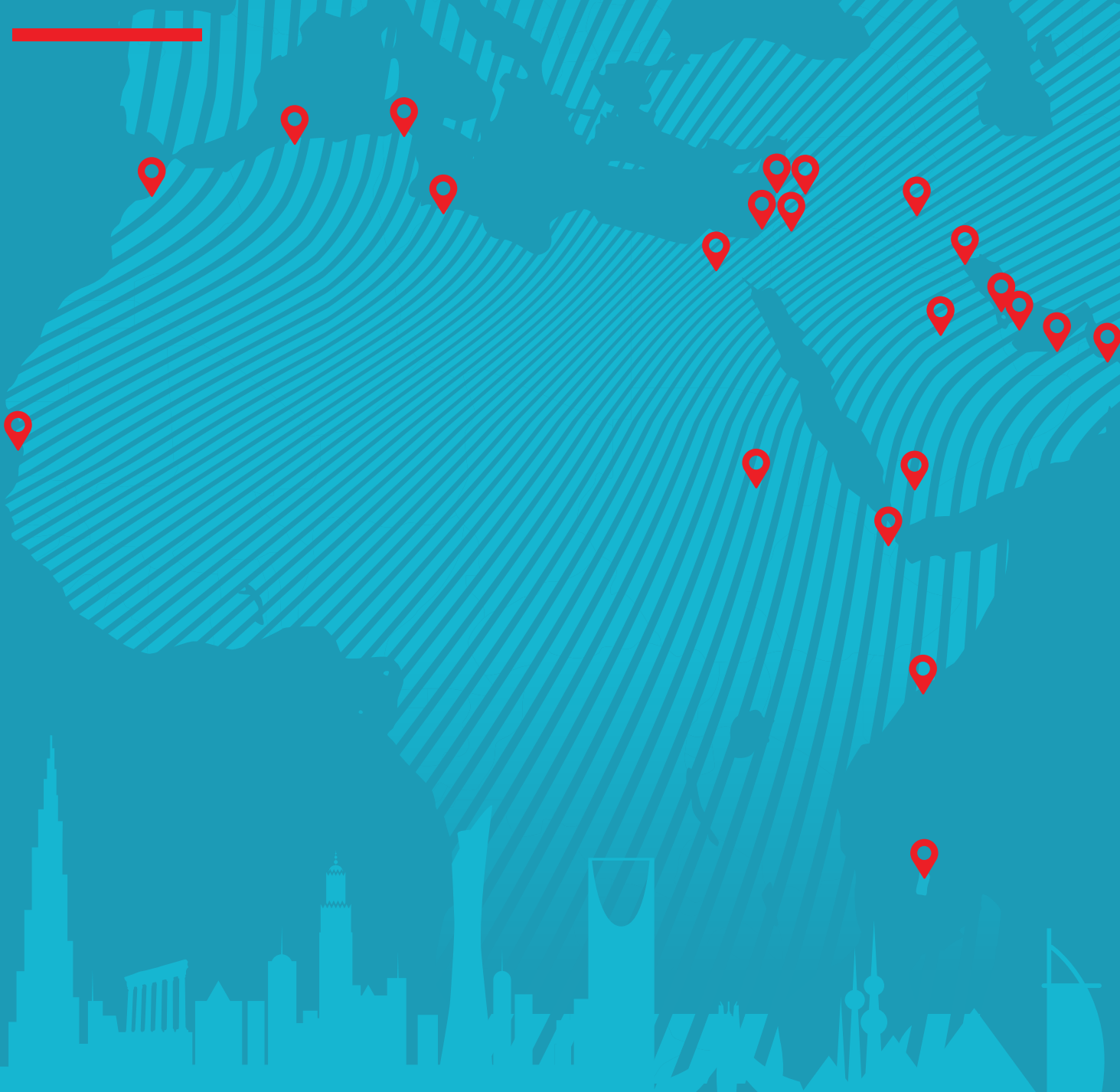




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THE ARAB CITIES RESILIENCE REPORT



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THE ARAB CITIES RESILIENCE REPORT



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Resilient nations.*

CITIES ARE WHERE THE BATTLE FOR SUSTAINABLE DEVELOPMENT WILL BE WON OR LOST

United Nations, The Report of the High-Level Panel of Eminent Persons on the Post-2015 Development Agenda. A New Global Partnership: Eradicate Poverty and Transform Economies Through Sustainable Development. New York: United Nations publication, 2013, p. 17.

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Abbreviations & acronyms

ACSAD	Arab Center for the Studies of Arid zones and Dry lands
AF MPI	Alkire-Forster Multidimensional Poverty Index
AI	Aridity Index
ANDV	Aqaba Neighbourhood Disaster Volunteer
ASEZA	Aqaba Special Economic Zone Authority
ATO	Arab Towns Organization
AUDI	Arab Urban Development Institute
CCA	Climate Change Adaptation
CI	Critical Infrastructure
CO	Country Office
DiMSUR Urban	Technical Centre for Disaster Risk Management, Sustainability and Resilience
DM	Disaster Management
DRG	Disaster Risk Governance
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
DST	Dead Sea Transform
EARS	East African Rift System
EM-DAT	The Emergency Events Database
EMR	Eastern Mediterranean Region
EMSC	European-Mediterranean Seismological Centre
GCC	Gulf Cooperation Council
GCIF	Global City Indicators Facility
GDCCD	General Directorate of Civil Defence
GDP	Gross Domestic Products
GFDRR	Global Facility for Disaster Reduction and Recovery
GIS4DS	Geographic Information System for Decision Support
GNI	Gross National Income
ICDO	International Civil Defence Organization
IDMC	Internal Displacement Monitoring Centre
IDP	Internally Displaced Person
IDSC	Information and Decision Support Centre
INDC	Intended Nationally Determined Contribution
IOM	International Organization for Migration
IPCC	Intergovernmental Panel on Climate Change
IRGC	International Risk Governance Council
ISIS	Islamic State of Iraq and Syria
ITCZ	Inter-Tropical Convergence Zone
LDCs	Least Developed Countries
LEED	Leadership in Energy and Environmental Design
LGSAT	Local Governance Self-Assessment Tool
MCR	Making Cities Resilient
MENA	Middle East and North Africa
MD	Multidimensional

