and facing economic crises. Yemen, which is experiencing the world's worst food crisis, was forecast to face a new generation of locusts after the heavy rains in March 2020 created favourable breeding conditions. Some food insecure areas in parts of the Sudan and the Syrian Arab Republic are facing desert locust infestations, imposing additional challenges to already fragile situations in these countries.

In the event of a desert locust infestation, food security impacts are significant for vulnerable households in affected areas, especially for food insecure households (IPC 2 and above) reliant on cropping activities.<sup>a</sup> Pasture losses are also expected in areas where the swarms land, limiting the capacity of pastoral households to feed their grazing animals. In a worst-case scenario, where desert locusts cause below-average national harvests and major pasture losses in arid and semi-arid regions, the food security outlook is dire. Below average food stocks and pasture conditions, reduced incomes and rising food prices will likely drive widespread food insecurity for cropping, agropastoral and pastoral households.

a IPC Overview and Classification System. Available at <http://www.ipcinfo.org/ipcinfo-website/ipc-overview-and-classification-system/en/>.

## 5. The systemic risks related to pests and diseases

### a. Impact of climate change on pests and diseases

Evidence suggests a correlation between climate change and the distribution, frequency and severity of plant pests and diseases.<sup>551</sup> Climate change directly affects the behaviour, reproduction rate, geographic distribution range, overwintering success, and pesticide resistance and dispersal ability of plant pests. It also affects host-plant physiology, plant pest interactions, plant pest enemy populations and pest management strategies. The multiplication rates of certain insects vary with temperature, while the severity of some insect increases is dependent on rainfall, such as in the case of the desert locust, where extended periods of rain and wet ground provide the most suitable environment for breeding. With regards to diseases, wheat leaf rust, for example, would develop earlier due to an increase in temperatures earlier in the season. Wheat yellow rust is now developing heat-tolerant strains that can make the disease spread more as epidemics.

549 Yaseen, 2019.

550 European and Mediterranean Plant Protection Organization, 2005.

551 FAO, n.d.



Climate change influences livestock diseases and zoonotic diseases directly and indirectly, especially vector-borne diseases. Variations in rainfall, temperature and flooding affect the distribution and abundance of disease vectors. A temperature rise increases transmission rates by increasing vectors' feeding interval and development rate, leading to an extension of vector habitats. Climate stress lowers animal immunity and alters ecosystem structure and functioning. Increased risk of infection leads to an increased risk of zoonotic diseases. Desertification intensifies the encroachment of humans and livestock into the natural habitats of wild animals, increasing contact between wildlife and livestock, and accelerating the risk of spillover and zoonotic disease outbreaks.

## **b. Human health and zoonotic disease**

About 60 per cent of all infectious diseases in humans are zoonotic.<sup>552</sup> They cause approximately 60,000 deaths annually. The 2009 swine flu pandemic, which originated in Mexico, is estimated to have infected more than 100 million people, with a death toll of about 20,000.<sup>553</sup> Several emerging zoonotic diseases have recently caused, or threatened to cause, major pandemics. These include Ebola, highly pathogenic avian influenza (HPAI), Middle East respiratory syndrome (MERS, caused by MERS-CoV), Rift Valley fever, sudden acute respiratory syndrome (SARS), West Nile virus, and Zika virus. The pathogens causing these diseases have wildlife reservoirs acting as their long-term hosts. In the past two decades, emerging diseases losses exceeded \$100 billion; if these outbreaks had become human pandemics, the losses would have amounted to several trillion dollars.<sup>554</sup> The World Economic Forum's 2019 global risks report notes the World Bank estimated Guinea, Liberia and Sierra Leone, the three countries most impacted by 2014-2015 Ebola outbreak, suffered combined GDP losses of \$2.2 billion.<sup>555</sup>

### **Box 7.7** *Holistic risk management*

Addressing the risks posed by animal and plant pests and disease requires a holistic risk management approach that emphasizes prevention, surveillance and early warning and response. This includes understanding the relationship between animal and plant pests and diseases and other hazards; for example, plant pesticides and animal drugs can have negative consequences on food safety and human health, such as food contamination and antimicrobial resistance. Zoonotic diseases affect both animals and humans, and displacements caused by conflict necessitate certain quarantine measures to limit the transmission of animal and plant pests and disease systems. Such a holistic approach also requires: sustainability of response actions to avoid negative consequences on environment and human health; regional collaboration and joint actions to manage transboundary pests and disease, including coordinated surveillance, standards and protocols, and regional reference laboratory networks; and the use of science, technology and innovation, such as GIS in surveillance, research and preservation of genetic resources, and research to identify natural enemies of pests and diseases to limit the use of chemicals.

Recommended measures include: (i) coordination and cooperation between sectors using one-health and whole-of-society approaches; (ii) epidemiological assessments backed by reliable diagnostics (which necessitate laboratory capacities and epidemiological networks); (iii) human health and related areas, such as food safety, included when dealing with zoonotic diseases; and (iv) improved surveillance, monitoring and early warning systems for transboundary pests and diseases.

## **6. Economic shocks**

Economic shocks have severe negative consequences for food security. They include a sudden increase or fluctuation in the price of food and productive inputs, leading to limited production capacity, limited access to financial support/credit systems and markets, in turn leading to a reduction in income across the agriculture sector, especially for vulnerable farming communities and self-employed, wage and informal workers threatened by food supply chain disruptions. Global economic shocks have a substantial impact in countries that are highly dependent on food imports due to their vulnerability to price volatility, an important indicator of the access and stability dimensions of food security. Food trade is disturbed as export countries often respond to economic shocks by restricting exports, which affects availability,

552 Woolhouse and Gowtage-Sequeria, 2005.

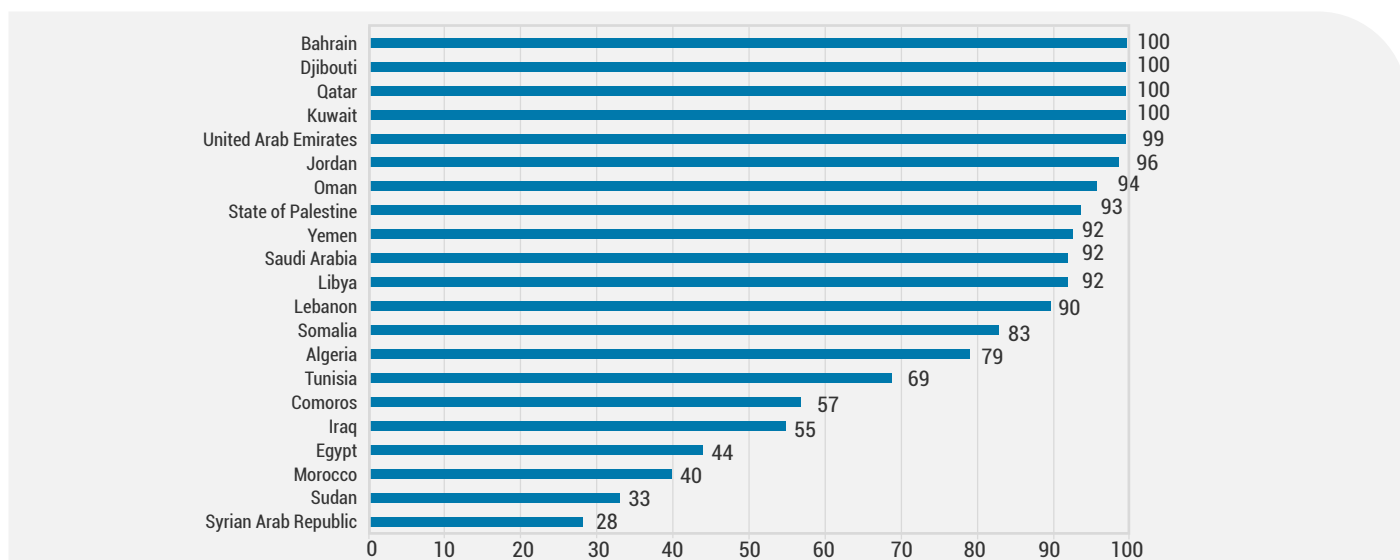
553 Nathason, 2016.

554 UNEP, 2016b.

555 World Economic Forum, 2019.

a third dimension of food security. The region is heavily dependent on world markets for a significant share of its food requirements, particularly cereals, with the cereal import dependency ratio ranging from 28 per cent in the Syrian Arab Republic to more than 90 per cent in the GCC countries (figure 7.2).

Figure 7.2 Cereal import dependency ratio of Arab countries, percentage



Source: World Bank, "World Development Indicators", DataBank. Available at <https://databank.worldbank.org/source/world-development-indicators> (accessed on 15 April 2021).

The Arab region is highly vulnerable to global economic shocks, as evidenced by the world food crisis of 2007-2008. Skyrocketing food prices made basic staples such as rice, wheat and corn unaffordable to lower-income groups, and the crisis subjected most States to considerable social and economic hardships. The GCC oil-producing countries, with their relatively small populations and ample revenue, attempted to adjust to the inflation in food prices. A significant number of people living below or just at the poverty line in the populous, non-oil-exporting countries were forced to resort to non-economic methods to protect themselves.<sup>556</sup>

National economic shocks also have a significant impact on the main dimensions of food security, particularly access, stability and utilization, especially among the poor. Hyperinflation, as in Lebanon, the Sudan and Yemen, reduces uninterrupted access to the adequate quantities of healthy food that ensure food utilization and stability.

### Box 7.8 COVID-19: a systemic health crisis impacting food security

The outbreak of the COVID-19 pandemic and the control and mitigation measures enforced worldwide, combined with the massive economic impacts of these necessary measures, compounded by the preceding stresses of conflict, natural hazards and pests and diseases, all contribute towards a scenario of global food emergency.

Although the COVID-19 pandemic is primarily a health crisis, it has manifested in significant economic crisis, with risk implications for food trade, and consequently food security in the Arab region. Although global cereal markets are expected to remain balanced and comfortable, localized disruptions, caused largely by logistical issues, pose challenges to food supply chains in some markets, and risks to countries that are highly dependent on food imports. Some countries in the region also face specific risks related to their agrofood import-export profiles.



556 Saif, 2008.

Food exports, which make up more than 20 per cent of total merchandise exports in six Arab countries, are facing disruption risks. In addition, while all countries are net-importers of food, they import mainly staple commodities but export varying – and for some substantial – amounts of high-value products such as fruit, vegetables, fish and meat. Usually exports are made up of a few agricultural commodities, as in Egypt, Jordan, Mauritania, Morocco and Tunisia. This implies exposure to fluctuating demand if these exports become regarded as non-essential.

Source: United Nations, The impact of COVID-19 on food security and nutrition, Policy Brief (June 2020).

### **Box 7.9** *The need for regional collaboration*

In the medium and long term, Arab governments need to adopt policies that reduce their vulnerability to global economic shocks. However, as no country is individually capable of achieving full food security, regional collaboration throughout food value chains is highly recommended, including in production, strategic reserves, processing and trade. Arab countries also need to diversify their trade partners in strategic food commodities. In parallel, they must further expand pro-poor social protection policies and programmes, including safety nets to safeguard those most vulnerable to economic shocks.

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## **E. Conclusion**

The Arab region has displayed deteriorating food security and nutrition trends since 2014. Natural hazards and human-made disasters are among the main reasons behind this worrying state. Beside conflicts, droughts and transboundary animal and plant pests and diseases have a paramount impact on food security in the region. Growing water scarcity represents a critical risk multiplier that exacerbates vulnerabilities. Studies suggest that climate change will further aggravate water stress and worsen the impact of climate-related disasters on food security.

The relationship between food security and disasters is complex. Most of the hazards affecting food security trigger systemic risks that result in significant social, economic and environmental impacts. Therefore, addressing these hazards necessitates a holistic DRM approach that fosters building resilience – across multiple sectors and systems – to multiple hazards and risks in line with the four priorities of the Sendai Framework.

## Towards an enabling environment for coherent implementation

# 8.



### A. Introduction

Chapters 1 and 2 describe hazards, exposure and risks in the region, and the progress made by States in managing these risks according to the Sendai Framework, which includes a broad hazard and risk scope, including cascading and systemic risks across natural, environmental, health, financial, economic and social systems. Chapter 3 reviews efforts and opportunities for coherence and integration across the SDGs, Paris Agreement and Sendai Framework to efficiently and safely address traditional and emerging systemic risks. Chapter 4 examines the structural drivers of vulnerability to and impacts of climate change and disaster risk to identify priority vulnerable groups in order to meet the new humanitarian agenda goal of leaving no one behind and reaching the furthest behind first.<sup>557</sup> Chapters 5, 6 and 7 look at the broader contextualized background of socioeconomic development challenges in the region against which risk reduction, CCA and sustainable development efforts are taking place. They address risk reduction in urban settings against emerging trends, risk reduction in conflict and fragile settings and the food security risks emerging under growing water scarcity.

<sup>557</sup> United Nations, General Assembly, 2016b.

This chapter considers Sendai target E (DRR strategies at national and local levels) as the starting point to address the challenges to achieving the 2030 goals on reducing disaster mortality, affected people, direct economic losses, damage to infrastructure and disruption to basic services. It reviews regional practices and challenges encountered in creating an enabling environment for coherent and integrated risk governance at national and local levels. It considers regional efforts supporting enabling environments, including institutions and initiatives for risk information, technology and data sharing. It then reviews the main practices for creating national enabling environments, namely through legal and institutional frameworks, people-centred approaches, technology and data sharing, and incentives for investment and mainstreaming with sustainable development and climate change planning. Challenges and opportunities for creating enabling environments at local level are presented, along with a discussion on entry points for an enabling environment in conflict settings.

## B. Regional enabling environment for integrated risk reduction

The systemic nature of the hazards and risks prevailing in the Arab region necessitates strong coordination at different levels, scales and sectors to promote cooperation while ensuring policy coherence to address challenges. These include the allocation and efficient use of resources for generating disaggregated vulnerability and risk data, monitoring implementation across all agendas and reducing risks from cross-boundary hazards.

The ASDRR 2030 was developed within the construct of this regional cooperation and approved during the 2018 Arab League Summit.<sup>558</sup> The strategy, which is aligned with the Sendai Framework and SDGs, proposes a multisectoral approach to reduce disaster risks in the region. It provides a framework to foster progress in the agreed areas of implementation and to produce a detailed work programme in three phases until 2030. A priority action plan setting the objectives, with deadlines, has been drawn up for the period 2019–2020. The plan was adopted as an outcome document of the Africa-Arab Platform 2018,<sup>559</sup> with progress over the past two years. An evaluation will inform the 2021–2024 prioritized action plan that will be endorsed at the Fifth Arab Regional Platform for DRR in the last quarter of 2021.

The League of Arab States coordinates actions to implement the regional strategy. Within its technical organizations, it integrates DRR measures in technical assistance projects and programmes across the Arab States. It supports actions to mainstream DRR across sectors and to strengthen coherence between the three international agendas of sustainable development, climate change and DRR (box 8.1).

### **Box 8.1** *Global best practices and regional initiatives for aligning international agendas for disaster risk reduction, sustainable development and climate change*

The intergovernmental group established by the United Nations General Assembly to look at developing indicators for measuring progress in implementing the Sendai Framework,<sup>a</sup> drawing on lessons learned and good practices, listed issues for countries to consider when seeking alignment between DRR, sustainable development and CCA. These include: (i) shared understanding of goals, processes and stakeholders specific to each programme; (ii) building consensus around priority objectives, mechanisms and organizations to be set up, with precise mandates, missions, responsibilities and plans of actions, including financial and human resources; (iii) establishing a joint intersectoral monitoring system; and (iv) identifying and implementing approaches supporting the joint objectives of DRR. At the regional level, the League of Arab States, working with its partners, is implementing several measures to promote this coherence, including:



558 UNDRR, 2018a.

559 UNDRR, "Africa-Arab Platform on Disaster Risk Reduction", 9-13 October 2018, Tunisia.



- (i) Regional Initiative for the Assessment of Climate Change Impacts on Water Resources and Socio-Economic Vulnerability in the Arab Region, or RICCAR,<sup>a</sup> whose results/databases are used to prioritize activities and guide investments in national development plans, according to an integrated DRR and CCA approach. Work continues, with new regional climate modelling projections expected during the second quarter of 2021.
- (ii) AGIR fills gaps in information, analysis and monitoring of risks, vulnerabilities and exposure related to climate change and natural hazards to support decision-making in the region. Its first report in 2019, Geographic Information towards Building Resilience in the Arab Region (Water, Food and Social Vulnerability Nexus), addressed a range of topics focused on climate change as a challenge in managing and mitigating risks.
- (iii) The SDG-Climate Nexus Facility (2019–2023) strengthens resilience to risks by supporting countries in integrating climate measures into their broader actions for sustainable development. Emphasis is placed on creating and implementing innovative financing instruments and relevant partnerships, in particular to achieve SDG 13.

a United Nations, General Assembly, 2016a.

b UNESCWA and others, 2017a.

During the COVID-19 crisis, regional discrepancies have been observed in institutional capacity, resources, responses and technology use. Further, there has been limited coordination among governments. It is envisaged that strengthened cooperation and coordination mechanisms in the response to potential future pandemics would help address this gap.