NAO	North Atlantic Oscillation
NCCMDRR	National Committee for Crisis Management and Disaster Risk Reduction
NCEMA	National Emergency Crisis and Disaster Management Authority
ODI	Overseas Development Institute
OECD	Organisation for Economic Co-operation and Development
OICC	Organization of Islamic Capitals and Cities
PDTRA	Petra Development and Tourism Regional Authority
PGA	Peak Ground Acceleration
PME	Presidency of Meteorology and Environment
PPRD	Prevention, Preparedness and Response to Natural and Man-made Disasters
RA	Resilience Alliance
RCPs	Representative Concentration Pathways
ROAS	Regional Office for Arab States
SDC	Swiss Development Cooperation
SDGs	Sustainable Development Goals
SGS	Saudi Geological Survey
SLR	Sea Level Rise
SNSN	Saudi National Seismic Network
SPEI	Standardized Precipitation-Evapotranspiration Index
STC	Southern Tier Countries
UAE	United Arab Emirates
UBC	Uniform Building Code
UHI	Urban Heat Island
UNDESA	United Nations Department of Economic and Social Affairs
UNDP	United Nations Development Programme
UNHCR	United Nations High Commissioner for Refugees
UNFCCC	United Nations Framework Convention on Climate Change
UNISDR	United Nations International Strategy for Disaster Reduction
WB	World Bank
WCCD	World Council on City Data

Summary

At a time when the Arab region is going through political turmoil, numerous civil wars and an economic crisis, a debate about urban resilience may sound inapt or untimely. However the growing dominance of urban landscapes against rapidly changing, demographic, political, economic and climatic conditions means that the future of human development in the region will be determined by how its cities are governed. Indeed, an answer to the ongoing crises of the region might lie in the effective governance of its cities. How can Arab cities offer better opportunities to urban dwellers irrespective of their class, tribe, creed, gender, age or nationality of origin? What resources are available to the cities to foster such opportunities? To what extent are citizens represented in urban governance and can hold their representatives accountable? What risks, threats and challenges do cities face in ensuring a sustainable, equitable, safe and fulfilling lifestyle for their residents? How can those risks, threats and challenges be minimized? What capacities are required to address those risks and challenges? Some of these questions relate to the subject of this *Report*, especially those concerned with risks, threats and challenges to sustainable and safer urban development and the capacities needed in this regard.

Broad in concept, resilience is concerned with a society's ability to anticipate, prevent, respond to, and recover from potential shocks in the economic, social, political, technological and environmental domains. The subject matter of this *Report* is concerned with the shocks and threats posed by environmental hazards to urban development.

According to the UN Population Division, the total population residing in urban areas of the Arab region was just over 58 per cent by 2016.¹ Population and urbanization levels vary significantly across the Arab subregions. For instance, urban population in the Mashreq (Egypt, Iraq, Jordan, Lebanon, Palestine and the Syrian Arab Republic) was 88.5 million in 2015, compared to 64.1 million in the Maghreb (Algeria, Libya, Mauritania, Morocco and Tunisia), 43.3 million in the countries of the Gulf Cooperation Council (GCC - Bahrain, Iraq, Kuwait, Oman, Qatar, Saudi Arabia and the United Arab Emirates), and 27.5 million in the Southern Tier Countries (STC - Comoros, Djibouti, Somalia, South Sudan, Sudan and Yemen). On the other hand, the most urbanized subregion is the GCC (82.2 per cent), and the least urbanized area is the STC (34.6 per cent).

Numerous unique demographic, sociopolitical and economic trends have a strong bearing upon urban development, vulnerability and resilience in the Arab region. There is mushrooming of Medium and small cities have mushroomed across the region. Urban sprawl is another prominent feature of the settlement patterns in the region, as seen along the coasts of the Mediterranean, the Red Sea and the Arabian Gulf. The countries that have largest populations and higher poverty rates are also the ones that are experiencing the fastest urbanization rates, including Egypt, Iraq and Syria from the Mashreq subregion, and Somalia, Sudan and Yemen from the Southern Tier. Most of the 41.23 million urban poor who have been identified by the Alkire-Forster Multidimensional poverty index (AF MPI) as Multidimensional (MD) poor and the 21.5 million city dwellers who are at risk of MD poverty live in the above countries.²

FOOTNOTES

¹ The United Nations Population Division's World Urbanization Prospects [<https://data.worldbank.org/indicator/SP.URB.TOTL.IN.ZS?locations=1A>]. Accessed 30 January 2018.

² Nawar 2014.