## Regional platforms and commitments for integrated risk reduction

Regional platforms are recognized as an essential element in creating an enabling environment and opportunities for collaboration. Supported by UNDRR, they play an important role in raising awareness, sharing information, cooperation and capacity-building in DRR actions. Regional platforms for DRR evolved steadily between 2005 and 2015, and their role is confirmed within the Sendai Framework. By producing and approving regional strategies and plans, and becoming politically involved with regional intergovernmental organizations, they provide a key opportunity to tackle transboundary issues. States, through the Sharm el-Sheikh Declaration on DRR in 2014,<sup>560</sup> committed to developing national financial mechanisms to reduce disasters and cope with their impact across all sectors and local authorities while mobilizing private sector resources.

The UNDRR-ROAS co-organized, in collaboration with the League of Arab States, African Union Commission, and UNDRR Regional Office for Africa, the 2018 Africa-Arab Platform on DRR in Tunis, the first to bring together two major regions facing common challenges of drought, refugees and migration. As well as adopting the Tunis Declaration on DRR, the platform provided an opportunity to develop a joint communiqué for strengthening Africa-Arab collaboration and deliver a set of voluntary action statements from stakeholder groups in the Arab region,<sup>561</sup> namely the Arab DRR Children and Youth Group, Arab DRR Civil Society Group, Arab Gender Equality and Women's Empowerment Group, Arab Scientific and Technical Advisory Group (STAG) and Arab Red Cross and Red Crescent Societies. UNDRR also announced its commitment to the Prioritized Action Plan 2019–2020 to implement the Sendai priorities. This included:

- Support implementation of Arab DRR strategy and its programme of work.
- Strengthen coordination mechanisms between Arab States for DRR.
- Strengthen DRR integration with sustainable development and climate change through partnerships with multiple stakeholders, including the League of Arab States, United Nations Sustainable Development Group, the Regional Coordination Mechanism and SDG-Climate Facility.
- Strengthen stakeholder engagement based on principles of inclusiveness and shared responsibility.
- Support the development of national strategies, local action plans and Sendai monitoring.
- Support national loss accounting and risk assessment systems.

<sup>560</sup> UNDRR, 2014.

<sup>561</sup> International Federation of Red Cross and Red Crescent Societies Declaration Africa-Arab Platform on Disaster Risk Reduction, Tunis, 2018.

UNDRR ROAS organized Arab DRR Partnership meetings<sup>562</sup> with key stakeholders engaged in DRR to expedite implementation of the Sendai Framework. The fourth Arab Partnership Meeting, in December 2019, brought together representatives from a range of stakeholder groups engaged in DRR, including the private sector, civil society, the media, women, young people, academia, NGOs and United Nations agencies. The two-day meeting in Cairo focused on stakeholder engagement and progress in voluntary action, and deliberated on challenges and the way forward. Coherence between the SDGs, CCA and DRR was also emphasized. The voluntary commitments and activities of stakeholder groups include:

- Gender Equality and Women's Empowerment Voluntary Stakeholder Group on DRR, Climate Change and Migration (GEWE) addresses issues related to climate change, migration and gender in a coherent framework. This incorporates the Paris Declaration, the global compact for migration, the Convention on the Elimination of All Forms of Discrimination against Women, the SDGs and DRR actions (box 8.2).
- STAG provides scientific information and technical advice. It coordinates the strategic engagement of science, research and technology communities with decision-makers to increase regional resilience and strengthen regional and national DRR programmes to support sustainable development. The Arab STAG's voluntary action statement comprises actions on both a long- and short-term basis (box 8.3).
- DRR working group of the United Nations Major Group for Children and Youth in the region (UNMGCY) acts as an engagement mechanism for children and youth in the implementation, follow-up and review of the Sendai Framework (box 8.4).
- Red Cross Red Crescent (RC/RC) National Societies Stakeholder Group reinforces the RC/RC approach to community resilience by bridging development and humanitarian work using common insights and approaches that integrate DRR and CCA strategies (box 8.5).
- Arab Civil Society group provides consistent guidance and advice on the coherent implementation of the post-2015 frameworks (box 8.6).

## **Box 8.2** *Gender Equality and Women's Empowerment Voluntary Stakeholder Group*

Through advocacy with Arab governments, GEWE seeks more women in decision-making roles in national and local strategy development and management processes. Their enhanced presence will better help identify women's knowledge, needs and priorities in DRR, climate change and migration, effectively reducing disaster risks while leaving no one behind. Arab women remain underrepresented in the workforce and at all levels of decision-making. Identifying and removing obstacles to their social, economic and political participation, including in DRR, is a priority to achieve SDG 5.<sup>a</sup> GEWE guidelines are in tandem with the Hanoi Recommendations for action, reported in GAR19, on implementing the Sendai Framework to promote gender equality. They include: (i) better understand risk by updated national and local statistics, broken down by sex, age and disability; (ii) enact laws that prescribe women's participation and leadership in decision-making and create mechanisms to ensure effective implementation; and (iii) implement security and protection interventions led by women to reduce current risks and prevent new risks resulting from gender-based discrimination and violence. GEWE is co-chaired by UN Women and the AWC.

a <https://sdgs.un.org/goals/goal5>.

## **Box 8.3** *Arab STAG Voluntary Action Statement to the Africa-Arab Platform on DRR*

The short-term actions of Arab STAG, outlined in its voluntary action statement at the Africa-Arab Platform on DRR, include developing a status report on science and technology for DRR in the region, organizing the Arab science-policy dialogue focusing on DRR, engaging with the global STAG, supporting sustainable development in the context of climate change, developing a network of science institutions and preparing a roster of DRR experts. The long-term programme includes plans to engage governments in increasing public and private sector



562 UNDRR, "The Arab Partnership Meeting for Disaster Risk Reduction", 22-23 April 2018.

investment in DRR science and technology, prepare guidance to introduce science and technology in sectoral planning, and promote DRR research and innovation in higher education through regional organizations.

Since the statement, the Arab STAG, which is chaired by the CNRS in Lebanon, has taken part in a number of expert groups and programmes on DRR, such as the GRAF,<sup>a</sup> UNDRR Integrated Research on Disaster Risk programme (IRDR) and UNDRR/ISC expert review group,<sup>b</sup> UNDRR/ISC Sendai Hazard Definition and Classification Review Technical Report, and the regional atlas on natural risks in Arab countries piloted by UNESCO.<sup>c</sup> It has co-organized workshops and technical courses, and is planning the first Arab regional conference on the science and technology policy interface in DRR. A master's degree programme in DRR to build expertise at sectoral and local levels is also being finalized, to expedite implementation and monitoring of DRR strategies and action plans.

a Global Risk Assessment Framework. Available at <https://www.preventionweb.net/disaster-risk/graf>.

b Sendai Hazard Definitions and Classification Review. Available at <https://council.science/sendai-hazard-review>.

c Presented as an instrument for the resilience and adaptation of socioecological systems on a regional scale.

### **Box 8.4** *The Arab United Nations Major Group for Children and Youth Voluntary Action Statement*

The UNMGCY is an open constituency for all young people, designed to show that they are not only part of vulnerable groups but also of the solution, driving the behavioural change required to build resilient and sustainable societies.

The Arab UNMGCY has committed to actions in support of the implementation of the ASDRR2030 and Sendai Framework. These include: (i) facilitating DRR awareness campaigns, and mobilizing the growing network of Arab children and youth for DRR; (ii) providing children and youth with access to an easy-to-understand knowledge on DRR and the Sendai Framework, and on emerging disaster trends, impacts of climate change and risks in the region; (iii) facilitating an online and offline interprofessional regional and global dialogue among young DRR experts on evidence-based best practices and emerging trends; (iv) facilitating online and in-person development and progress reports of youth-led action plans on local DRR actions; (v) facilitating children and youth-led monitoring, evaluation and reporting on the Sendai Framework; and (vi) facilitating participation of youth as equal stakeholders in the region's formal and informal avenues of DRR policy design, implementation, monitoring and review.

### **Box 8.5** *Arab Red Cross Red Crescent National Societies Stakeholder Group*

The Red Cross Red Crescent National Societies Stakeholder Group, along with the International Federation of Red Cross Red Crescent Societies (IFRC), build community resilience on the understanding that vulnerability to disasters, crises and shocks is often determined less by the scale of a hazard and more by underlying vulnerability caused by a set of interrelated risks.

In its Statement of Voluntary Commitments to the Africa-Arab Platform on DRR, the IFRC commits to working with the 16 national Red Cross and Red Crescent Societies in the Arab region, including on the following actions: (i) putting IFRC Framework for Community Resilience into operation by implementing the IFRC Road to Resilience (R2R) guide in at least five countries, ensuring every community living in a high-risk area has the capacity to reduce risk, prepare and respond to disasters, promote inclusion and mainstream gender, and strengthen volunteer/community-based networks, communities and the role of women as a force in local resilience building; (ii) scaling up support to community-led action and volunteering to contribute to resilience and enhancing technical and financial investment in RC/RC national societies in DRR and community resilience building; (iii) advocating institutionalization of integrated multisectoral community resilience approaches in local risk reduction policies, planning and programmes, and strengthening community and local government partnerships, legal frameworks and accountability mechanisms to create an enabling environment for DRR,



prevent new risks and make communities safer; (iv) advocating enhancement and consolidation of a culture of safety and resilience that is action-oriented and respects local realities, cultures and ancestral practices, contributing to a better understanding of risk and generating action to reduce vulnerability; (v) prioritizing actions based on the needs of those living at high risk or belonging to traditionally excluded groups, particularly migrant populations, those affected by the impact of climate change or living in areas that are geographically remote and affected by insecurity and conflict; (vi) joining forces with local and national authorities to develop local risk management and promote an approach based on community resilience and sustainability; and (vii) strengthening collaboration and coordination with CSOs and their respective national and local governments.

## Box 8.6 Arab Civil Society Voluntary Action Statement

The Arab CSO group has formed a partnership with the League of Arab States to emphasize the role of civil society in developing and implementing the ASDRR and national DRR strategies. It has also partnered with the Global Network of Civil Society Organisations for Disaster Reduction (GNDR) to promote coherent action at national, regional and international levels. Work is under way to integrate DRR into the activities of member CSOs in ongoing projects on climate change, water, gender and youth.

In its voluntary action statement, the Arab CSO group committed to: (i) increase awareness and advocacy of DRR by improving public and private understanding of the Sendai Framework and concepts of DRR; (ii) encourage coordination and forge partnerships at local, national, regional and international levels; (iii) promote integration of DRR concepts in sustainable development and the 17 global goals, including in education, health and housing, and development in general, to ensure no one is left behind; (iv) build capacity to identify, monitor and assess disaster risks; and (v) build society resilience through knowledge, advocacy, research and training.

The annual Arab Forum for Sustainable Development (AFSD) is the primary regional mechanism for following up implementation of the 2030 Agenda. Convened by ESCWA in cooperation with the United Nations system, it brings together high-level representatives of ministries, planning and review bodies, parliamentarians, regional and international institutions, CSOs, the private sector, academic and research centres, and the media. The AFSD formally delivers the views of the region to the High-level Political Forum on Sustainable Development<sup>563</sup> held annually in New York. Its report sets out the key messages from regional dialogue on the opportunities and challenges of implementing the 2030 Agenda, and reports progress on key priorities.

The Arab Forum for Environment and Development (AFED) has helped enable conditions for achieving the SDGs in the region, beyond capacity-building.<sup>564</sup> Its 2018 report prioritized the need for reform of current institutional arrangements at regional and national levels, with High Councils for Sustainable Development (HCSD) recommended to ensure integrated policy formulation, adequate cooperation and coordination between government entities, and between government and other stakeholders. Such councils would also assess the implementation of proposed strategies, propose corrective measures and ensure adequate communication between stakeholders, including governments, the private sector, civil society, and gender and youth organizations. The councils are not yet fully operational, with insufficient funding and institutional support from stakeholders being a key stumbling block.

Recognizing the challenges, the League of Arab States, UNDRR and other agencies are strengthening regional cooperation and coordination towards achieving sustainable development, CCA and DRR to build sustainable cities and communities that leave no one behind.

563 United Nations, Department of Economic and Social Affairs, Sustainable Development Goals, "High-level Political Forum 2021 under the Auspices of ECOSOC". Available at <https://sustainabledevelopment.un.org/hlpf/2021> (accessed on 11 March 2021).

564 AFED, 2018.

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## C. National enabling environment for integrated risk reduction

### 1. Legal and institutional arrangements for disaster risk reduction and sustainable development

The Sendai Framework identifies that the multisectoral, multi-stakeholder aspect of DRR governance stems from the fact that DRR mandates cut across sectoral laws not generally treated as risk management and risk reduction frameworks. These include building codes, environmental protection, land-use planning, water and waste management and ecosystem protection. For risk governance to reduce existing risk, prevent cascading risk and address systemic risks, these mandates and associated institutions and resources must function as a system.

Establishing national cross-sectoral, multi-stakeholder platforms, and strengthening existing ones, is essential to creating the enabling environment at national and local levels to allow different DRR legislative components to work as one system. Widening representation in institutional decision-making, including national platforms for DRR, to include critical infrastructure and basic service sector providers, national statistics offices, finance ministries, women and youth organizations, vulnerable communities, NGOs, research institutions and the private sector would ensure multiple sectors and stakeholders are engaged. At national level, Egypt has established policy coherence with the NSDRR 2017–2030, which states that integrating DRR into sustainable development policies is a main priority area, in particular in the sustainable development strategy, Vision 2030 of Egypt. The NSDRR recognizes that DRR is best addressed by developing a defined vision and specific plans, specializations and tasks, and high-level coordination between sectors. It prioritizes investment in the development of early warning systems to enhance preparedness and promotes insurance tools for risk transfer, both of which build private sector and community resilience against climate change.<sup>565</sup>

Strengthening legal and institutional support from national to local level and to other stakeholders, including communities, NGOs and the private sector, to help develop financial mechanisms to invest in DRR (as highlighted in the AAAA) is another factor that can expedite financing and implementation of DRR strategies. Some countries, such as Bahrain, Egypt, Jordan, Kuwait and the United Arab Emirates, have recognized the role of the private sector for partnership and insurance. The UNDRR-ROAS is also supporting countries to establish ARISE (Private Sector Alliance) Networks, including the ARISE UAE network that was successfully formed with a strong commitment to enabling the private sector to play a role in DRR.

Capacity-building is required at national and local levels to assess and enhance governance to manage systemic risks, develop institutional frameworks for engaging the private sector in DRR, and improve monitoring progress and reporting and accountability for implementing DRR strategies. Capacity-building is required at local administrative level to develop DRR strategies, effective communication, inclusive and resilient urban development strategies, and resilient infrastructure and basic service networks.

Enhancing understanding of systemic risks, and the regional and national capacity to successfully manage them, requires new governance structures, including improved multisectoral and multi-stakeholder participation from the private sector, civil society, women, youth, NGOs and community-based organizations, the elderly, persons with disabilities, refugees and internally displaced persons. It also requires multilevel public sector partnerships with vertical coordination mechanisms (national and subnational governments) and horizontal ones (ministries and regions). Contextualizing GRAF guidance on systemic risks is a useful way forward.<sup>566</sup>

### 2. Vulnerability-disaggregated data and inclusive vulnerability reduction for rural and urban contexts

This RAR has identified key challenges that must be addressed to allow for a truly inclusive approach to risk assessment, policy formulation and risk reduction. These include assessing social factors contributing to vulnerability, adopting inclusive community-based DRR strategies that account for indigenous knowledge, engaging the private sector in understanding risk, engaging and sharing disaster risk information with stakeholders, and generating disaggregated risk information to inform vulnerability analysis and policy formulation.

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<sup>565</sup> Egypt, Government of Egypt, 2017.

<sup>566</sup> Global Risk Assessment Framework. Available at <https://www.preventionweb.net/disaster-risk/graf>.



### **a. Generation of vulnerability-disaggregated risk information and engagement with vulnerable groups to enhance policy**

The development of refined disaggregated data – on the basis of age, sex/gender, economic condition, ethnicity, nationality, immigration status and disabilities – on the drivers of disaster risk and climate change, and associated losses arising from them, would create a more accurate picture of vulnerable groups (children, youth, women, economically marginalized persons, older persons, persons with disability, migrants), and of the successes and challenges of vulnerability reduction initiatives. This would help ensure that CCA, risk reduction and sustainable development policies, laws, plans and budgets are designed in a coherent manner, increasing the likely success of leaving no one behind and endeavouring to reach the furthest behind first.

Engagement with vulnerable groups would help ensure an inclusive, participatory approach is adopted in the review of policy and programmatic decision-making and implementation mechanisms related to CCA, risk reduction and sustainable development. This would also assist in the adoption of a whole-of-government and whole-of-society, multi-stakeholder, multisectoral approach that brokers collaborative and coordinated action and capacity development of relevant government ministries and departments,<sup>567</sup> parliamentarians and civil society.<sup>568</sup>

### **b. Capacity-building to reduce vulnerability**

Developing the capacities of government and civil society actors would contribute to an enhanced understanding of the conceptual linkages between DRR, climate change, sustainable development and migration, and the priorities of different vulnerable groups across these linked agendas. This would provide insight on how to mainstream, implement, monitor and evaluate measures linking CCA and risk reduction into development instruments to reduce the vulnerability of different groups.