Although the percentage of slums is decreasing in the Arab States (UN Habitat 2012), some of the countries are still home to big slum populations. The highest percentage of people living in slums is in Sudan (91.6 per cent), Mauritania (79.9 per cent), Somalia (78.6 per cent), Comoros (69.6 per cent), and Yemen (60.8 per cent). Even though the percentage is smaller in other countries like Syria (19.3 per cent), Morocco (13.1 per cent), Jordan (12.9 per cent), Egypt (10.6 per cent) or Tunisia (8.0 per cent), the absolute number of people living in slums or informal settlements in these countries is still in the millions.

The region has the fastest population growth rate in the world. More than half of the 405 million inhabitants of the region is younger than the age of 25. Unemployment rates among Arab youth are the highest in the world, turning this large social segment into a source of concern and potential instability. Indeed, the events of “the Arab Spring” have been attributed to the dissatisfaction of the educated urban youth with the existing system, and rising demands to accommodate their needs and interests.

The region is one of origin, destination and transit of refugees, internally displaced persons (IDPs) and migrants. The recent conflicts in Iraq, Libya, Syria and Yemen together with the enduring Palestine occupation have resulted in large displacements. The number of IDPs at 17,324,219³ is by far the largest in the world. There are 8,315,636⁴ refugees, mostly from Iraq, Syria, Yemen, Libya and Palestine. Jordan and Lebanon are the countries hosting the most refugees, followed by Egypt. The Gulf region is also home to 32 million⁵ migrant workers, mainly from Asia and other Arab States. Most of the refugees, migrants and IDPs typically live in urban slums and informal settlements,⁶ contributing to their vulnerability. Migrant workers make up the majority of the population in Bahrain, Oman, Qatar and the United Arab Emirates, creating a new set of challenges with regards to hazard and climate risks.

Another important consideration while addressing resilience-building is the importance of cultural and natural heritage and their preservation. The Arab region is home to a large number of cultural, religious and natural sites included on the World Heritage List. Protection of these sites is also important from the perspective of sustainable urban development, which is underlined also in Goal 11 (Sustainable cities and communities) of the Sustainable Development Goals (SDGs). Many Arab cities are economically dependent on tourism and, therefore, protection of the heritage sites is vital to the functioning of those cities. At the moment, there are 80 cultural and natural properties in total in the region that have been officially added to the World Heritage List, by the United Nations Education, Scientific and Cultural Organization (UNESCO).

In terms of environmental hazards that pose risks to urban development, the exposure to hydrometeorological hazards is comparatively very high. Between the 1982-2011 period, a total of 14,447 (97 per cent) hydrometeorological disasters were recorded together in the

FOOTNOTES

³ Our calculations, based on the Internal Displacement Monitoring Centre (IDMC) database [www.internal-displacement.org/global-figures]. Accessed 11 December 2016.

⁴ The World Bank, refugee population by country or territory of asylum [<https://data.worldbank.org/indicator/SM.POP.REFG>].

⁵ International Labour Organization (ILO), Labour Migration [<http://www.ilo.org/beirut/areasofwork/labour-migration/lang--en/index.htm>].

⁶ UN-Habitat, 25th Session of the Governing Council [<https://unhabitat.org/wp-content/uploads/2015/01/From-Refugee-Camps-to-Urban-Slums.pdf>]. Accessed 25 February 2018..

Emergency Events Database (EM-DAT) and the Disaster Information Management System (DesInventar) in comparison to 422 (3 per cent) geophysical disasters. Floods are the most commonly occurring events. The most devastating disasters have been caused by droughts and consequential famines. Sandstorms are also fairly common, as are forest fires in some countries of the Mashreq and Maghreb region.

Due to its highly arid desert conditions, the region is one of the most vulnerable to climate change. Climate change is expected to severely reduce the rainfall/runoff (by up to 50 per cent), and to increase the intensity of droughts and heat waves that can kill hundreds. A lack of potable water and sanitation facilities will increase waterborne and foodborne diseases. By 2025, the water supply in the region will be just 15 per cent of what it was in the 1960s. Sustainable urban development in the region will therefore be very much about water scarcity management and dealing with the effects of increased temperatures and heat waves.

These climate effects will put dozens of Arab cities at greater risk. The nexus between water-food scarcity and social unrest is becoming entwined, threatening to destabilize countries. IDPs, refugees, migrant workers and poor inhabitants of slums and informal settlements are the most vulnerable social segments. Unprecedented growth in disease is going to be a primary consequence of the water scarcity, droughts and heat waves. A lack of potable water and sanitation facilities will increase waterborne and foodborne diseases. Warmer city temperatures will lead to increases in respiratory disease due to the pollution effect. Heat cramps, exhaustion and stroke will cause more disease, reducing the number of workable days especially in summer. A side effect will be the increase in health-related costs and stresses. Energy demands will also increase for hot season cooling.

Coastal cities are also vulnerable hotspots for climate change. Most cities and towns in the Gulf, Mashreq, Egyptian Delta and North Africa are located by the Arabian Sea, Red Sea or on either side of the Mediterranean Sea. Over 70 per cent of the Tunisian and Libyan population live in cities along the coast. The Egyptian Delta – with almost 40 per cent of the total Egyptian population – is sandwiched between the Mediterranean and Red Seas. The coast of Lebanon is an extended sprawl of towns and cities, as is the Saudi Arabian coast along the Red Sea. On the Arabian Sea, in addition to the archipelago of Bahrain, all the major urban centres of Kuwait, Oman, Saudi, Qatar and the United Arab Emirates (UAE) are located on the Gulf shore. The coastal areas of the Maghreb and Mashreq are vulnerable to earthquakes, flash flooding and tsunamis. Flood and cyclone-related urban disasters could also lead to economic losses amounting to billions of dollars.

Although geophysical disasters are only a fraction of the total disasters experienced by Arab cities, they can be extremely devastating when they occur, as demonstrated by the violent earthquakes that have hit cities in the region. Dozens of cities in Algeria, Iraq, Jordan, Lebanon, Morocco, Palestine, Tunisia and Yemen are at risk of earthquakes. Cities in the coastal zones of Lebanon and the Maghreb are also vulnerable to tsunamis.

Contrary to the gravity of these risks from natural hazards, urban resilience-building remains generally an ignored aspect in the political and administrative landscape of the Arab States. Unlike elsewhere, the city is a weak link in the governance structure of the region, barring few exceptions in the case of certain megacities and special economic zones, as well as the cities in Palestine, which have become autonomous by default. For the most part, Arab cities lack autonomous local governments and therefore the ability to govern their affairs effectively. Urban planning, management and service delivery is relegated to central

ministries, which manage it either directly through local officials or by subcontracting private sector service providers, in many cases bypassing municipal authorities. The financial, administrative and technical capacities of most municipal authorities are very poor. Since most Arab States lack democratic systems, the representation of citizens in the local government affairs remains minimal, and the accountability and transparency of government officials almost nonexistent. Disaster risk management still remains primarily relegated to the Civil Defence department.

Another key impediment to building urban resilience is the cost. Barring the Gulf, most Arab countries lack the finances required to anticipate, prevent and mitigate risks to build urban resilience. The city authorities lack taxation powers, and central allocations are usually only sufficient to meet operating costs. Funds coming from development partners in the form of aid are too little to finance the interventions. In this context, the role of international lending institutions is crucial to support Arab cities in identifying resilience-building costs and financing the implementation process.

However, in spite of the weak urban governance and poor financing, many Arab cities have been introduced to the idea of urban resilience, and there are already good practices in place. This positive development is mainly attributed to the role of international protocols on disaster and climate risk management, and the support of international development partners, including UNDP, UNISDR, UN-Habitat, the Swiss Agency for Development Cooperation (SDC), the World Bank and the 100 Resilient Cities of the Rockefeller Foundation. More than two dozen cities across the region have benefited from the technical and financial support of the above partners in improving their capacities and resilience to natural hazards and climate risks. These include cities in Comoros, Djibouti, Jordan, Lebanon, Palestine, Saudi Arabia, Sudan and Tunisia. Algeria and the UAE have taken the lead independently with national resources to build urban resilience.

Tourism, trade and industry and foreign investments appear to be serving as key drivers behind the growing demands for urban autonomy in many countries in the region. In return, this is leading to new initiatives for decentralized urban governance and opportunities for financing of urban resilience. The region possesses significant technical and traditional knowledge for resilience-building, including academia, and national and regional research entities. There is a need to develop networking and build synergies between the scientific community and the local and national entities dealing with urban management. International development partners like the United Nations can play a critical role in this regard.

Finally, urban resilience is a continuous process that requires ongoing attention, as well as financial and human resources to account for the constantly changing hazard and vulnerability profiles of cities. Global best practices demonstrate that the benefits of building urban resilience far outweigh the costs. In the wake of the political events in Iraq, Libya, Syria and Yemen, and the growing climate-related risks, there is a much greater awareness among national authorities to adopt better governance practices (including decentralization, transparency, accountability) and reduce disaster and climate risks. Therefore the pendulum appears to be moving in the right direction, although the gaps are huge and multifarious.

This *Report* intends to establish a baseline for urban resilience in Arab cities starting from 2016 and highlight some important considerations that can facilitate meaningful progress in helping Arab cities to be better prepared to face climate and disaster risks, both today and in the future.

Introduction

Background

The Arab Cities Resilience Report 2016 explores resilience-building against natural hazards with a focus on the urban environment. In response to the rapid urbanization challenges in the region, the *Report* is an attempt to inform stakeholders about the growing threats from disaster and climate risks, to commence a debate about urban resilience, and to share best practices.

The *Report* was commissioned by the UNDP Arab Regional Hub under the Arab Cities Disaster Resilience Project. It is intended as a guiding resource for stakeholders in the region to support the achievement of their commitments towards the Sendai Framework for Disaster Risk Reduction 2015-2030⁷ and the SDGs,⁸ particularly Goal 11: Make cities inclusive, safe, resilient and sustainable.

It has also been drawn up to promote the implementation of the Aqaba Declaration on Disaster Risk Reduction in Cities adopted at the First Arab Conference on DRR, held in Aqaba, Jordan, on 19-21 March 2013.⁹ The *Report* is further informed by the priorities set forth in the Arab Strategy for Disaster Risk Reduction 2020.

The *Report* is geared towards The New Urban Agenda.¹⁰ However, while urban resilience thinking¹¹ in the New Urban Agenda focuses on building urban resilience to multiple stressors (political, social, economic, technological and natural), this *Report* focuses on resilience to natural hazards, which is a transformative commitment in the New Urban Agenda.¹²

Maintaining the focus on Arab cities, the *Report* highlights the drivers and challenges to resilience-building in the region. It covers the period from 2005 to 2030 and beyond, insofar as available data allows. The *Report* explores urbanization trends in the region, reveals exposure and vulnerability to the natural hazards that are prevalent in the region, and explores risk governance as an enabler of resilience-building at urban and municipal levels. Acknowledging that resilience-building is inherently context-specific, the *Report* further narrows its focus to highlight various cases of resilience-building in certain Arab cities.