Building the capacity of local government and vulnerable communities, while also engaging these communities, would contribute to well-designed, sustainably financed, scalable, community-based pilots that link the CCA, sustainable development and risk reduction priorities of different vulnerable groups.

## **3. Technology and data sharing**

The science-policy interface is an enabler for DRR. The Sendai Framework calls for enhanced science and technology work in DRR, and gives a clear mandate to the community to work in a transdisciplinary manner to develop the knowledge and technology needed to save lives and reduce disaster losses. The Sendai Framework also calls for evidence-based decision-making.

### **a. Hazard, vulnerability and risk information**

The Sendai Framework emphasizes risk-informed decision-making through open disaggregated data sharing for gender, age and disability. Lack of data, due to gaps in data availability, quality/aggregation issues and accessibility constraints, is one of the major obstacles hindering integrated DRR actions at national, sectoral and urban levels in the Arab region. Moreover, considerable gaps are reported in fragile and conflict-affected contexts that suffer from specific problems in data collection, analysis and sharing. Developing such information will allow for meaningful cross-sectoral and multi-stakeholder linkages of DRR efforts and strategies, which will facilitate a more efficient use of resources for reducing risk. Developing disaggregated data will also accelerate linkages between CCA, sustainable development, conflict mitigation, urban development and humanitarian response efforts. A way forward is to strengthen DRR legislative systems, currently divided across ministries and agencies. Strengthening data mechanisms is also necessary to improve the process of addressing and reducing exposure, vulnerabilities, risks and losses, as well as displacement trends.

The multiplier characteristic of water scarcity with regards to hazards affecting food security – drought, floods and flash floods, transboundary animal and plant pests and diseases, and socioeconomic shocks – is cross-border in nature, which necessitates regional collaboration to better understand the risk. In particular, regional collaboration is necessary for deploying information systems integrating multiple risks. Such systems are essential for early warning, anticipation and mitigation actions to ensure that primary support reaches the most vulnerable.

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<sup>567</sup> These include environment, agriculture, urban affairs, industry, women, labour, health, foreign affairs, home, planning and finance.

<sup>568</sup> This should include academic and research institutions in pure, applied and social sciences, the private sector, NGOs and community-based organizations working on sustainable development, climate action, DRR, migration, gender, children/youth/older persons and persons with disabilities.

Regional cooperation is an opportunity to improve systems for collecting, analysing and sharing missing data, in particular for hazards and risks common to the region, for cross-border hazards and risks, and for complex and systemic risks. In an attempt to address this issue, UNDRR initiated an Arab States DRR Partnership Group as a community of practice to advocate data sharing and aligned actions for DRR at local, national and regional levels. This regional mechanism facilitates discussion of DRR among Arab governments and international partners working in the region to collectively develop, implement and assess DRR actions.

### **b. People-centred, multi-hazard, early warning systems**

The Sendai Framework, in its target G, calls for a substantial increase in the availability of and access to MHEWS. Some countries such as Bahrain, Jordan, Qatar and the United Arab Emirates have advanced early warning technologies, while others, including Algeria, Comoros and Djibouti, depend on regional weather forecasts made available to them. Further, community-based early warning systems are not given due importance. Existing systems mostly provide information based on weather events and are not multi-hazard in nature. Lack of reliable information on various aspects linked to disaster risk and food security is a key gap in the region, highlighting the importance of investing in food security and nutrition information systems. One way forward is to first assess, regionally and nationally, gaps and linkages in the four elements necessary for the functioning of people-centred MHEWS, which are multi-hazard risk assessment, prediction and forecasting, messaging and dissemination, and response. Improving hazard- and risk-disaggregated information may then be used to strengthen linkages between the elements and act as an enabling factor towards developing evidence-based strategies, policies and programmes that can prevent and mitigate the impacts of shocks across the three main agendas of DRR, CCA and the SDGs.

### **Box 8.7** *Geoinformation for disaster risk reduction/decision-makers*

Emphasizing the need for capacity-building in disaster risk mapping and management, the sustainable natural resource management platform and early warning system was established by the Lebanese CNRS in 2014 to assist the DRM Unit. Equipped with skilled experts, hardware, software, an Internet-based satellite receiving station and associated infrastructure for producing and storing geoinformation, it assists both emergency operations and prevention and preparedness actions, serving stakeholders and decision-makers in DRM. The platform currently provides daily predictions for the next 72 hours for forest fire potential across Lebanon. A risk bulletin is released on a daily basis, along with alert messages via mobile apps to all stakeholders in each municipality and district where the fire risk index is between high and extreme.

### **c. Data science and interoperability of data**

Using existing geospatial automated models for remote data capture (remote sensing data, climate data, agricultural and population statistics) to collate data on Sendai Framework indicators would generate datasets to inform the Sendai Framework monitor and help ensure a coherent approach to CCA, DRR and the SDGs. It would also mitigate existing data collation challenges, including in environments where insecurity or low prioritization impedes collection on the ground.

The use of interoperable information would facilitate organizations' data entry and analysis. For example, bottom-up approaches have the potential to improve data resolution and disaggregated data. Data innovations by the science and technology community, such as mainstreaming integration of geospatial information and citizen-generated data and investing in the physical infrastructure of the information technology sector, would contribute to online reporting and loss accounting at all administrative levels. Building capacity in cartography and geospatial data, and aligning regional targets and indicators (for countries with similar geopolitical and hazard profiles) to enable spatial comparisons is necessary. Better data management, dissemination and sharing among stakeholders, including CSOs, the private sector and communities, is best achieved through legislation. One way forward is to strengthen the role of national statistics offices, research centres and remote-sensing centres in DRR practices to improve the science-policy interface.

#### **d. Technology facilitation mechanisms**

The AAAA seeks the creation of a technology facilitation mechanism to strengthen global cooperation for access to science, technology and innovation and to support the goals of sustainable development. At international and regional cooperation levels, Arab states in Africa stand to gain from the European Union and the African Union uniting their research communities around flagship projects such as the H2020 and Africa Centres of Excellence funded by the World Bank. It would be helpful to develop similar cooperation initiatives in the Arab region.

### **4. Enabling environment for integrated risk reduction at urban levels**

Several countries in the region are embarking on projects to improve urban governance, integrate DRR into their development plans and build urban resilience. The State of Palestine is adopting spatial planning interventions, characterized by a participatory approach focused on vulnerability. Aqaba in Jordan is integrating DRR into city development and land-use planning to build resilience to floods and earthquakes. Ain Draham in Tunisia is designing flood risk governance mechanisms using a partnership framework with the private sector and NGOs. Lebanon conducted detailed hazard and risk assessment of riverine and flash floods across the country, with the results and recommendations mainstreamed in the general urban planning scheme and as an action plan for stakeholders. Dubai is developing an institutional framework to enable stakeholders to conduct a comprehensive urban risk assessment and mobilize resources for DRR. But cities in the region face a multitude of challenges and growing vulnerabilities associated with rapid and haphazard urbanization. Such challenges are best addressed through improving risk governance in all its dimensions, namely by empowering local authorities with mandates to build urban resilience and reduce risk, adopting a participatory approach to engage all stakeholders, enhancing inclusive governance of informal areas, building urban resilience in conflict situations and investing in urban infrastructure.

#### **a. Governance and financial capacity**

The role of local governments in building urban resilience and addressing the multiple risks associated with urbanization is central to sustainable urban development processes. DRM at local level needs to be based on an understanding of risks and vulnerabilities to inform decision-making and to incorporate DRR considerations in urban planning.<sup>569</sup> DRR efforts must be mainstreamed throughout formal and informal planning processes and the entire planning cycle, and integrated into the planning system as such, including legal and regulatory frameworks and financing arrangements.<sup>570</sup>

Delineation of mandates and allocation of resources at local level would help address the scarcity of data to measure urban resilience. Building capacities and mobilizing resources for partnerships, and multisectoral and multi-stakeholder engagement helps coherence and integration efforts to bring about local resilience building. Stronger legislative mechanisms would also expedite the engagement of cities and international actors with private sector actors, academic organizations, civil society, vulnerable communities and other stakeholders to ensure a coherent whole-of-society approach to DRR and climate resilience building.<sup>571</sup>

#### **b. Inclusive governance of informal urban areas**

Complex and multidimensional urban challenges have led to the emergence and growth of informal settlements, and increased the influx of people to informal areas to seek safety and access to housing and job opportunities. Informal settlement dwellers in the region are often exposed to factors that increase their vulnerability, including lack of tenure security, poor access to basic urban services and infrastructure facilities, location in unsafe or hazardous areas, social stigmatization that often obstructs the ability to access formal livelihood opportunities, and poor health conditions. As informal areas increasingly become integral parts of the urban fabric, more attention and resources need to be given to integrating and upgrading them in urban planning policies. Socioeconomic and environmental aspects must be considered, to mitigate the socioeconomic exclusion that acts as a key driver for violent extremism and conflict.

Evidence has shown that adopting a people-centred approach to urban and land-use planning, in addition to enforcing laws and building regulations to ensure sustainable urban development, can reduce urban vulnerabilities and exposure to risks.

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569 UNDP, 2018b.

570 UNDRR, 2020c.

571 UNDRR, 2013a.

### **c. Build back better as entry point for urban resilience in cities affected by conflict**

Building urban resilience in cities affected by conflict and those facing humanitarian situations and an influx of migrants requires careful consideration in urban resilience strategies of the special requirements and vulnerabilities of refugees and internally displaced persons, including poverty, gender considerations, youth and human rights. There is a growing need to develop durable solutions for displaced persons and returnees in Arab cities to ensure their long-term safety, security and local integration. Recovery is an opportunity to build back better, in a more sustainable and inclusive way, reduce future disaster risks through risk-informed development measures and build more resilient infrastructure networks and associated basic services, and an entry point to link DRR, the SDGs and CCA efforts with conflict rehabilitation and reconstruction efforts.

### **d. Building resilient urban infrastructure**

Target D of the Sendai Framework promotes resilient infrastructure and seeks a reduction in damage to critical infrastructure. In the region, unplanned urban development along with poor networks of roads, communication, electricity and drainage are frequently observed. Vulnerable infrastructure leads to the creation of systemic risks with cascading effects. While efforts have been directed at shifting towards green infrastructure, the scale of investment is still limited in comparison with needs and the scale of challenges. This is exacerbated by the fact that critical infrastructure is often targeted in conflict areas.

Developing critical infrastructure protection plans, strategies and policies that consider these infrastructure sectors as one interlinked network/system can help significantly reduce damage and interruption to basic services. This can act as an entry point to create linkages to CCA and SDG efforts. Such plans are usually based on treating infrastructure sectors as one network, with interlinked characteristics of resistance, reliability, redundancy, response and recovery.

## **5. Innovative finance mechanisms as a means of implementing national strategies and an entry point for coherent integration with climate change adaptation and the SDGs**

The Sendai Framework recognizes that effective implementation of national DRR strategies depends on the resources made available at global, regional, national and local levels. Priority action 3 therefore calls for greater investment in DRR. Access to sustainable finance is a prerequisite for enabling a suitable environment for DRR, especially in countries in the region already suffering from economic crises. National DRR strategies recognize the importance of finance without identifying funding sources for implementation. However, the AAAA, the Agenda for Humanity and the Warsaw International Mechanism for Loss and Damage associated with Climate Change focus attention on funding DRR through the prism of sustainable development and CCA.

The AAAA promotes the consideration of climate and disaster resilience in development finance and calls for diversifying financing mechanisms and using innovative instruments that allow countries to better prevent and manage risks. It recommends strengthening the capacity of national and local actors in the management and monitoring of DRR financing. The agenda prioritizes financial measures targeting vulnerable groups and employment generation, such as social protection schemes, access to basic health services and support to micro, small and medium-sized enterprises. Through a five-point plan, the Agenda for Humanity seeks increased national resources for risk mitigation, including through extending tax coverage, better spending efficiency, emergency reserve funds, devoted budget lines for DRR activities and risk transfer through risk insurance. It calls on developed countries to devote at least 1 per cent of their ODA to DRR activities by 2020. Arab countries spend on average 0.6 per cent of their annual public budget on DRR, unlike the best performing countries, which spend an average of 2.4 per cent. The Warsaw International Mechanism was mandated to promote implementing approaches to address loss and damage caused by the adverse effects of climate change, including support for finance, technology and capacity-building.

At regional level, however, significant gaps remain in resource allocations for DRR, a major challenge for national and local authorities, civil society and other stakeholders. As part of the ASDRR 2030, the League of Arab States called on member States to substantially increase their participation in DRR actions and to allocate a minimum 1 per cent of national funding to developing and implementing DRR measures. This remains below the level in developed countries; in Japan, for example, more than 5 per cent of the general national budget is earmarked for mitigation, preparedness, and response and recovery measures.<sup>572</sup>

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572 Phaup and Kirschner, 2010.

## a. Strengthening the case for investment in disaster risk reduction

Traditional arguments focused on the value of disaster risk and resilience investments fail to appeal to stakeholders in environments with significant resource constraints or where resources are allocated to conflict or to responding to the fallout of conflict. Arguments for DRR interventions must be relative to the operational realities across all stages of the DRR cycle, including prevention, mitigation, preparedness, response and recovery. Developing evidence to strengthen the case for DRR in fragile and conflict contexts and the return on investment through case studies and key advocacy messages for use with governments and donors is one way forward. Leveraging the information provided by peacebuilding actors in the region, the DRR community can better position interventions to reduce drivers of fragility and conflict, thereby increasing its appeal.

Further, DRR interventions should identify context-specific arguments in settings where non-traditional actors are major powerbrokers and governance systems are ruptured or not responsive to community needs. This means exploring processes to decentralize DRR in non-permissive environments away from national stakeholders and generating localized DRR responses. In this manner, DRR investment in fragile and conflict contexts in the region can be attached or mainstreamed in ongoing peacebuilding and emergency or post-conflict recovery programmes.

## b. Linkages with tools for sustainable development

Arab countries have access to a diverse pool of financial mechanisms and tools to support DRR, and more broadly, sustainable development, including ODA, foreign direct investment, mechanisms associated with the World Bank, OPEC Fund for International Development, GEF, Global Climate Funds, European Bank for Reconstruction and Development and Islamic Development Bank.<sup>573</sup>

There is limited data to rigorously monitor ODA expenditure, particularly that related to DRR. GAR19 indicates that within the framework of the Global Readiness Review for monitoring achievement of Sendai global targets, in particular target F,<sup>574</sup> only 38 per cent of responding countries reported sufficient data to inform indicator F-1 relating to ODA and other total international flows. Analysis of global data provided by the OECD for the period 2005–2017 showed that spending for DRR amounts to \$5.2 billion, or 3.8 per cent of the total amount. Most of the ODA – \$122 billion, or 89 per cent – is spent on emergency response, while \$9.84 billion is dedicated to aid for reconstruction and rehabilitation.

At national level, tracking ODAs and other international flows is also complicated. This is confirmed by the Arab Sustainable Development Report 2020 that states that the indicators corresponding to SDG 17 on strengthening the means of implementation and revitalization of the global partnership for sustainable development are not sufficiently available, in particular those concerning indicator 17.3.1, "... foreign direct investments (FDI), official development assistance and South-South cooperation".<sup>575</sup>

The flow of total ODA provided to Arab countries from outside the region has increased substantially since 2011 but remains volatile, fluctuating from year to year. A significant portion is devoted ex post to refugees and humanitarian aid, particularly in the Syrian Arab Republic, Somalia and Yemen (figures 8.1 and 8.2). A significant portion of funding for DRR would appear to be devoted to preparedness and recovery, to the detriment of that devoted to risk assessment and risk reduction. In addition, sectoral distribution of ODA in the region shows declining trends in aid flows to education, health, water supply and sanitation sectors.

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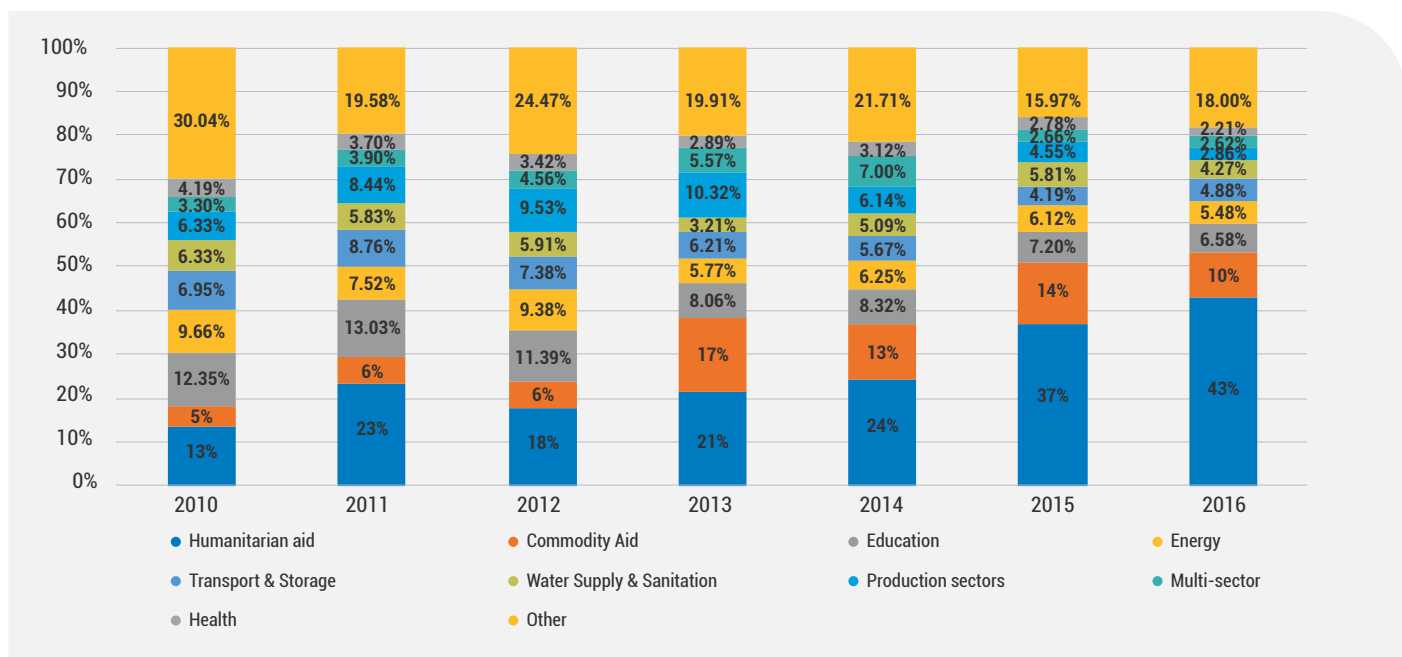
573 AFED, 2018.

574 Target/objective F encourages strengthening international cooperation with developing countries through adequate, sustainable support for their action plans. Three indicators measure official international support for national DRR actions. This support takes the form of ODA in addition to other total international flows (indicator F-1), delivered via multilateral agencies/organizations (indicator F-2) and/or bilateral (indicator F-3).

575 UNESCWA, 2020b.

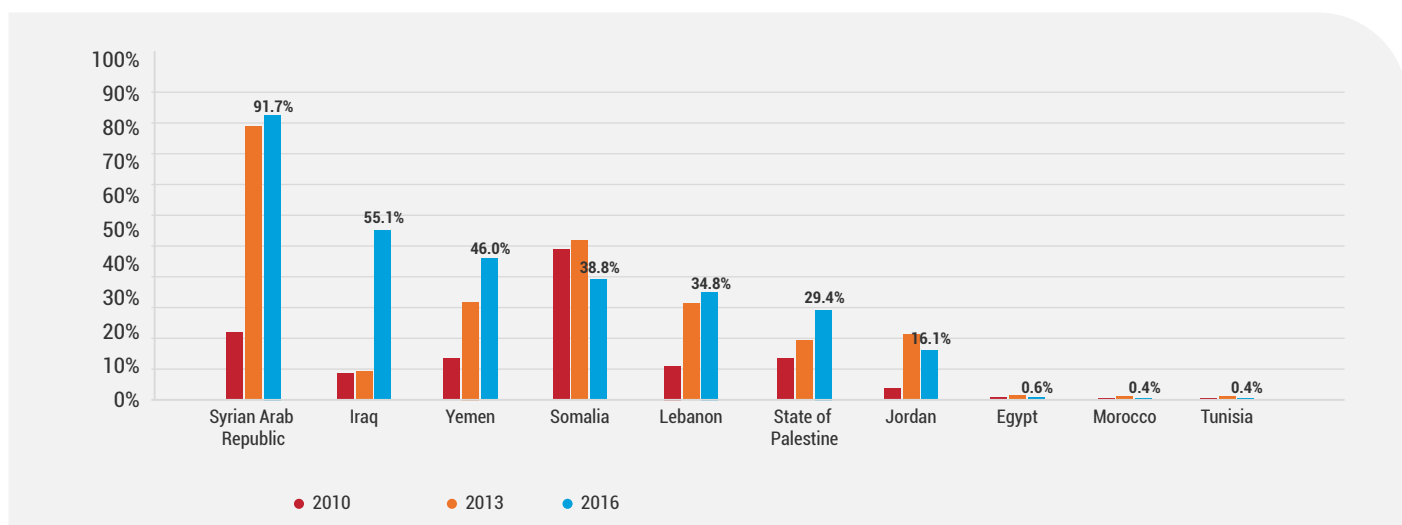


Figure 8.1 Distribution of ODA to Arab countries, by sector



Source: AFED, 2018; OECD, "International Development Statistics". Available at <http://stats.oecd.org/qwids> (accessed on 15 March 2021).

Figure 8.2 Share of humanitarian aid in relation to ODA expenditure for 10 main recipient countries, Arab region



Source: AFED, 2018; OECD, "International Development Statistics". Available at <http://stats.oecd.org/qwids> (accessed on 15 March 2021).

### c. Innovative financing

To mobilize additional resources for development and supplement traditional international resource flows, Arab countries are piloting innovative financial instruments, mainly through multilateral organizations, to scale up climate finance and accelerate funding and partnerships to synergize new finance opportunities under national SDG and CCA plans. Recent initiatives also associate additional financing with the notion of results, such as result-based financing, performance-based contracting and debt transformation for development.

One way to proceed is to expedite the establishment of the SDIC regional centre for sustainable finance that will help shape future SDG investments, increase the number of PPPs and use of blended financing instruments, and improve reporting on the business impact on SDG achievements.

## 6. Risk reduction in conflict and fragile countries

The widened scope of the Sendai Framework and the need to integrate with other post-2015 frameworks requires DRR practitioners to embed strategies and policies in the strategic socioeconomic, development and conflict mitigation priorities of the country under consideration.

The setting and the level of conflict significantly alter the opportunities and challenges, and the stakeholders available to successfully implement DRR interventions. To integrate more efficient, flexible and context-adapted programming, the DRR community must better integrate research and data on ongoing conflict dynamics across the region to develop guidance on different types of conflict, available resources, coordination mechanisms, access and approach. This type of analysis will likely come from collaboration with peacebuilding actors and will be invaluable in developing efficient DRR responses. Efforts should be directed at enhancing the understanding of all stakeholders, including the DRR community and donors, that DRR and climate change are both important pieces of the HDPN and prevention agendas to ensure that a DRR and climate perspective is applied to all peacebuilding and recovery investments.

At regional level, there are multiple operational examples of DRR being implemented in fragile and conflict settings. The DRR community at regional and national level should work to harness this operational learning to deepen the understanding of approaches and best practices to implement DRR in conflict-affected and fragile settings. The catastrophe-conflict-fragility link in the region was recognized in the Tunis declaration, an outcome of the 2018 Africa-Arab Platform on DRR.

### a. Building capacity for integrated and coherent conflict-sensitive disaster risk reduction strategies

Conflict analysis and sensitivity should be integrated into the identification, design and implementation of DRR programmes through the creation of appropriate guidance and tools, and training and capacity-building for DRR practitioners. The required skillset will result from cooperation between the CCA, humanitarian, peacebuilding, development and DRR communities. Mainstreaming conflict-sensitive approaches in the DRR community can be achieved through forums that engage peacebuilding and DRR actors. Risk analysis in affected settings should reflect on how a community or society has adapted to the pressures of conflict and integrate this in the design of DRR interventions.

Institutional arrangements and regional cooperation have a part to play in collecting, analysing and advocating good practices to promote cross-pollination and dissemination in other cases and places of intervention. Another part will be in supporting implementation of the Sendai Framework in conflict zones, building on recent initiatives such as the joint agreement between UNDP and the UNDRR, which seeks to integrate DRR into national planning and decision-making process, and the CADRI Partnership that integrates conflict sensitivity into its diagnosis and planning for DRR.

### b. Displacement as an entry point

Policy architecture addressed through a displacement perspective could provide a viable entry point to advance DRR in the region. Significant conflict and disaster-induced displacement provides a relevant link between disaster and conflict. Integrating DRR policies in active ventures to resolve the vulnerabilities created through displacement can advance DRR in conflict settings.

At community level, engaging displacement-affected populations, including internally displaced persons and host communities, provides an opportunity to better integrate localized sociocultural and conflict dynamics into the design of DRR interventions, alongside the preferences and coping strategies of the affected populations. In situations where governance structures are weak or impeded, community-centred approaches can create the foundations for broader national advancements in DRR. Mobility dimensions should be better integrated in DRR responses. Including human mobility patterns and mobile populations in DRR will ensure newly settled communities and those that are still mobile are informed and engaged in DRR. This is central to ensuring affected populations have ownership and are engaged in the design and implementation of DRR strategies. It also enables strategic partnerships across the HDPN.

### c. Climate change as an entry point

With increased focus on CCA, there are opportunities to make the link with conflict over key regional issues such as water scarcity, flooding, rising sea levels and unsustainable temperatures, and the role of DRR.

In Somalia, the IOM has integrated DRR mechanisms such as water and sanitation management in camps, building resilient infrastructure to reduce the risk of flooding. This has been achieved partly through reforestation. Another example at country level is reported in Yemen, where drought risk reduction has been used by FAO and IOM to mitigate conflicts related to water scarcity. These experiences indicate it is possible to integrate DRR into humanitarian assistance activities, and support post-conflict recovery, rehabilitation and reconstruction plans, by collaborating with peacebuilding actors and those intervening in the aftermath of conflicts, using building back better, priority 4b of the Sendai Framework.

## 7. Food security under water scarcity

### a. Food security and nutrition information systems

Investing in food security and nutrition information systems is key to strengthening reliable data on various aspects linked to the disaster risk and food security nexus. This would significantly improve early warning and anticipatory actions, which have considerable impact on preventing and mitigating the impact of shocks. Reliable information systems would also help ensure that different categories of vulnerable people receive the right support at the right time, thereby contributing to the new humanitarian agenda of leaving no one behind and endeavouring to reach the furthest behind first.

### b. Evidence-based risk-informed policies

Using information systems to help develop evidence-based and risk-informed policies is indispensable for effective DRR in the agriculture, energy and water sectors, all of which are crucial to food security. Evidence-based food security policies would help shift focus from increased production towards sustainable management of natural resources. This may be achieved by reforming policies to increase water efficiency in agriculture, including moving from cereal cultivation to more horticultural-based farming. As horticulture can provide smallholders with a better living, these policies can be part of the agricultural transformation required in the region to close the rural-urban gap in productivity, poverty and public services.

### c. National and regional collaboration

Strong national and regional coordination between different sectors to ensure policy coherence is necessary to address the systemic, transboundary nature of hazards and risks related to food security. For instance, addressing volatility to economic shocks requires institutional frameworks, policies and actions related to agriculture and trade.

### d. Disaster risk reduction investments at institutional and farm levels

Properly designed and implemented and mutually reinforcing DRR interventions at institutional and farm levels can address multiple hazards related to food security, holistically and sustainably, and present a way to enhance the resilience of farming families to natural hazards.<sup>576</sup> The full package of climate-smart agriculture and implementation of agroecological approaches would reduce vulnerability to climatic shocks and also result in valuable environmental benefits. Using drought-resistant seeds and adopting good agricultural practices would build resilience to the increasing droughts and dry spells experienced in the region, such as the recent one in the Maghreb countries.

At institutional level, implementing well-designed agriculture insurance schemes would help reduce the impact of disasters, particularly drought and transboundary animal diseases, on smallholders, and contribute to valuable economic benefits.

Implementation of various safety net interventions would support vulnerable groups with anticipated and uninterrupted access to cash to ensure access to adequate and healthy food and other basic necessities. Related safety net interventions would also significantly reduce the cost of livelihood-based responses.

### e. A holistic resilience-building approach

A holistic resilience-building approach represents a sound entry point to ensure that people's vulnerabilities to multiple shocks are coherently addressed. In countries receiving humanitarian assistance, such approaches would be

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576 FAO, 2018b.

implemented under the overall framework of the HDPN to ensure the response measures reinforce social and economic developments while protecting the environment.

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## D. Closure

Since GAR11, it has been clear that exposure, vulnerability and risks – as opposed to natural hazards – are directly related to development pathways. The Sendai Framework and GAR19 further enhanced the understanding of risks by identifying emerging systemic risks across and within natural, environmental, health, social, economic and physical systems. This RAR-Arab States highlights emergent systemic risks, which bring high degrees of uncertainty, interacting with existing uncertainty related to climate change impacts. This requires a new approach for the governance of systemic risks, based on more transparent, inclusive and coherent strategies and policies across systems and frameworks.

The expanded scope of the Sendai Framework is a starting point, complemented by GAR19 and GRAF at international level, and more recently by this **RAR** at regional level. Designing, financing and implementing coherent, national and local DRR, CCA, inclusive urbanism and sustainable development strategies that leave no one behind and endeavour to reach the furthest behind first is a complex task, particularly in countries in the region subjected to or impacted by conflict. It requires context-specific, good-practice principles for risk-informed sustainable development that is also informed by international best practice.

Effecting change, however, is more than simply developing the required policies and capability of governments and other development stakeholders. Achieving a paradigm shift requires capabilities, agency and a value change. GAR19 recognized important paradigms with critical impacts on DRR and resilience-building efforts, namely the pervasive extraction-production-distribution-consumption-disposal linear process of resource use in the current economic paradigm. It highlighted the systemic nature of risk, enshrined in the 2015 agreements on climate change, sustainable development and DRR, and called for a fundamental change in approach, to adopt systems-based approaches and work in new ways to collaboratively reduce the creation of new risk and manage the existing stock of risk. Further, GAR19 emphasized the need for a new paradigm for understanding and living with uncertainty and complexity. Crucially, it reminded us that disasters are not natural but a product of the interaction between naturally occurring events and human agency. Finally, GAR19 reiterated that paradigms are not corrigible by normal science and that paradigm change is a value change<sup>577</sup>.

Similarly, the Human Development Report 2020 highlighted the three critical dimensions of human development, namely capabilities, agency and values, drawing special attention to our interactions with nature – to our stewardship of the planet.<sup>578</sup> This RAR-Arab States argues that for the Arab region – which is facing a multitude of systemic risks, against a backdrop of inequality, vulnerability and fragility, non-sustainable consumption and production patterns, and conflict – to push forward a resilient, inclusive sustainable development while managing and mitigating systemic risks, it must clearly and promptly address the three dimensions of human development.

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577 Kuhn, 1962.

578 UNDP, 2020.

# References

Abdallah, Chadi, and others (2018). Agricultural risk assessment for Lebanon to facilitate contingency & DRR/CCA planning by the Ministry of Agriculture (MoA). Beirut: National Council for Scientific Research and Food and Agriculture Organization of the United Nations.

Abdel-Dayem, Safwat, and Rachael McDonnell (2012). Water and food security in the Arab world. In *Integrated Water Resources Management in the Mediterranean: Dialogue Towards New Strategy*, Redouane Choukr-Allah, Ragab Ragab and Rafael Rodriguez-Clemente, eds. Springer.

Abdel Rahman, Tomader Taha, and Maha El Gaafary (2012). Elder mistreatment in a rural area in Egypt. *Geriatric Gerontology International*, vol. 12, No. 3 (July).

Abouzeid, Marina, and others (2020). Lebanon's humanitarian crisis escalates after the Beirut blast. *The Lancet*, vol. 396, No. 10260 (October 2020).

Abu Dhabi Global Environmental Data Initiative (AGEDI), National Centre for Atmospheric Research (NCAR) and Climate Change Research Group (2015). Regional atmospheric modelling. Policymaker summary for AGEDI's Local, National and Regional Climate Change Programme.

ACAPS (2018). Somalia: Somaliland (Awdal and Woqooyi Galbeed). Tropical storm Sagar – update I, 30 May. Available at [https://www.acaps.org/sites/acaps/files/products/files/20180530\\_acaps\\_short\\_note\\_somalia\\_tropical\\_cyclone\\_sagar\\_update\\_i.pdf](https://www.acaps.org/sites/acaps/files/products/files/20180530_acaps_short_note_somalia_tropical_cyclone_sagar_update_i.pdf).

Adams, Barbara, and Gretchen Luchsinger (2009). *Climate Justice for a Changing Planet: A Primer for Policy Makers and NGOs*. Geneva: United Nations Non-Governmental Liaison Service.

ADRA-Sudan, Land Use Desertification Control Administration and University of Khartoum, Institute of Environmental Studies (1999). Um Jawasir impact assessment end-line survey.

Al-Ansari, Nadhir, and Sven Knutsson (2011). Toward prudent management of water resources in Iraq. *Journal of Advanced Science and Engineering Research*, vol. 1.

Arab Center for the Studies of Arid Zones and Dry Lands (ACSAD) and United Nations Office for Disaster Risk Reduction (2011). *Drought Vulnerability in the Arab Region: Case Study – Drought in Syria, 10 Years of Scarce Water (2000–2010)*.

Arab Forum for Environment and Development (AFED) (2017). *Arab Environment in 10 Years: 2017 Report of the Arab Forum for Environment and Development*, Najib Saab, ed. Beirut, Lebanon: Technical Publications.