The *Report* has the following key components:

- Urbanization trends reflecting current developments in the region and perspective on demographic and socioeconomic developments at subregional level: the Mashreq, the Maghreb, the Gulf, and the Southern Tier Countries;

FOOTNOTES

⁷ <http://www.unisdr.org/we/coordinate/sendai-framework>.

⁸ <https://sustainabledevelopment.un.org>.

⁹ <http://www.preventionweb.net/english/hyogo/regional/platform/acdrr/2014/>.

¹⁰ <https://www.habitat3.org/the-new-urban-agenda>.

¹¹ UN-Habitat 2015c.

¹² UN-Habitat 2016.

- Hazard exposure and vulnerability profile of the region with a particular focus on hydrometeorological and geophysical hazards at regional, subregional and city levels, where data allows;
- Governance analysis and praxis of resilience-building against natural hazards at the city and municipal levels in the context of their specific disaster and climate risk landscapes.

As a first attempt to explore Arab cities' resilience to natural hazards, the *Report* sets the stage for further debate about making cities resilient against emerging risks. The *Report* acknowledges the complex interplay between *hazard exposure*, *vulnerability*, and *resilience capacities* of cities and their inherent interdependency in their broader national and regional contexts, as well as the synergies with the surrounding rural and suburban areas. Later editions of the *Report* should offer more refined qualitative as well as quantitative analysis on issues of urban resilience to disaster risks in the Arab States.

Rationale

This *Report* is designed to inform and provoke: to inform about concepts, their limitations, and how they are viewed in the Arab region; and to provoke new ideas and thinking for both discussion and resilience interventions in Arab cities.

This *Report* appears at a time when the Arab region is experiencing a very turbulent period in its history. On one hand, it is seeing extraordinary growth in urbanization which presents new opportunities for the millions of people living there. On the other hand, civic unrest and ongoing conflicts in the region are threatening to jeopardize development gains for many generations to come.

At the moment, the region's outlook is dominated by social unrest and armed conflicts. Some countries have experienced devastating war and civil unrest in the recent past and are still feeling the ramifications (e.g., Bahrain, Egypt, Lebanon and Somalia). Others are still in active conflict and war situations, like Syria, Iraq, Libya, Yemen and Palestine with its long-drawn-out occupation and conflict. There is, of course, also the situation surrounding the so-called Islamic State of Iraq and Syria (ISIS) which, despite international efforts to combat it, still manages to cling to territories in both Iraq and Syria, threatening further destabilization of the region. In this context it might be argued that the risk of disasters probably should not be given the highest priority. On contrary, however, it is of vital importance to examine how resilience-building activities can help reduce long-term reliance on humanitarian assistance and bring stability and prosperity to the region.

Limitations

This *Report* should be seen in light of the following limitations on its design and development, as well as its further application to the region.

1. Terminology and concept definitions

There is a certain ambiguity in the definition and interpretation of each of the words in the phrase: *Arab cities' resilience*.

- Arab is a cultural and linguistic term, but it is also a geographic region. In this *Report*, it refers to the geographic region of the world that consists of the following 22 countries in the Middle East and North Africa: Algeria, Bahrain, the Comoros Islands, Djibouti, Egypt, Iraq, Jordan, Kuwait, Lebanon, Libya, Morocco, Mauritania, Oman, Palestine, Qatar, Saudi Arabia, Somalia, Sudan, the Syrian Arab Republic, Tunisia, the United Arab Emirates, and Yemen.
- Criteria for what constitutes a *city* remain opaque. There is no clear-cut definition of *cities* in the literature. The practice across the globe, including the Arab region, shows that countries define for themselves what is urban, with great variation in the kind and size of the places deemed as urban.¹⁴ Further, there is no harmonization in the region on data collection in terms of the demographics of urban areas. The data collected does not differentiate between urban agglomerations, metropolitan or municipal areas either.
- Resilience was voted the “development buzzword” of 2012, according to devex.com, but many remain confused about what it actually means. Resilience is not just one of the most contested concepts with no single theoretical framework, but also a new preferred paradigm among development organizations.

2. Sketch rather than finished drawing

As the very first of its kind, the focus of this *Report* is on outlining the vulnerabilities of Arab cities, along with the main drivers and inhibitors of resilience-building. The *Report* does not claim to be comprehensive in terms of the various conceptual definitions and empirical applications of resilience in Arab cities. By no means does it provide a full representation across the spectrum of disaster and climate resilience-building in the region.

3. Resilience thinking at a crossroads

The main limitation is probably that the resilience thinking in development is still very much an evolving area of knowledge and practice. There is a wide variety of conceptualizations but none are shared. Hence, there is widespread confusion concerning its implementation in actual resilience-building strategies and programmes. This *Report* therefore provides an overview of the spectrum of resilience thinking, allowing each of the partners to experiment and find the most suitable fit-for-purpose approach in any given context.