\_\_\_\_\_ (2018). *Financing Sustainable Development in Arab Countries: 2018 Report of the Arab Forum for Environment and Development*, Najib Saab and Abdul-Karim Sadik, eds. Beirut, Lebanon: Technical Publications. Available at [http://www.afedonline.org/uploads/afed\\_reports/AFEDReport-financingSDinArabCountries2018-.pdf](http://www.afedonline.org/uploads/afed_reports/AFEDReport-financingSDinArabCountries2018-.pdf).

Arab NGO Network for Development (ANND) (2019). *Arab Watch on Economic and Social Rights: Right to Food*. Available at <http://annd.org/arabwatch2019/righttofood/en/index.pdf>.

Arab Organization for Agricultural Development (AOAD) (2018). *The First Arab Report on the Arab States' Efforts to Combat Desertification and Achieve Land Degradation Neutrality*. Khartoum, the Sudan.

Arab Water Council (2014). *Region coordination on improved water resources management and capacity building programs. Main challenges in MENA*. Available at [http://www.arabwatercouncil.org/index.php?option=com\\_content&view=article&id=463:region-coordination-on-improved-water-resources-management-and-capacity-building-programs&catid=160&Itemid=576&lang=en](http://www.arabwatercouncil.org/index.php?option=com_content&view=article&id=463:region-coordination-on-improved-water-resources-management-and-capacity-building-programs&catid=160&Itemid=576&lang=en).

Aqaba Special Economic Zone Authority (ASEZA), and United Nations Office for Disaster Risk Reduction (2016). *The Aqaba Risk Reduction and Resilience Action Plan*.

Assad, Ruby (2010). Field notes on the gender-related aspects of a GTZ community-based water management project in the Republic of Yemen. Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH GTZ.



- Augustin, Ebba, and Ruby Assad (2010). Gender strategy: Component 4. Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH GTZ Water Programme - Yemen.
- Azour, Jihad (2019). Poor access to finance is holding back businesses in MENA. This is how we can help them. World Economic Forum.
- Bahrain, National Committee for Disaster Management (n.d.). *National Major Civil Contingency Strategy*.
- Baroud, Maysa (2017). Improving healthcare access for persons with disabilities in Lebanon: Together for justice in service provision. Policy Brief. Beirut: AUB Policy Institute.
- Benaim, Rachel Delia (2020). Unbelievably large swarm of locusts threatens Middle East, 18 March. Available at <https://weather.com/science/environment/news/2020-03-18-swarm-of-locusts-threatens-middle-east>.
- Bernal, Gabriel A., and others (2017). Integration of probabilistic and multi-hazard risk assessment within urban development planning and emergency planning and response: Application to Manizales, Colombia. *International Journal of Disaster Risk Science*, vol. 8.
- Boniol, Mathieu, and others (2019). Gender equity in the health workforce: Analysis of 104 countries. Working Paper 1. Geneva: World Health Organization.
- Boulghobra, Nouar, Merdas Saifi, and Lakhdari Fattoum (2015). Sand encroachment in the Saharan Algeria; the not declared disaster. Case study: In-Salah region in the Tidikelt.
- Burke, Marshall B., and others (2009). Warming increases the risk of civil war in Africa. *Proceedings of the National Academy of Sciences*, vol. 106, issue 49.
- Cardona, Omar Dario (2001). Estimación holística del riesgo sísmico utilizando sistemas dinámicos complejos (Holistic estimation of seismic risk using complex dynamic systems). Thesis. Universidad Politécnica de Cataluña.
- Cardona, Omar Dario, and others (2014). Global risk assessment: A fully probabilistic seismic and tropical cyclone wind risk assessment. *International Journal of Disaster Risk Reduction*, vol. 10.
- Carreño, Martha-Liliana, Omar Dario Cardona and Alex H. Barbat (2007). Urban seismic risk evaluation: A holistic approach. *Natural Hazards*, vol. 40.
- Center for Disaster Philanthropy (2020). People with disabilities. Available at <https://disasterphilanthropy.org/issue-insight/people-with-disabilities/>.
- Centre for the Observation and Modelling of Earthquakes, Volcanoes and Tectonics (2020). Volcano Database. Middle East and Indian Ocean. Jabal Yar. Available at <https://comet.nerc.ac.uk/volcanoes/jabal-yar/>.
- Centre for Research on the Epidemiology of Disasters (CRED) (2020). EM-DAT, International Disaster Database. Available at <https://www.emdat.be/>. Accessed on 26 March 2021.
- CGIAR Research Program on Water, Land and Ecosystems (2016). Six ways to increase productivity in flood-based farming systems. Available at <https://wle.cgiar.org/solutions/six-ways-increase-productivity-flood-based-farming-systems>.
- Chen, Martha, and Jenna Harvey (2017). The informal economy in Arab nations: A comparative perspective. Paper for Arab Watch Report on Informal Employment in MENA Region. Manchester, U.K.: Wiego Network.
- Cline, William R. (2008). Global Warming and Agriculture. *IMF Finance and Development*, vol. 45, issue 1. Available at [www.imf.org/external/pubs/ft/fandd/2008/03/pdf/cline.pdf](http://www.imf.org/external/pubs/ft/fandd/2008/03/pdf/cline.pdf).
- Cohen, Stewart, and others (1998). Climate change and sustainable development: Towards dialogue. *Global Environmental Change*, vol. 8, No. 4.
- Conacher, Arthur, and Jeanette Conacher (1995). *Rural Land Degradation in Australia*, D. Dragovich and A. Maude, eds. Melbourne, Victoria: Oxford University Press.
- Corral, Paul, and others (2020) Fragility and Conflict: On the Front Lines of the Fight against Poverty. Washington, D.C.: World Bank.
- Cutter, Susan L., Bryan J. Boruff and W. Lynn Shirley (2003). Social vulnerability to environmental hazards. *Social Science Quarterly*, vol. 84, issue 2 (June).
- D'Cunha, Jean (2018). Gender inclusive disaster risk reduction. Presentation for UN Women at the Africa-Arab Platform on Disaster Risk Reduction, Tunisia, October.
- \_\_\_\_\_ (2019). Women on gender, climate change and migration. Presentation for UN Women at Arab Sustainable Development Week 2019, November.
- \_\_\_\_\_ (2020). Impact of COVID-19 pandemic and drop in oil prices on women migrant workers in GCC and wider Arab region. Presentation for Center for Migration and Refugee Studies, Cairo, 22 June.
- Dabbeek, Jamal, and Vitor Silva (2019). Modeling the residential building stock in the Middle East for multi-hazard risk assessment. *Natural Hazards*, vol. 100.

- Darawcheh, Ryad, and others (2000). The 9 July 551 AD Beirut Earthquake, Eastern Mediterranean Region. *Journal of Earthquake Engineering*, vol. 4, issue 4.
- De Bono, Andrea, and Bruno Chatenoux (2015). A global exposure model for GAR 2015. Background paper for GAR 15. United Nations Environment Programme/GRID-Geneva.
- De Souza, Ken, and others (2015). Vulnerability to climate change in three hot spots in Africa and Asia: key issues for policy-relevant adaptation and resilience-building research. *Regional Environmental Change*, vol. 15, No. 5.
- De Waal, Alex (1997). *Famine Crimes: Politics and the Disaster Relief Industry in Africa*. Oxford: James Currey.
- Development Initiatives (2019). Towards an improved understanding of vulnerability and resilience in Somalia. Available at [https://reliefweb.int/sites/reliefweb.int/files/resources/Report\\_Towards-an-improved-understanding-of-vulnerability-and-resilience-in-Somalia.pdf](https://reliefweb.int/sites/reliefweb.int/files/resources/Report_Towards-an-improved-understanding-of-vulnerability-and-resilience-in-Somalia.pdf).
- Dilley, Maxx, and others (2005). *Natural Disaster Hotspots: A Global Risks Analysis*. Washington, D.C.: World Bank.
- Dockery, Wesley (2018). Where does the Arab world stand on female genital mutilation? DW Akademie, 6 February.
- Dubai, Dubai Police Force (2020). Dubai Resilience Strategy. Available at <https://u.ae/en/about-the-uae/strategies-initiatives-and-awards/local-governments-strategies-and-plans/smart-dubai-2021-strategy>.
- Egypt, Cabinet of Egypt, Information and Decision Support Center (2017). *National Strategy for Disaster Risk Reduction 2030*. Available at <https://www.preventionweb.net/english/professional/policies/v.php?id=57333>.
- Egypt, Central Agency for Public Mobilization and Statistics (2017). Percentage of housing units connected to the public water network. Available at [http://www.capmas.gov.eg/Pages/IndicatorsPage.aspx?Ind\\_id=4565](http://www.capmas.gov.eg/Pages/IndicatorsPage.aspx?Ind_id=4565).
- Egypt, Government of Egypt (2017). *National Strategy for Disaster Risk Reduction 2030*. Available at [https://www.preventionweb.net/files/57333\\_egyptiannationalstrategyfordrrengli.pdf](https://www.preventionweb.net/files/57333_egyptiannationalstrategyfordrrengli.pdf).
- Egypt, League of Arab States, and United Nations Office for Disaster Risk Reduction (2014). Second Arab conference on disaster risk reduction, Sharm El Sheikh, Egypt, from 14-16 September 2014. Available at <https://www.preventionweb.net/events/view/36370?id=36370>.
- El-Khولي, Ahmed C. (2019). Are Arab cities prepared to face disaster risks? Challenges and opportunities. *Alexandria Engineering Journal*, vol. 58, issue 2.
- Elmekki, A-G. (1999). Food crisis: Their roots in a country's political and developmental crisis. In *Ecology, Politics and Violent Conflicts*, Mohamed Suliman, ed. London: Zed Books.
- El-Zein, Abbas, and others (2014). Health and ecological sustainability in the Arab world: a matter of survival. *The Lancet*, vol. 383, issue 9915.
- The European and Mediterranean Plant Protection Organization (EPPO) (2005). Data sheets on quarantine pests. Available at <https://onlinelibrary.wiley.com/toc/13652338/35/3>.
- Evaluación de Riesgos Naturales (2020). Evaluación de Riesgos Naturales (Earthquake hazard map for North Africa).
- Fakih, Lama (2021). Where's the accountability for the Beirut blast? Nearly six months later, victims still await answers, 22 January. Available at <https://www.hrw.org/news/2021/01/22/wheres-accountability-beirut-blast>.
- Fanning, Emma (2018). *Drought, Displacement and Livelihoods in Somalia/Somaliland: Time for Gender-Sensitive and Protection-Focused Approaches*. Briefing Note. Concern Worldwide, Danish Refugee Council, Norwegian Refugee Council, Oxfam, Plan International, REACH and Save Somali Women and Children. Available at <https://policy-practice.oxfam.org.uk/publications/drought-displacement-and-livelihoods-in-somaliasomaliland-time-for-gender-sensi-620503>.
- Food and Agriculture Organization of the United Nations (FAO) (n.d.). Climate change and transboundary pests and diseases. Rome. Available at <https://www.farm-d.org/app/uploads/2012/05/i0142e06.pdf>.
- \_\_\_\_\_ (2008). AQUASTAT Country profile – Yemen. Rome.
- \_\_\_\_\_ (2015). *The Impact of Natural Hazards and Disasters on Agriculture, Food Security and Nutrition*. Rome 2015
- \_\_\_\_\_ (2017). AQUASTAT. Available at <http://www.fao.org/aquastat/statistics/query/index.html>.
- \_\_\_\_\_ (2018a). *Yemen: Plan of Action 2018-2020 – Strengthening Resilient Livelihoods*. Rome.
- \_\_\_\_\_ (2018b). *The Impact of Disasters on Agriculture and Food Security 2017*. Rome.
- \_\_\_\_\_ (2018c). Global body adopts new measures to stop the spread of plant pests, 18 April. Available at <http://www.fao.org/news/story/en/item/1118322/icode>.
- \_\_\_\_\_ (2019a). *The State of the World's Biodiversity for Food and Agriculture*, Julie Bélanger and Dafyd Pilling, eds. Rome: FAO Commission on Genetic Resources for Food and Agriculture.
- \_\_\_\_\_ (2019b) Regional Overview of Food Security and Nutrition: Near East and North Africa. Cairo.

- \_\_\_\_\_ (2019c). Employment indicators. FAOSTAT. Available at [www.fao.org/faostat/en/#data/OE](http://www.fao.org/faostat/en/#data/OE). Accessed on 16 July 2019.
- \_\_\_\_\_ (2019d). *Rural Transformation: Key for Sustainable Development in the Near East and North Africa*. Rome.
- \_\_\_\_\_ (2019e). Regional Dialogue on Biodiversity Mainstreaming Across Agricultural Sectors in the Near East and North Africa Region, 3-5 November 2019. Amman.
- Food and Agriculture Organization of the United Nations and Intergovernmental Technical Panel on Soils (ITPS) (2015). *Status of the World's Soil Resources*. Rome. Available at <http://www.fao.org/3/a-i5199e.pdf>.
- Food and Agriculture Organization of the United Nations, and others (2019). *The State of Food Security and Nutrition in the World 2019: Safeguarding against Economic Slowdowns and Downturns*. Rome.
- Food Security Information Network (FSIN) (2020). *Global Report on Food Crises 2020: Joint Analysis for Better Decisions*. Rome, Italy and Washington, D.C.: Food and Agriculture Organization, World Food Programme, and International Food Policy Research Institute (IFPRI).
- Food Security and Nutrition Analysis Unit (FSNAU) (2017). Risk of Famine Increases in Somalia. FSNAU-FEWSNet, 2 February.
- Fritz, Hermann, and others (2010). Cyclone Gonu storm surge in Oman. *Estuarine, Coastal and Shelf Science*, vol. 86, issue 1.
- The Fund for Peace (2020). *Fragile States Index 2020*. Available at <https://fragilestatesindex.org/data/>.
- Global Weather and Climate Centre (2019). Tropical Cyclone Kyarr: the strongest over the Arabian Sea in 12 years, 30 October.
- Harrison, Rhett D., and others (2019). Agro-ecological options for fall armyworm (*Spodoptera frugiperda* JE Smith) management: Providing low-cost, smallholder friendly solutions to an invasive pest. *Journal of Environmental Management*, vol. 243.
- Healy, Sean, and Sandrine Tiller (2014). *Where is everyone? Responding to emergencies in the most difficult places*. London: Médecins Sans Frontières. Available at <https://www.alnap.org/help-library/where-is-everyone-responding-to-emergencies-in-the-most-difficult-places>.
- HelpAge International (2019). *Age Inclusive Disaster Risk Reduction: A Toolkit*. Chiang Mai, Thailand.
- HelpAge International, and United Nations High Commissioner for Refugees (2000). *Older People in Disasters and Humanitarian Crises: Guidelines for Best Practice*.
- Henry Fountain (2015). Researchers link Syrian conflict to a drought made worse by climate change. *The New York Times*, 2 March.
- Hilhorst, Dorothea, and others (2019). *Disaster risk governance and humanitarian aid in different conflict scenarios*. Contributing Paper to GAR 2019.
- Hofste, Rutget Willem, Paul Reig and Leah Schleifer (2019). 17 countries, home to one-quarter of the world's population, face extremely high water stress. World Resources Institute blog, 6 August.
- Hoorweg, Daniel, and Perinaz Bhada-Tata (2012). *What a Waste: A Global Review of Solid Waste Management*. World Bank, Washington, D.C.: World Bank. Available at <http://documents1.worldbank.org/curated/en/302341468126264791/pdf/68135-REVISED-What-a-Waste-2012-Final-updated.pdf>.
- Hussein, Muawya Ahmed, (2008). Costs of environmental degradation: An analysis in the Middle East and North Africa region. *Management of Environmental Quality An International Journal*, vol. 19, issue 3.
- Ibish, Hussein (2017). *The UAE's evolving natural security strategy*. Washington, D.C.: The Arab Gulf States Institute.
- Ingeniar Ltda. (2014). *Country risk profile for Comoros*.
- Institute for Economics and Peace (IEP) (2018). *Global Peace Index 2018: Measuring Peace in a Complex World*. Sydney.
- Inter-American Development Bank (IDB) and Acclimatise (2020). *Increasing Infrastructure Resilience with Nature-based Solutions (NbS)*.
- Intergovernmental Panel on Climate Change (IPCC) (2012a). Glossary of terms. In *Managing the Risks of Extreme Events and Disasters to Advance Climate Change*, Christopher B. Field and others, eds. Cambridge, U.K., and New York: Cambridge University Press.
- \_\_\_\_\_ (2012b). *Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation*. A Special Report of the IPCC, Christopher B. Field and others, eds. Cambridge, U.K., and New York: Cambridge University Press.
- \_\_\_\_\_ (2014). *Climate Change 2014: Synthesis Report*, Rajendra K. Pachauri, Leo Meyer and Core Writing Team, eds. Geneva.
- Intergovernmental Panel on Climate Change, World Meteorological Organization (WMO), and United Nations Environment Programme (1992). *Climate Change: The IPCC 1990 and 1992 Assessments*. Available at [https://www.ipcc.ch/site/assets/uploads/2018/05/ipcc\\_90\\_92\\_assessments\\_far\\_full\\_report.pdf](https://www.ipcc.ch/site/assets/uploads/2018/05/ipcc_90_92_assessments_far_full_report.pdf).

Internal Displacement Monitoring Centre (IDMC) (2020a). *Global Report on Internal Displacement: GRID 2019*. Available at <https://www.internal-displacement.org/publications/2019-global-report-on-internal-displacement>.