Report development process

The *Report* was drawn up by a team of experts in close collaboration with various development partners in the Arab region. The *Report* was conceptualized during a regional brainstorming workshop of urban, innovation, disaster and climate experts which was held at the Dead Sea in August 2015. Further, a consultation with national and local stakeholders was organized through the Amman Resilience Forum that took place on 25-26 November 2015, in Jordan. This was attended by stakeholders from Arab cities, civil society organizations, media, youth and women's representatives, and UNDP experts.

This *Report* is primarily based on secondary sources, including existing scientific and grey literature from a wide range of fields, such as disaster and climate risk management, governance, resilience, sustainable development, crisis management, sustainable urban development, risk management, and many more.

The team of experts, in close cooperation with UNDP Country Offices (COs), selected several cities for a closer analysis of resilience-building. Given the time pressure, primary and secondary data was balanced in these rapid assessments with cross-referencing and review. The case studies illustrate the context-specific variability of resilience-building in the Arab region.

Acknowledgements

This *Report* has been published under the Arab Cities Disaster Resilience Project, which was implemented by the UNDP Regional Centre from January 2015 through December 2016. The *Report* was produced after a year-long process of consultations, research and analysis. A three-member team of authors led the writing, and their work was supported by contributions from numerous individuals, consultative forums and organizations. Mr Zubair Murshed, Regional DRR Specialist conceptualized the *Report* and led the process of development of the *Report*. He also served as editor and prepared written contributions to the analysis on urban governance for resilience. Mr Kishan Khoday (team leader, climate disaster, energy Arab States), Ms Jennifer Colville (regional policy advisor, innovation), Mr Walid Ali (climate change specialist), and Mr Justus Okoko (coordination specialist, the UNDP Regional Hub) provided inputs into the design of the *Report*.

Ms Magda Stepanyan served as the lead author, supported by Mr Djillali Benouar and Mr Wadid Erian. Mr Djillali Benouar wrote a chapter on the analysis of seismic hazards and risks. He also contributed best practice cases from Algeria. Mr Wadid Erian wrote the chapter on hydrometeorological hazard risks within the context of climate change. Mr Adel Al-Assaf, Project Coordinator, provided crucial management and communications support to the production process, including interaction with partners for organization of

FOOTNOTES

¹² <http://www.prb.org/Publications/Articles/2009/urbanization.aspx>.

consultation events. Mr Jacques Aswad, researcher and English language editor, provided crucial inputs in finalizing the report and the referencing system. The Programme Support Unit (PSU) of the Regional Programmes Division of UNDP was instrumental in the logistical management of consultative events and in the contract management namely Mr Tarek T. Abdelhadi and Mr Youssef Beyhum. Mr Yakup Baris, the programme manager of the Regional Programmes of UNDP led the regional consultative forum in Kuwait.

Many experts served as authors of the case studies. They include Mohammed Shaheen, Chief Resilience Officer, Ramallah Municipality; Mr Husam Tubail, UNDP Palestine; Dr Jalal Al-Dabeek, Al Najah University Palestine; Ms Karine Zoghby, UNDP Lebanon; Mr Abdul Qadir, UNDP Somalia; Mr Abdirisak Hussein Aden, UNDP Somalia; and Nuha Eltinay, Director of Urban Planning and Sustainable Development, Arab Urban Development Institute (AUDI). Mr Hicham Ezzine, Senior Consultant, from the Geographic Information System for Decision Support (GIS4DS), supported the development of Table 7.

Three regional consultative forums were held between June 2015 and October 2015 in the Dead Sea, Amman and Kuwait respectively; the Dead Sea Consultative Forum on Arab Cities Resilient Report (June 2015), the Amman Cities Resilience Forum (August 2015) and the Kuwait Cities Resilience Forum (October 2015). The Forums were attended by DRR experts, governance experts, city representatives, city networks, UN agencies including UN-Habitat and UNISDR, and regional organizations. The discussions at the forums played a crucial part in defining the purpose and structure for the *Report*, as well as the process of its development. Participants of the forums also made written contributions, especially in terms of case studies.

The Arab Towns Organization (ATO) and its subsidiary, the Arab Urban Development Institute (AUDI) actively participated in the consultation forums and demonstrated keen interest to use the *Report* in raising awareness of their member cities about disaster risks and urban resilience.

01

Conceptualizing urban resilience to natural hazards

1.1 Resilience

A fusion of ideas from various fields has been used to underpin certain aspects of resilience. In order to effectively address resilience-building issues, particularly those related to urban resilience to disaster and climate risks, it is important to first have an understanding of the concept of resilience. David E. Alexander (2013) traces the evolution of the concept from Roman antiquity to modern times. The first scientific definition of the concept, due to Holing (1973), emphasized on the general persistence of ecological systems functioning under continuous change. Later it was expanded to address the question of the *adaptation* of humans in nature. The most recent refinement of the concept takes it to the more critical question of social *transformation* in the face of global change, the latter implying that environmental problems cannot be addressed in isolation from the social context and that when exposed to specific shocks a system can undergo transformation from one state to another, creating thereby a new system pathway.

In simple terms resilience is the long-term capacity of a system to deal with change and shocks and continue to evolve. UNISDR 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.”¹ This definition emphasizes hazards and the ability to resist and recover quickly.

The Intergovernmental Panel on Climate Change (IPCC 2014b) definition of resilience is similar to that of the UNISDR, except that it also highlights the ability to anticipate hazards as a key element in resilience-building, and to maintain “the capacity for adaptation, learning and transformation.”

With the focus on socioecological systems, scholars from the Resilience Alliance (RA 2010) drew attention to further characteristics of resilience (i.e., the capacity of a system for learning, adaptation and self-organization).