\_\_\_\_\_ (2020b). 2019 internal displacement figures by country. Global Internal Displacement Database. Available at <https://www.internal-displacement.org/database/displacement-data>. Accessed on 15 March 2021.

\_\_\_\_\_ (2020c). Thematic Series no Matter of Choice: displacement in a changing climate. Available at <https://www.internal-displacement.org/publications/no-matter-of-choice-displacement-in-a-changing-climate>.

\_\_\_\_\_ (2020d). Internal displacement in the Arab States: Patterns and trends (2009–2019). Background Paper for RAR01 (unpublished).

Internal Displacement Monitoring Centre, and Norwegian Refugee Council (NRC) (2017). Positioned for action: Displacement in the Sendai Framework for Disaster Risk Reduction. Briefing Paper. Available at <https://www.internal-displacement.org/sites/default/files/publications/documents/20170216-idmc-briefing-paper-drr.pdf>.

International Energy Agency (2019). CO2 emissions by product and flow. IEA CO2 Emissions from Fuel Combustion Statistics. Available at <https://doi.org/10.1787/data-00430-en>. Accessed on 15 March 2021.

\_\_\_\_\_ (2021). CO2 emissions by product and flow. IEA CO2 Emissions from Fuel Combustion Statistics. Available at <https://doi.org/10.1787/data-00430-en>.

International Food Policy Research Institute (IFPRI), and University of Bonn, Center for Development Research (ZEF) (2007). *Economics of Land Degradation Improvement: A Global Assessment for Sustainable Development*, Ephraim Nkonya, Alisher Mirzabaev and Joachim von Braun, eds. SpringerLink.com.

International Labour Organization (n.d.). Labour migration. Arab States. Available at <https://www.ilo.org/beirut/areasofwork/labour-migration/lang-en/index.htm>.

\_\_\_\_\_ (2017). *Global Employment Trends for Youth 2017: Paths to a Better Working Future*. Geneva. Available at [www.ilo.org/wcmsp5/groups/public/---dgreports/---dcomm/---publ/documents/publication/wcms\\_598669.pdf](http://www.ilo.org/wcmsp5/groups/public/---dgreports/---dcomm/---publ/documents/publication/wcms_598669.pdf).

\_\_\_\_\_ (2018a). Labour force participation rate by sex and age. ILOSTAT explorer. Available at [http://www.ilo.org/shinyapps/bulkexplorer6/?lang=en&segment=indicator&id=EAP\\_2WAP\\_SEX\\_AGE\\_RT\\_A](http://www.ilo.org/shinyapps/bulkexplorer6/?lang=en&segment=indicator&id=EAP_2WAP_SEX_AGE_RT_A). Accessed on 10 March 2021.

\_\_\_\_\_ (2018b). Rural-urban labour statistics. Paper presented at 20th International Conference of Labour Statisticians. Geneva, October. Available at: [https://www.ilo.org/wcmsp5/groups/public/---dgreports/---stat/documents/meetingdocument/wcms\\_636038.pdf](https://www.ilo.org/wcmsp5/groups/public/---dgreports/---stat/documents/meetingdocument/wcms_636038.pdf).

International Organization for Migration (2019). Migration and water in the Middle East and North Africa. IOM MENA Regional Position Paper.

\_\_\_\_\_ (2020). Internal Displacement. In *The Context of the Slow-Onset Adverse Effects of Climate Change Submission by the International Organization for Migration to the Special Rapporteur on the Human Rights of Internally Displaced Persons*.

Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) (2018). *The Assessment Report on Land Degradation and Restoration: Summary for Policymakers*, Robert Scholes and others, eds. Bonn: IPBES Secretariat. Available at <http://www.ipbes.net/assessment-reports/ldr>.

International Telecommunication Union (2017). ITU Gender Dashboard. Available at [www.itu.int/en/action/gender-equality/data/Pages/ie.aspx?en/action/gender-equality/data/Pages/default.aspx](http://www.itu.int/en/action/gender-equality/data/Pages/ie.aspx?en/action/gender-equality/data/Pages/default.aspx).

International Union for Conservation of Nature (IUCN) (2015). *Annual Report: IUCN 2015*. Available at <https://portals.iucn.org/library/sites/library/files/documents/2016-020.pdf>.

Iraq, Ministry of Displacement and Migration (2008). *National Policy on Displacement*. Baghdad.

IRIN News (2009). Clambering up mountains to find water, 3 November. Available at <http://www.irinnews.org/Report.aspx?ReportID=86847>

Jordan, Government of Jordan (2019). *Jordan National Disaster Risk Reduction (DRR) Strategy 2019–2022*.

Johnsen, Fred H., and others (2000). Evaluation of the Um Jawasir project. Agricultural University of Norway, Centre for International Environment and Development Studies.

Kaisi, Ali, and Samira Alzoughbi (2007). Women's contributions to agricultural production and food security: Current status and perspectives in Syria. Paper presented at the GEWAMED workshop. Larnaca, Cyprus, March.

Kalin, Walter (2015). Sendai Framework: An important step forward for people displaced by disasters, 20 March. Available at <https://www.brookings.edu/blog/up-front/2015/03/20/sendai-framework-an-important-step-forward-for-people-displaced-by-disasters/>.

Kelman Ilan, and others (2016). Learning from the history of disaster vulnerability and resilience research and practice for climate change. *Natural Hazards*, vol. 82 (21 March).

- Kirbyshire, Amy, and others (2017). *Mass Displacement and the Challenge for Urban Resilience*. London: Overseas Development Institute.
- Kronfol, N., A. Rizk and A. M. Sibai (2015). Ageing and intergenerational family ties in Arab countries. *Eastern Mediterranean Health Journal*, vol. 21, No. 11.
- Kuhn, Thomas S. (1962). *The Structure of Scientific Revolutions*. Chicago: University of Chicago Press.
- Kumar, Arun (2008). History of earthquakes and tsunamis in the Arabian Gulf: Potential hazard for reclaimed island communities. Conference Paper.
- \_\_\_\_\_ (2010). *The Arab Strategy for Disaster Risk Reduction 2020*. Available at [https://www.preventionweb.net/files/18903\\_17934asdrfinalenglishjanuary20111.pdf](https://www.preventionweb.net/files/18903_17934asdrfinalenglishjanuary20111.pdf).
- League of Arab States (2015). Framework for Child-Centred Disaster Risk Reduction in the League of Arab States. Decree 799 D35.
- \_\_\_\_\_ (2018). The Climate Risk Nexus Initiative. Available at [http://www.arabwatercouncil.org/index.php?option=com\\_content&view=article&id=467:the-climate-risk-nexus-initiative&catid=160&Itemid=576&lang=en](http://www.arabwatercouncil.org/index.php?option=com_content&view=article&id=467:the-climate-risk-nexus-initiative&catid=160&Itemid=576&lang=en).
- \_\_\_\_\_ (n.d.). International migration in the Arab region and suggestions for key actions.
- League of Arab States, Arab Geographical Information Room, and Arab Water Council (2019). *Geographic information towards building risk resilience in the Arab region. Geographical Information towards Building Resilience in the Arab Region (Water, Food and Social Vulnerability Nexus)*. Available at [http://www.arabwatercouncil.org/images/Technical-Reports/AGIR\\_Report\\_Final\\_30-10-2019.pdf](http://www.arabwatercouncil.org/images/Technical-Reports/AGIR_Report_Final_30-10-2019.pdf).
- League of Arab States, and Arab Water Council (2018). *Mapping the Way Towards Achieving Sustainable Development in the Arab Region: A Focus on Food, Water, Climate and Disaster Related SDGs*.
- Linden, O., A. Jerneloev, and J. Egerup (2004). The environmental impacts of the Gulf War 1991. IIASA Interim Report. Available at <https://core.ac.uk/download/pdf/33898896.pdf>.
- Luomi, Mari, and others (2019). *Arab Region SDG Index and Dashboards Report 2019*. Abu Dhabi and New York: Emirates Diplomatic Academy and Sustainable Development Solutions Network.
- Mariner, Jeffrey (2018). *Rift Valley Fever Surveillance*. FAO Animal Production and Health Manual No. 21. Rome: Food and Agriculture Organization of the United Nations.
- Marulanda, Mabel C, Omar D. Cardona and Alex H. Barbat (2011). Revealing the impact of small disasters to the economic and social development. In *Coping with Global Environmental Change, Disasters and Security*, Hans Günter Brauch and others, eds. Berlin, Heidelberg: Springer.
- Mauritania, Nouakchott Authority, and United Nations Office for Disaster Risk Reduction (2019). *Nouakchott Disaster Risk Reduction Plan (2019–2023)*.
- Maystadt, Jean-Francois, and Oliver Ecker (2014). Extreme weather and civil war: Does drought fuel conflict in Somalia through livestock price shocks. *American Journal of Agricultural Economics*, vol. 96, issue 4.
- Mena, Rodrigo, Dorothea Hilhorst and Karen Peters (2019). *Disaster risk reduction and protracted violent conflict: The case of Afghanistan*. London: Overseas Development Institute.
- Messouli, M., and S. Rochdane (2011). Vulnerability assessment and risk level of ecosystem services for climate change impacts and adaptation in Morocco. Field notes. University Cadi Ayyad, Department of Environmental Sciences.
- Moh, Khalid Salih (1999). Forced migration in the Sudan: Dilemmas and opportunities of return. Economic and social development in Um Jawasir with emphasis on different kind of relationship between different groups of people in the area. Paper. ADRA-Sudan/ Agricultural University of Norway, Centre for International Environment and Development Studies.
- Morocco, Ministry of Interior, Department of Natural Hazard (2020). Natural Disaster Impact Relief Fund (FLCN).
- Murray, Virginia, and others (2017). *Coherence between the Sendai Framework, the SDGs, the Climate Agreement, New Urban Agenda and World Humanitarian Summit, and the Role of Science in their Implementation*. Integrated Research On Disaster Risk and International Council For Science. Available at <https://www.preventionweb.net/publications/view/53049>.
- The Nansen Initiative (2015). *Agenda for the Protection of Cross-Border Displaced Persons in the Context of Disasters and Climate Change: Volume I*. Available at <https://environmentalmigration.iom.int/agenda-protection-cross-border-displaced-persons-context-disasters-and-climate-change>
- NAP Global Network (2019). PATPA 8th workshop for the regional group for Anglophone Africa. Available at [https://www.transparency-partnership.net/system/files/document/3.%20Deborah\\_PATPA\\_linkages\\_Uganda\\_May2019.pdf](https://www.transparency-partnership.net/system/files/document/3.%20Deborah_PATPA_linkages_Uganda_May2019.pdf).
- Nathanson, Neal (2016). The human toll of viral diseases: Past plagues and pending pandemics. In *Viral Pathogenesis*, 3rd edition, Michael Katze and others, eds. Amsterdam: Elsevier.



- National Aeronautics and Space Administration (NASA) (2020a). Gridded population of the world, version 4, revision 11. Socioeconomic Data and Applications Center (SEDAC).
- \_\_\_\_\_ (2020b). Record Flooding in Sudan. Earth Observatory, 23 September. Available at <https://earthobservatory.nasa.gov/images/147288/record-flooding-in-sudan>.
- \_\_\_\_\_ (2021). Active fire data: Syria active daily alerts. Fire Information for Resources Management System (FIRMS). Available at <http://firms.modaps.eodis.nasa.gov/firemaps>.
- National Drought Mitigation Centre (2021). Drought Basics. University of Nebraska-Lincoln. Available at <https://drought.unl.edu/Education/DroughtBasics.aspx>.
- National Oceanic and Atmospheric Administration (NOAA) (2020). NOAA historical hurricane tracks.
- Nature Middle East (2010). Tackling the drought in Syria, 27 September. Available at <https://jwp-nme.public.springernature.app/en/nmiddleeast/article/10.1038/nmiddleeast.2010.206>.
- The New Arab (2019). Floods hit 40,000 displaced people in northwest Syria: UN, 3 April. Available at <https://english.alaraby.co.uk/news/floods-hit-40000-displaced-people-northwest-syria-un>. Accessed on 13 May 2020.
- Nguyen, Hanh (2018). Sustainable food systems: Concept and framework. Food and Agriculture Organization of the United Nations. Rome.
- Norwegian Geotechnical Institute, Australia, Department of Industry, and Geoscience Australia (2015). *Tsunami methodology and result overview*. Background Paper of GAR 15.
- Oil & Gas Journal (2004). Algerian LNG complex explosion caused by gas pipeline leak, 18 February.
- Olawuyi, Damilola S. (2017). Financing low-emission and climate-resilient infrastructure in the Arab region: Potentials and limitations of public-private partnership contracts. In *Climate Change Research at Universities*, Walter Leal Filho, ed. Cham, Switzerland: Springer.
- Olsson, Lennart (1993). On the causes of famine: Drought, desertification and market failure in the Sudan. *Ambio, A Journal of the Human Environment*, vol. 22, No. 6.
- Ordaz, Mario (2000). Metodología para la evaluación del riesgo sísmico enfocada a la gerencia de seguros por terremoto. Technical Note. National Autonomous University of Mexico.
- Ordaz, Mario G., and others (2014). Probabilistic seismic hazard assessment at global level. *International Journal of Disaster Risk Reduction*, vol. 10, part B.
- \_\_\_\_\_ (2019). Considering the impacts of simultaneous perils. *Disaster Prevention and Management*, vol. 28, issue 6.
- Organisation for Economic Co-operation and Development (OECD) (2009). Migration now and then. In *International Migration*. Paris.
- \_\_\_\_\_ (2015). Keeping the multiple dimensions of poverty at the heart of development. OECD and Post-2015 Reflections series, element 1, paper 1.
- \_\_\_\_\_ (2017). Blended finance: Mobilizing resources for sustainable development and climate action in developing countries. *Policy Perspectives*.
- \_\_\_\_\_ (2018). *States of Fragility 2018*. Paris: OECD Publishing. Available at [https://www.oecd-ilibrary.org/development/states-of-fragility-2018/top-25-most-fragile-cities-2015\\_9789264302075-graph2-en](https://www.oecd-ilibrary.org/development/states-of-fragility-2018/top-25-most-fragile-cities-2015_9789264302075-graph2-en).
- Osman-Elasha, Balgis (2010). *Arab Human Development Report: Mapping of Climate Change Threats and Human Development Impacts in Arab States*. Research Paper Series. United Nations Development Programme, Regional Bureau for Arab States.
- Oxford Economics (2020). A downside scenario for the global economy. Research Briefing.
- Paradise, Thomas. (2005). Perception of earthquake risk in Agadir, Morocco: A case study from a Muslim community. *Environmental Hazards*, vol. 6, issue 3.
- Peters, Katie (2019). *Disaster Risk Reduction in Conflict Contexts: An Agenda for Action*. London: Overseas Development Institute. Available at <https://odi.org/en/publications/disaster-risk-reduction-in-conflict-contexts-an-agenda-for-action>.
- Peters, Katie, and Mirianna Budimir (2016). When disasters and conflicts collide: Facts and figures. Briefing Paper. London: Overseas Development Institute.
- Peters, Katie, Nuha Eltinay, and Kerrie Holloway (2019). *Disaster risk reduction, urban informality and a 'fragile peace': The case of Lebanon*. London: Overseas Development Institute.
- Peters, Katie, Kerrie Holloway, and Laura E.R. Peters (2019). Disaster risk reduction in conflict contexts: The state of the evidence. Working Paper 556. London: Overseas Development Institute.
- Phaup, Marvin, and Charlotte Kirschner (2010). Budgeting for disasters: Focusing on good times. *OECD Journal on Budgeting*, vol. 2010/1.