In its Strategic Plan 2014-2017: Changing with the World, UNDP defines resilience as “an inherent as well as acquired condition achieved by managing risks over time at individual, household, community, and societal levels in ways that minimize costs, build capacity to manage and sustain development momentum, and maximize transformative potential.”² Importantly, UNDP places risk at the centre of resilience-building, linking it with sustainable development objectives.

FOOTNOTES

¹ United Nations. *Report of the open-ended intergovernmental expert working group on indicators and terminology relating to disaster risk reduction*, 1 December 2016 [A/71/644, p. 22].

² UNDP Strategic Plan 2014-2017: Changing with the World, p. 34, note 8. http://www.undp.org/content/dam/undp/library/corporate/UNDP_strategic-plan_14-17_v9_web.pdf. Accessed 25 February 2018.

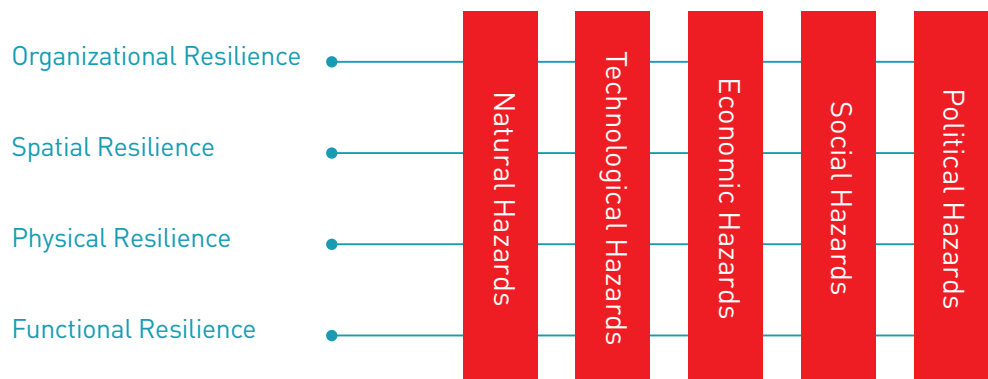
At the core of the concept of resilience is the notion of change (especially in the form of shocks) and its associated risks, often (but not always) a change that could potentially have a negative impact on a system (e.g., disaster, crisis, stress or disturbance). This *Report* employs such an operationalization of the concept of resilience that reflects the latest thinking within the scholars' community,³ and is geared to address uncertainties and manage risks:

- capacity to anticipate risk
- capacity to respond to and manage risk (including risk reduction and risk transfer)
- capacity to cope with disaster, crisis, stress, disruptions (when risk materializes)
- capacity to recover from disaster, crisis, stress, disruptions
- capacity to adapt to a changing context (by learning)

1.2 Urban resilience

Resilience has emerged as a central theme in urban development, being perceived as a quality of sustainable urban development as much as a driver of development itself.⁴ In the run-up to the Habitat III Conference held in October 2016, the UN Task Team on Habitat III proposed a concept for urban resilience: the Urban System Model Approach. The model highlights a variety of hazards and, importantly, pinpoints the urban systems whose resilience is crucial to build and maintain the effective functioning of cities. Figure 1 illustrates the Urban System Model Approach.

Figure 1
Urban system
model approach



The model considers four critical and interdependent dimensions of urban resilience common to all human settlements: organizational, spatial, physical and functional. *Organizational resilience* implies resilience of any human association – formal or informal, corporate or political, at various scales. The *spatial resilience* highlights the difference in spatial distribution of human settlements from the smallest plot up through urban segments, to peri-urban, district, national and international contexts. The *physical resilience* refers to the resilience of infrastructure from small dwellings to the complex, built environment of megacities. Finally, *functional resilience* reflects the importance of processes and flows from a rural village market and transport hub, to commercial, governance, and social processes in large cities.

While this model addresses all possible hazards (e.g., natural, technological, social, economic, political), the focus of this *Report* will be on natural hazards only and the resilience of Arab cities against the risks posed by those hazards.

FOOTNOTES

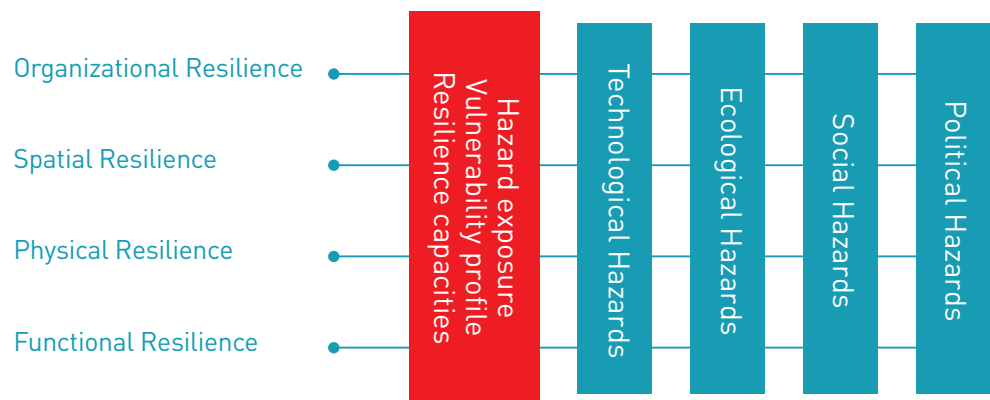
³ Birkmann et al. 2013.