- Plufke, J. (1960). Agadir earthquake of February 29, 1960 – Seismicity and geology of the area.
- Ramesh Chandra, Geetanjali, Bhoopesh Kumar Sharma, and Iman Ali Liaqat (2019). UAE's strategy towards most cyber resilient nation. *International Journal of Innovative Technology and Exploring Engineering*, vol. 8, issue 12.
- Ramsey, Imogen, and others (2016). Assessing community disaster resilience using a balanced scorecard: lessons learnt from three Australian communities. *Australian Journal of Emergency Management*, vol. 31, Issue 2.
- Robalino, David A., and others (2005). *Pensions in the Middle East and North Africa: Time for Change*. Washington, D.C.: World Bank. Available at
- Rocha, Roberto, Zsofia Arval and Subika Farazi (2011). *Financial Access and Stability: A Road Map for the Middle East and North Africa*. MENA development report. Washington, D.C.: World Bank.
- The Rockefeller Foundation and Arup (2016). City Resilience Index. Available at <https://www.rockefellerfoundation.org/wp-content/uploads/CRI-Revised-Booklet1.pdf>.
- Rollins, Nigel C., and others (2016). Why invest, and what it will take to improve breastfeeding practices? *The Lancet*, vol. 387, issue 10017.
- Romdhani, N. (2019). The Arab world needs literacy programmes more than ever. *The Arab Weekly*, 16 June.
- Ross, Charles (2020). The hidden data economy: Companies need to get serious about managing and leveraging data. *The Economist*, 1 June.
- Ryan, Devon (2019). Stanford-led study investigates how much climate change affects the risk of armed conflict. *Stanford News*, 12 June.
- Saab, Najib (2015). Food security in Arab countries: Efficiency, productivity, and shifting dietary habits. Watch Letter No. 32. International Centre for Advanced Mediterranean Agronomic Studies.
- Sachs, Jeffrey, and others (2019). *Sustainable Development Report 2019*. New York: Bertelsmann Stiftung and Sustainable Development Solutions Network.
- Saif, Ibrahim (2008). The food price crisis in the Arab countries: Short term responses to a lasting challenge. Carnegie Endowment for International Peace Web Commentary, June.
- Sapountzaki, Kalliopi (2019). The Interplay between Socio-economic Crises and Disaster Risks: Examples from the Developed and Developing World. Contributing Paper to GAR 2019.
- Saleem, Qamar (2017). Overcoming constraints to SME development in MENA countries and enhancing access to finance: IFC advisory services in the Middle East and North Africa. Working Paper. Washington, D.C.: World Bank. Available at <http://documents.worldbank.org/curated/en/581841491392213535/Overcoming-constraints-to-SME-development-in-MENA-countries-and-enhancing-access-to-finance-IFC-advisory-services-in-the-Middle-East-and-North-Africa>.
- Salgado-Gálvez, Mario A., and others (2016a). Probabilistic estimation of annual lost economic production due to premature mortality because of earthquakes. *Human and Ecological Risk Assessment*, vol. 22, issue 2.
- \_\_\_\_\_ (2016b). Urban seismic risk index for Medellín, Colombia, based on probabilistic loss and casualties estimations. *Natural Hazards*, vol. 80, issue 3.
- Save the Children (2020). Northern Syria flooding: thousands of children at risk of further displacement, 20 December. Available at <https://www.savethechildren.net/news/northern-syria-flooding-thousands-children-risk-further-displacement>. Accessed on 13 May 2020.
- Savoy, Conor M., and Aaron N. Milner (2018). *Blended Finance and Aligning Private Investment with Global Development: Two Sides of the Same Coin*. Center for Strategic and International Studies. Available at <https://www.csis.org/analysis/blended-finance-and-aligning-private-investment-global-development>.
- Sbeinati, Mohamed Reda, Ryad Darawcheh and Mikhail Mouty (2005). The historical earthquakes of Syria: An analysis of large and moderate earthquakes from 1365 B.C. to 1900 A.D. *Annals of Geophysics*, vol. 48, No. 3 (June).
- Sendai Framework for Disaster Risk Reduction (2018). Measuring implementation of the Sendai Framework. Available at <https://sendaimonitor.undrr.org>.
- Seneviratne, Sonia I., and others (2012). Changes in climate extremes and their impacts on the natural physical environment. *In Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation*, Christopher B. Field and others, eds. Cambridge, U.K., and New York: Cambridge University Press. Available at [https://www.ipcc.ch/site/assets/uploads/2018/03/SREX-Chap3\\_FINAL-1.pdf](https://www.ipcc.ch/site/assets/uploads/2018/03/SREX-Chap3_FINAL-1.pdf).
- Smith, Joel, and others (2013). *Potential Impacts of Climate Change on the Egyptian Economy*. Cairo: United Nations Development Programme.
- Somalia, Government of Somalia (2018a). *Somalia Recovery and Resilience Framework*.

\_\_\_\_\_ (2018b). *Somalia Drought Impact and Needs Assessment: Volume I – Synthesis Report*. Available at <https://www.undp.org/content/undp/en/home/librarypage/climate-and-disaster-resilience-/somalia-drought-impact-and-needs-assessment.html>.

Somalia, Government of Somalia, and World Bank (2020). *Somalia: 2019 Floods Impact and Needs Assessment*. Available at <http://documents.worldbank.org/curated/en/764681585029507635/pdf/Somalia-2019-Floods-Impact-and-Needs-Assessment.pdf>.

Somalia, Ministry of Planning, Investment and Economic Development (2020). *Somalia National Development Plan 2020 to 2024*.

State of Palestine, Environment Quality Authority (2016). *National Adaptation Plan (NAP) to Climate Change*. Available at [https://unfccc.int/files/national\\_reports/non-annex\\_i\\_parties/application/pdf/national\\_adaptation\\_plan\\_\\_state\\_of\\_palestine.pdf](https://unfccc.int/files/national_reports/non-annex_i_parties/application/pdf/national_adaptation_plan__state_of_palestine.pdf).

Stoddard, Abby, and others (2017). Out of reach: How insecurity prevents humanitarian aid from accessing the neediest. *Stability, International Journal of Security and Development*, vol. 6.

Strand, Håvard, and others (2019). Trends in armed conflict, 1946–2018. *Conflict Trends* 3. Oslo: PRIO.

Strategy& (2015). *Cyber security in the Middle East: A strategic approach to protecting national digital assets and infrastructure*. Available at <https://www.strategyand.pwc.com/m1/en/reports/cyber-security-in-the-middle-east.pdf>.

The Sudan, Ministry of Agriculture, ADRA-Sudan, and Andrews University (1995). *Baseline study of socioeconomic and environmental characteristics of the Um Jawasir project area*. Khartoum.

The Sudan, Ministry of Environment, Natural Resources and Physical Development (2016). *National Adaptation Plan*. Available at <https://www4.unfccc.int/sites/NAPC/Documents%20NAP/National%20Reports/Sudan%20NAP.pdf>.

The Sudan, Ministry of Infrastructure and Transport, and United Nations Office for Disaster Risk Reduction (2019). *Khartoum Disaster Risk Reduction Action Plan 2019–2023*.

Sweden, Ministry of Foreign Affairs, Commission on Climate Change and Development (2009). *Closing the Gaps: Disaster Risk Reduction and Adaptation to Climate Change in developing Countries*. Stockholm.

Swiss Re (2020). *Catastrophe and Insurance Market Data*. Sigma Explorer. Available at <https://www.sigma-explorer.com>.

Szabo, Sylvia, and others (2016). Making SDGs work for climate change hotspots. *Environment Science and Policy for Sustainable Development*, vol. 58, No. 6.

Tsunami Inter-Agency Assessment Mission (2005). *Hafun to Gara'ad, northeast Somali coastline 28 Jan–8 Feb 2005*.

Twigg, John (2015). *Good Practice Review 9: Disaster Risk Reduction*, 15 October. Available at <https://goodpracticereview.org/9/drr-social-crisis-and-conflict/conflict-sensitivity/>.

United Arab Emirates, Supreme Council for National Security, National Emergency Crisis and Disasters Management Authority (NCEMA) (2017). *National Early Warning System*. Available at <https://www.ncema.gov.ae/en/initiatives/early-warning-system.aspx?DisableResponsive=1#page=1>.

\_\_\_\_\_ (2020). *COVID-19 emergency proactive national strategy*.

United Nations (2009). *Syria Drought Response Plan*. Available at [https://reliefweb.int/sites/reliefweb.int/files/resources/2A1DC3EA365E87FB8525760F0051E91A-Full\\_Report.pdf](https://reliefweb.int/sites/reliefweb.int/files/resources/2A1DC3EA365E87FB8525760F0051E91A-Full_Report.pdf).

\_\_\_\_\_ (2015). *Sendai Framework for Disaster Risk Reduction 2015–2030*. Available at <https://www.unisdr.org/we/inform/publications/43291>.

\_\_\_\_\_ (2020a). *Financing for development in the era of COVID-19 and beyond: Menu of options for the consideration of Heads of State and Government Part I*. Available at [https://www.un.org/sites/un2.un.org/files/financing\\_for\\_development\\_covid19\\_part\\_i\\_hosg.pdf](https://www.un.org/sites/un2.un.org/files/financing_for_development_covid19_part_i_hosg.pdf).

\_\_\_\_\_ (2020b). *Financing for development in the era of COVID-19 and beyond: Menu of options for the consideration of Heads of State and Government Part II*. Available at [https://www.un.org/sites/un2.un.org/files/financing\\_for\\_development\\_covid19\\_part\\_ii\\_hosg.pdf](https://www.un.org/sites/un2.un.org/files/financing_for_development_covid19_part_ii_hosg.pdf).

United Nations Children's Fund (2017). *Child Poverty in the Arab States: Analytical Report of Eleven Countries*.

United Nations Children's Fund, and Countdown to 2030 (2019). *Countdown to 2030: Country profiles on early childhood development*. Available at <http://www.countdown2030.org>.

United Nations, Department of Economic and Social Affairs (2015). *Transforming our World: The 2030 Agenda for Sustainable Development*. Available at <https://sustainabledevelopment.un.org/post2015/transformingourworld>.

United Nations, Department of Economic and Social Affairs, Population Division (2018). *World Urbanization =: The 2018 Revision*. New York.

United Nations Development Programme (2013). *Water Governance in the Arab Region: Managing Scarcity and Securing the Future*. Available at [Environment/Arab\\_Water\\_Gov\\_Report/Arab\\_Water\\_Gov\\_Report\\_Full\\_Final\\_Nov\\_27.pdf](http://Environment/Arab_Water_Gov_Report/Arab_Water_Gov_Report_Full_Final_Nov_27.pdf).

\_\_\_\_\_ (2018a). *Climate Change Adaptation in the Arab States: Best Practices and Lessons Learned*. Bangkok, Thailand.

- \_\_\_\_\_ (2018b). *The Arab Cities Resilience Report*.
- \_\_\_\_\_ (2020) *Human Development Report 2020: The Next Frontier – Human Development and the Anthropocene*. New York. United Nations Development Programme, and Syrian Centre for Policy Research (SCPR) (2016). *Confronting Fragmentation: Impact of Syrian Crisis Report*. Available at <https://www.sy.undp.org/content/syria/en/home/library/poverty/confronting-fragmentation.html>.
- United Nations Development Programme, Bahrain Center for Strategic and International Studies and Energy and United Nations Human Settlements Programme (2020). *The State of the Arab Cities 2020: Financing Sustainable Urban Development in the Arab Region*.
- United Nations Economic and Social Commission for Western Asia (2015). *ESCWA Water Development Report 6: The Water, Energy and Food Security Nexus in the Arab Region*. Beirut. Available at [www.unescwa.org/sites/www.unescwa.org/files/publications/files/e\\_escwa\\_sdpd\\_15\\_2\\_e\\_0.pdf](http://www.unescwa.org/sites/www.unescwa.org/files/publications/files/e_escwa_sdpd_15_2_e_0.pdf).
- \_\_\_\_\_ (2017a). *Rethinking Fiscal Policy for the Arab Region*. Beirut. Available at [www.unescwa.org/sites/www.unescwa.org/files/publications/files/rethinking-fiscal-policy-arab-region-english\\_1.pdf](http://www.unescwa.org/sites/www.unescwa.org/files/publications/files/rethinking-fiscal-policy-arab-region-english_1.pdf).
- \_\_\_\_\_ (2017b). *Arab Multidimensional Poverty Report*. E/ESCWA/EDID/2017/2. Beirut
- \_\_\_\_\_ (2017c). *Water Development Report 7: Climate Change and Disaster Risk Reduction in the Arab Region*. Beirut.
- \_\_\_\_\_ (2017d). *Ageing in ESCWA Member States: Third Review and Appraisal of the Madrid International Plan of Action on Ageing*. Beirut.
- \_\_\_\_\_ (2017d). Regional Profile of the Arab Region Demographic of Ageing: Trends, Patterns, And Prospects Into 2030 And 2050. E/ESCWA/SDD/2017/Technical Paper.17.
- \_\_\_\_\_ (2018a). *Population and Development Report Issue No. 8: Prospects of Ageing with Dignity in the Arab Region*. Beirut. Available at [www.unescwa.org/publications/population-development-report-8](http://www.unescwa.org/publications/population-development-report-8).
- \_\_\_\_\_ (2018b). *Disability in the Arab Region 2018*. Beirut. Available at [www.unescwa.org/sites/www.unescwa.org/files/publications/files/disability-arab-region-2018-english\\_1.pdf](http://www.unescwa.org/sites/www.unescwa.org/files/publications/files/disability-arab-region-2018-english_1.pdf).
- \_\_\_\_\_ (2019). *Energy Vulnerability in the Arab Region*. Available at [www.unescwa.org/sites/www.unescwa.org/files/publications/files/energy-vulnerability-arab-region-english\\_0.pdf](http://www.unescwa.org/sites/www.unescwa.org/files/publications/files/energy-vulnerability-arab-region-english_0.pdf).
- \_\_\_\_\_ (2020a). COVID-19: Economic cost to the Arab region. Available at <https://www.unescwa.org/sites/www.unescwa.org/files/escwa-covid-19-economic-cost-arab-region-en.pdf>.
- \_\_\_\_\_ (2020b). *Arab Sustainable Development Report 2020*. Beirut.
- United Nations Economic and Social Commission for Western Asia, and Food and Agriculture Organization of the United Nations (2017). *Arab Horizon 2030: Prospects for enhancing food security in the Arab region. Technical Summary*. Beirut. Available at [www.unescwa.org/sites/www.unescwa.org/files/uploads/arab-horizon-2030-prospects-enhancing-food-security-summary-english.pdf](http://www.unescwa.org/sites/www.unescwa.org/files/uploads/arab-horizon-2030-prospects-enhancing-food-security-summary-english.pdf).
- \_\_\_\_\_ (2020). Regional talks commemorating Desertification and Drought Day, 24 June.
- United Nations Economic and Social Commission for Western Asia, and International Organization for Migration (2020). *Situation report on international migration 2019: The global compact on safe, orderly and regular migration in the context of the Arab region*. Beirut. Available at <https://www.unescwa.org/sites/www.unescwa.org/files/uploads/situation-report-international-migration-2019-summary-english.pdf>.
- United Nations Economic and Social Commission for Western Asia, and League of Arab States (2013). *The Arab Millennium Development Goals Report: Facing Challenges and Looking Beyond 2015*. Beirut.
- United Nations Economic and Social Commission for Western Asia and others (2017a). *Arab Climate Change Assessment Report: Main Report*. Available at <http://www.riccar.org>.
- \_\_\_\_\_ (2017b). *Arab Climate Change Assessment Report: Executive Summary*. Available at <https://www.unescwa.org/sites/www.unescwa.org/files/uploads/riccar-main-report-2017-summary-english.pdf>.
- United Nations, Economic and Social Council (2020). *Follow-up and review of the financing for development outcomes and the means of implementation of the 2030 Agenda for Sustainable Development*. 21 April. E/FFDF/2020/L.1Rev.1.
- United Nations Entity for Gender Equality and the Empowerment of Women (UN Women) (2017). *Report on roundtable discussion with women's groups on the Drought Impact Needs Assessment (DINA)*. Somalia. Mogadishu, 25 October.
- \_\_\_\_\_ (2018). *Facts and figures: Ending violence against women*. Available at <https://unwomen.org/en/what-we-do/ending-violence-against-women/facts-and-figures>.
- \_\_\_\_\_ (2020a). *Women's needs and gender equality in Egypt's COVID-19 response*. Available at [https://www2.unwomen.org/-/media/field%20office%20arab%20states/attachments/publications/2020/04/unwomen\\_brief\\_covid-19\\_egypt\\_response.pdf?la=en&vs=3919](https://www2.unwomen.org/-/media/field%20office%20arab%20states/attachments/publications/2020/04/unwomen_brief_covid-19_egypt_response.pdf?la=en&vs=3919).

\_\_\_\_\_ (2020b). Women's needs and gender equality in Lebanon's COVID-19 response. Available at [https://www2.unwomen.org/-/media/field%20office%20arab%20states/attachments/publications/2020/03/updated%20lebanon%20brief/gender%20and%20covid\\_english.pdf?la=en&vs=403](https://www2.unwomen.org/-/media/field%20office%20arab%20states/attachments/publications/2020/03/updated%20lebanon%20brief/gender%20and%20covid_english.pdf?la=en&vs=403).

United Nations Environment Programme (UNEP) (2015). Climate change in the Arab region. Issues Brief for the Arab Sustainable Development Report.

\_\_\_\_\_ (2016a). Financing sustainable development: Moving from momentum to transformation in a time of turmoil. Available at <https://www.un.org/pga/71/wp-content/uploads/sites/40/2017/02/Financing-Sustainable-Development-in-a-time-of-turmoil.pdf>.

\_\_\_\_\_ (2016b). *UNEP Frontiers 2016 Report: Emerging Issues of Environmental Concern*. Nairobi.

United Nations Environment Programme Finance Initiative (UNEP FI) (2019). *Changing Course: A Comprehensive Investor Guide to Scenario-based Methods for Climate Risk Assessment, in Response to the TCFD*. Available at <https://www.unepfi.org/publications/investment-publications/changing-course-a-comprehensive-investor-guide-to-scenario-based-methods-for-climate-risk-assessment-in-response-to-the-tcdf/>.

United Nations Framework Convention on Climate Change (2015). The Paris Agreement. Available at <https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement>.

\_\_\_\_\_ (2017). Opportunities and options for integrating climate change adaptation with the Sustainable Development Goals and the Sendai Framework for Disaster Risk Reduction 2015–2030. Technical Paper. Available at <https://www.preventionweb.net/publications/view/55605>.

United Nations, General Assembly (2005). Resolution adopted by the General Assembly on 16 September 2005, 2005 World Summit Outcome, para. 143. A/RES/60/1.

\_\_\_\_\_ (2016a). Report of the open-ended intergovernmental expert working group on indicators and terminology relating to disaster risk reduction, 1 December. A/71/644.

\_\_\_\_\_ (2016b). One humanity: shared responsibility. Report of the Secretary-General for the World Humanitarian Summit, 2 February. A/70/709.

\_\_\_\_\_ (2017). Resolution adopted by the General Assembly on 6 July 2017. Work of the Statistical Commission pertaining to the 2030 Agenda for Sustainable Development. A/RES/71/313.

\_\_\_\_\_ (2019). Resolution adopted by the General Assembly on 19 December 2019. Disaster risk reduction, paras. 28 and 29. A/RES/74/218.

United Nations High Commissioner for Refugees (UNHCR) (2020). *Global Trends: Forced Displacement in 2019*. Available at <https://www.unhcr.org/5ee200e37.pdf>.

United Nations Human Settlements Programme (UN-Habitat) (2003). *Slums of the World: The Face of Urban Poverty in the New Millennium?*

\_\_\_\_\_ (2012). *The State of Arab Cities 2012: Challenges of Urban Transition*. Available at [www.unhabitat.org/jo/en/inp/Upload/134359\\_OptiENGLISH\\_StateofArabCities\\_Edited\\_25\\_12\\_2012.pdf](http://www.unhabitat.org/jo/en/inp/Upload/134359_OptiENGLISH_StateofArabCities_Edited_25_12_2012.pdf).

\_\_\_\_\_ (2016a) *Towards an Arab Urban Agenda*.

\_\_\_\_\_ (2016b). *New Urban Agenda*. Available at <http://habitat3.org/wp-content/uploads/NUA-English.pdf>.

\_\_\_\_\_ (2017a). *City Resilience Profiling Tool*. Guide. Available at <https://reliefweb.int/sites/reliefweb.int/files/resources/CRPT-Guide-Pages-Online.pdf>.

\_\_\_\_\_ (2017b). *HABITAT III Regional Report: Arab Region – Towards Inclusive, Safe, Resilient and Sustainable Arab Cities*. Available at <http://habitat3.org/wp-content/uploads/Habitat-III-Regional-Report-Arab-Region.pdf>.

\_\_\_\_\_ (2020). *Informal Settlements in the Arab Region: "Towards Arab Cities without Informal Areas" – Analysis and Prospects*. Available at [https://unhabitat.org/sites/default/files/2020/12/regional\\_is\\_report\\_final\\_dec\\_2020.pdf](https://unhabitat.org/sites/default/files/2020/12/regional_is_report_final_dec_2020.pdf).

United Nations Human Settlements Programme, and Disaster Risk Management, Sustainability and Urban Resilience (DiMSUR) (2018). *City Resilience Action Planning Tool: CityRAP Tool*. Available at [https://unhabitat.org/sites/default/files/documents/2019-05/cityrap-tool\\_booklet\\_05032019-compressed.pdf](https://unhabitat.org/sites/default/files/documents/2019-05/cityrap-tool_booklet_05032019-compressed.pdf).

United Nations Human Settlements Programme in Iraq (UN-Habitat), and United Nations Educational, Scientific and Cultural Organization (UNESCO) (2018). *The Initial Planning Framework for the Reconstruction of Mosul*. Baghdad: United Nations Human Settlements Programme in Iraq.

United Nations Human Settlements Programme, and Minya Drinking Water and Sanitation Company (MDWSC) (2017). Riverbank filtration project for clean water production in Minya, Egypt. Project Brief. Available at <https://unhabitat.org/sites/default/files/download-manager-files/Riverbank-Filtration-Project-for-Clean-Water-Production-in-Minya-Brief-Note.pdf>.

United Nations Office for the Coordination of Humanitarian Affairs (OCHA) (2017). Somalia Humanitarian Bulletin.



- \_\_\_\_\_ (2018). Iraq Floods. Flash Update, No. 2 (November 2018).
- \_\_\_\_\_ (2020). Syrian Arab Republic: IDP movements. Available at <https://www.humanitarianresponse.info/en/operations/stima/idps-tracking>. Accessed in June 2020.
- United Nations Office for Disaster Risk Reduction (UNDRR) (2002). Disaster reduction for sustainable mountain development. Geneva. Available at [https://www.unisdr.org/2002/campaign/pdf/Mountain\\_Booklet\\_2002\\_eng.pdf](https://www.unisdr.org/2002/campaign/pdf/Mountain_Booklet_2002_eng.pdf).
- \_\_\_\_\_ (2005) Hyogo Framework for Action 2005–2015: Building the resilience of nations and communities to disasters. Geneva. Available at [https://www.unisdr.org/files/1037\\_hyogoframeworkforactionenglish.pdf](https://www.unisdr.org/files/1037_hyogoframeworkforactionenglish.pdf)
- \_\_\_\_\_ (2008). *Gender Perspectives: Integrating Disaster Risk Reduction into Climate Change Adaptation*. Geneva.
- \_\_\_\_\_ (2013a). Making Algeria resilient: Achieving DRR in the Arab States – Good practice country brief. Available at [https://www.preventionweb.net/files/32443\\_unisdralgeriafinal.pdf](https://www.preventionweb.net/files/32443_unisdralgeriafinal.pdf).
- \_\_\_\_\_ (2013b). Overview of disaster risk reduction in the Arab region. Fact Sheet. Available at [https://www.undp.org/content/dam/rbas/doc/Crisis%20prevention/31693\\_drrfactsheetarabregionfinal.pdf](https://www.undp.org/content/dam/rbas/doc/Crisis%20prevention/31693_drrfactsheetarabregionfinal.pdf).
- \_\_\_\_\_ (2014). Sharm El Sheikh Declaration on Disaster Risk Reduction 16 September 2014. Available at [http://www.preventionweb.net/files/42726\\_42726sharmdeclarationpublicationfin.pdf](http://www.preventionweb.net/files/42726_42726sharmdeclarationpublicationfin.pdf).
- \_\_\_\_\_ (2015). *Implementing the Hyogo Framework for Action in the Arab Region: Regional Synthesis Report 2005–2015*. Available at <https://www.undrr.org/publication/implementing-hyogo-framework-action-arab-region-regional-synthesis-report-2005-2015>.
- \_\_\_\_\_ (2017a). Disaster loss data and linkage to climate change impacts for the Arab region. RICCAR Technical Report. Beirut.
- \_\_\_\_\_ (2017b). *Global Assessment Report on Disaster Risk Reduction: Atlas – Unveiling Global Disaster Risk*.
- \_\_\_\_\_ (2018a). Arab Strategy for Disaster Risk Reduction 2030. Available at [https://www.preventionweb.net/files/59464\\_asdrrreportinsidefinalforweb.pdf](https://www.preventionweb.net/files/59464_asdrrreportinsidefinalforweb.pdf).
- \_\_\_\_\_ (2018b). *Review of the Arab Strategy for Disaster Risk Reduction 2020 (ASDRR) in View of Sendai Framework for Disaster Risk Reduction (2015-2030), the Sustainable Development Goals (SDGs) and the Climate Change Agenda*.
- \_\_\_\_\_ (2019a). GAR: *Global Assessment Report on Disaster Risk Reduction 2019*. Available at <https://gar.undrr.org/report-2019>.
- \_\_\_\_\_ (2019b) *Words into Action: Disaster Displacement – How to Reduce Risk, Address Impacts and Strengthen Resilience*. Available at <https://www.preventionweb.net/publications/view/58821>.
- \_\_\_\_\_ (2020a) Regional Overview of Disaster Loss Databases.
- \_\_\_\_\_ (2020b). *Sendai Framework Monitoring in Europe and Central Asia: A Regional Snapshot*. Available at <https://www.undrr.org/publication/sendai-framework-monitoring-europe-and-central-asia-regional-snapshot>.
- \_\_\_\_\_ (2020c). *Words into Action Guidelines: Implementation Guide for Land Use and Urban Planning*. Available at <https://www.undrr.org/publication/words-action-guidelines-implementation-guide-land-use-and-urban-planning>.
- \_\_\_\_\_ (2020d). Launch of Making Cities Resilient 2030 (MCR2030), 28 October 2020. Available at <https://www.undrr.org/event/launch-mcr2030>.
- \_\_\_\_\_ (2020e). UAE cultivates the first private sector alliance for disaster resilient societies (ARISE) in the Arab region, 9 September. Available at <https://www.preventionweb.net/news/view/73507>.
- \_\_\_\_\_ (2021). *Scaling up Disaster Risk Reduction in Humanitarian Action 2.0: Recommendations for the Humanitarian Programme Cycle*. Geneva.
- United Nations Office for Disaster Risk Reduction and League of Arab States (2018). Declaration of the Fourth Arab Conference for Disaster Risk Reduction. Tunis, Tunisia, 13 October. Available at: [https://www.preventionweb.net/files/57759\\_finaldeclarationtunisarabic.pdf](https://www.preventionweb.net/files/57759_finaldeclarationtunisarabic.pdf).
- United Nations Office for Disaster Risk Reduction, and United Nations Development Programme (2020). Enhancing community resilience and human security of vulnerable communities in urban settings in Tunisia and Mauritania.
- United Nations Resident and Humanitarian Coordinator for Lebanon, and United Nations High Commissioner for Refugees (2018). Lebanon: Inter-Agency Mapping Platform – Bekaa March 2018. Available at <https://reliefweb.int/report/lebanon/lebanon-inter-agency-mapping-platform-bekaa-march-2018>.
- United Nations Statistics Division (2016). Environmental indicators, Municipal waste collection. Available at <https://unstats.un.org/unsd/environment/municipalwaste.htm>. Accessed on 15 January 2021.
- United Nations Trust Fund for Human Security (UNTFHS) (2009). Human security in theory and practice: An overview of the human security concept and the United Nations Trust Fund for Human Security.

United Nations, and World Bank (2018). *Pathways for Peace: Inclusive Approaches to Preventing Violent Conflict*. Washington, D.C.: World Bank. Available at <https://openknowledge.worldbank.org/handle/10986/28337>.

United States Geological Survey (USGS) (2020). ShakeMap: M 5.8 – Morocco, 1960. Available at <https://earthquake.usgs.gov/earthquakes/eventpage/iscgem878424/shakemap/intensity?source=atlas&code=iscgem878424>.

Van de Steeg, Jeanette, and Markos Tibbo (2012). *Livestock and Climate Change in the Near East Region: Measures to Adapt to and Mitigate Climate Change*. Cairo: Food and Agriculture Organization of the United Nations.

Victora, Cesar G., and others (2016). Breastfeeding in the 21st century: Epidemiology, mechanisms, and lifelong effect. *The Lancet*, vol. 387, issue 10017.

Velásquez, César A., and others (2014). Retrospective assessment of risk to natural hazards. *International Journal of Disaster Risk Reduction*, vol. 10, part B.

Verner, Dorte, ed. (2012). *Adaptation to a Changing Climate in the Arab Countries. MENA Development Report*. Washington, D.C.: World Bank. Available at <http://documents1.worldbank.org/curated/en/740351468299700935/pdf/Adaptation-to-a-changing-climate-in-the-Arab-countries-a-case-for-adaptation-governance-and-leadership-in-building-climate-resilience.pdf>.

Wahba, Sameh, and others (2020). Cities are on the front lines of COVID-19. World Bank Blogs, 12 May. Available at <https://blogs.worldbank.org/sustainablecities/cities-are-front-lines-covid-19>.

Walz, Yvonne, and others (2020). Monitoring progress of the Sendai Framework using a geospatial model: The example of people affected by agricultural droughts in Eastern Cape, South Africa. *Progress in Disaster Science*, vol. 5.

Ward, Christopher (2014). *The Water Crisis in Yemen: Managing Extreme Water Scarcity in the Middle East*. Bloomsbury Publishing.

World Economic Forum (2015). *Global Risks 2015: 10th Edition*. Insight Report. Geneva.

World Health Organization (2013). *Global and Regional Estimates of Violence Against Women: Prevalence and Health Effects of Intimate Partner Violence and Non-partner Sexual Violence*. Available at <https://apps.who.int/iris/handle/10665/85239>.

World Health Organization, Food and Agriculture Organization of the United Nations, and World Organisation for Animal Health (2019). *Taking a Multisectoral, One Health Approach: A Tripartite Guide to Addressing Zoonotic Diseases in Countries*. Available at [https://www.oie.int/fileadmin/Home/eng/Media\\_Center/docs/EN\\_TripartiteZoonosesGuide\\_webversion.pdf](https://www.oie.int/fileadmin/Home/eng/Media_Center/docs/EN_TripartiteZoonosesGuide_webversion.pdf).

Woolhouse, Mark E.J., and Sonya Gowtage-Sequeria (2005). Host range and emerging and reemerging pathogens. *Emerging Infectious Diseases*, vol. 11, No. 12.

World Bank (2011). Costing adaptation through local institutions: Synthesis report. Washington, D.C.

\_\_\_\_\_ (2012). *People, Pathogens and our Planet: Volume 2 – The Economics of One Health*. Washington, D.C. Available at <http://documents.worldbank.org/curated/en/2012/06/16360943/people-pathogensplanet-economics-one-health>.

\_\_\_\_\_ (2014). *Natural Disasters in the Middle East and North Africa: A Regional Overview*. Washington, D.C. Available at [documents1.worldbank.org/curated/en/211811468106752534/pdf/816580WP0REPLA0140same0box00PUBLIC0.pdf](http://documents1.worldbank.org/curated/en/211811468106752534/pdf/816580WP0REPLA0140same0box00PUBLIC0.pdf).

\_\_\_\_\_ (2015). Data. Forest area (% of land area). Available at <https://data.worldbank.org/indicator/ag.lnd.frst.zs>. Accessed on 21 October 2019.

\_\_\_\_\_ (2018). *Beyond Scarcity: Water Security in the Middle East and North Africa*. Washington, D.C.

\_\_\_\_\_ (2019a). World Development Indicators. Databank. Available at <https://databank.worldbank.org/source/world-development-indicators/preview/on>. Accessed on 16 July 2019.

\_\_\_\_\_ (2019b). CO2 emissions (metric tons per capita). Databank. Available at <https://data.worldbank.org/indicator/EN.ATM.CO2E.PC>.

\_\_\_\_\_ (2019c). Somalia: Water. Climate Change Knowledge Portal. Available at <https://climateknowledgeportal.worldbank.org/country/somalia/impacts-water>.

\_\_\_\_\_ (2019d). Yemen: Water. Climate Change Knowledge Portal. Available at <https://climateknowledgeportal.worldbank.org/country/yemen/impacts-water>.

\_\_\_\_\_ (2020). *World Bank Group Strategy for Fragility, Conflict, and Violence 2020–2025*. Available at <http://documents.worldbank.org/curated/en/844591582815510521/pdf/World-Bank-Group-Strategy-for-Fragility-Conflict-and-Violence-2020-2025.pdf>.

World Economic Forum (2017). *The Global Gender Gap Report 2017*. Geneva.

\_\_\_\_\_ (2019). *The Global Risks Report 2019: 14th Edition*. Geneva.

World Inequality Lab (2018). *World Inequality Report 2018*.

WorldPop (2018). Global built-settlement growth. University of Southampton, School of Geography and Environmental Science; University of Louisville, Department of Geography and Geosciences; Universite de Namur, Departement de Geographie; Columbia University Center for International Earth Science Information Network.

World Resources Institute (2019). CAIT Climate Data Explorer. Available at <https://cait.wri.org/indcs/>. Accessed on 2 February 2020.

Yaseen, Thaer (2019). Invasive pests that threaten strategic agricultural crops in the Arab and NENA Region. *New Medit*, vol. 19, No. 4.

Yemen, Government of Yemen (2016). *Republic of Yemen: National Report*. Prepared for Third United Nations Conference on Housing and Sustainable Urban Development (HABITAT III). Quito, Ecuador.

Yemen, Government of Yemen, and United Nations High Commissioner for Refugees (2013). National policy for addressing internal displacement in Republic of Yemen. Available at <https://www.refworld.org/pdfid/5a7af3d74.pdf>.

Yemen, Government of Yemen, and others (2009). *Damage, Losses and Needs Assessment: October 2008 Tropical Storm and Floods, Hadramout and Al-Mahara, Republic of Yemen*. Available at [https://www.gfdr.org/sites/default/files/GFDRR\\_Yemen\\_DLNA\\_2009\\_EN.pdf](https://www.gfdr.org/sites/default/files/GFDRR_Yemen_DLNA_2009_EN.pdf).

Yount, Kathryn, and Abia Mehio Sibai (2009). The demography of ageing in Arab societies. In *International Handbook of Population Ageing*, Peter Uhlenberg, ed. Dordrecht, Netherlands: Springer.

Al-Yousfi, A. Basel (2004). Sound environmental management of solid waste: The landfill bioreactor. United Nations Environment Programme. Available at <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.578.1182&rep=rep1&type=pdf>.

Youssef, Ahmed, and others (2016). Analysis on causes of flash flood in Jeddah city (Kingdom of Saudi Arabia) of 2009 and 2011 using multi-sensor remote sensing data and GIS. *Geomatics, Natural Hazards and Risk*, vol. 7, issue 3.

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