⁴ UN-Habitat 2015c.

1.3 Urban resilience to natural hazards

When addressing urban resilience to natural hazards it is important to understand the scenarios of disaster and climate risks that could possibly threaten the well-being of the urban population and the proper functioning of the urban system. The risks to urban systems originate from a complex interplay of hazards, exposure and vulnerabilities in the urban setting, in combination with the effectiveness of the resilience capacities in place.

Figure 2
Urban system
model: drivers
and challenges to
resilience



1.4 Some background considerations

Before turning to an analysis of the urban resilience of Arab cities, it is important to reflect upon the following aspects that help to explain the gravity of the challenge and provide direction for resilience analyses.

1.4.1 Disaster risks are socially constructed

Since 1990, academics and practitioners around the globe have increasingly come to recognize the notion that disaster risk is a social construct.⁵ The social nature of disaster risks can be explained by two factors: (a) vulnerability that has a social quality (the vulnerability of the poor population in slums differs from that of the middle-income population in a metropolitan area, for example); and (b) the perception of risk that can be explained by the level of understanding about the actual exposure to hazards and the potential consequences. Regarding the latter, there is a growing gap between expert and lay people's assessments of risk that can have adverse consequences in terms of acceptance of disaster risk management (DRM) measures, trust in institutions introducing DRM measures, and the general level of preparedness of the population to cope with risks. Therefore, when assessing disaster and climate risks and defining resilience-building strategies, it is essential to take the socially constructed nature of risk into consideration.

FOOTNOTES

⁵ Birkmann et al. 2013.

1.4.2 Understanding emerging disaster and climate risks is increasingly difficult

In its review *Future Global Shocks* (OECD 2011), the Organisation for Economic Co-operation and Development emphasized that in the future, the task of assessing risk will be made all the more difficult by the interaction of known risks with previously unknown or unprepared-for vulnerabilities. While this argument is made in regard to global shocks and novel hazards, it equally applies when addressing risks from natural hazards, because it is difficult to ascertain, due to ever-growing interdependencies, the distributional effects of disaster and climate risks across geographic regions, sectors, industries and generations. This makes it necessary to take into account not only the known risks, but also the unknown ones. This challenges the capacity of the relevant agencies to anticipate, plan and respond to emerging risks and, most importantly, how their effects could cascade across various systems. Therefore, resilience-building strategies should be focused not only on adaptation to or reduction of predictable risks, but also on creating the necessary conditions for pre-adaptation, also called *exaptation* (a generic trait gets used for something else, unexpectedly by surprise).⁶

This requires building certain qualities into a resilient system. In its City Resilience Index, for example, the Rockefeller Foundation explores various indicators of a resilient system, among which are redundancy, or the spare capacity of a system to be able to accommodate a disaster, and flexibility – when a system can evolve and adapt in response to a change, which in turn would imply a degree of decentralization in the system.

1.4.3 Emerging vulnerabilities require regular relevance checks

One of the confident conclusions of the IPCC landmark publication, *Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation*, is that “*vulnerability and exposure are dynamic, varying across temporal and spatial scales, and depend on economic, social, geographic, demographic, cultural, institutional, governance, and environmental factors.*”⁷ The relevance of this statement can be further emphasized from the resilience perspective. Aggravation of vulnerability will inevitably change (lower) the threshold⁸ of the system’s susceptibility to the severity of a natural hazard. That is why many would argue that reducing vulnerabilities and improving livelihoods could be considered a means to improve resilience.⁹ A changing vulnerability context explains the emerging or re-emerging nature of disaster or climate risks. Therefore, when setting up resilience indicators and standards for resilience-building, it is also important to carry out regular relevance checks (in light of the changed hazard and vulnerability profile) of the resilience threshold, and thus the targets for resilience-building.

FOOTNOTES

⁶ Dave Snowden, Cognitive Edge, <http://cognitive-edge.com>. See also his public lecture at the Ohio State Wexner Medical Center [<https://www.youtube.com/watch?v=pHjeFFGug1Y>]. Accessed 25 February 2018.

⁷ IPCC 2012, p. 67.

⁸ Climate threshold: “A critical limit within the climate system that induces a non-linear response to a given forcing.” See also Abrupt climate change (Ibid, p. 557).

⁹ IDS 1992.

1.4.4 Resilience-building has to be sufficiently future-oriented

In addressing resilience, it should be recognized that resilience-building requires a time horizon well beyond today. There is no need to build resilience to today's risks if they are likely to change significantly in the future. Defining which time horizon in the future to target could potentially explain the pace of resilience-building, standards and indicators, and type of planning required, as well as the outcomes of the resilience-building effort. Therefore, when designing and implementing resilience programs, the time horizon identified by different stakeholders for resilience-building across various dimensions of the urban system needs to be carefully considered.

1.4.5 Resilience-building requires trade-offs

Resilience-building is a political decision. It often has trade-offs that require some amount of risk to be tolerated in one or more areas, for one or another stakeholder. In a resource-constrained context, there will always be trade-offs between what is practical, what is fair, what is affordable, etc. Ultimately, addressing resilience requires careful consideration about which risks matter and therefore, which risks to prioritize and which to tolerate. In building resilience there will be winners and losers. Therefore, resilience-building inevitably is intertwined with issues of equality in society. This is relevant even when comparing risks across the same time horizon or those that target a different time horizon. Trade-offs in making decisions about resilience investments has to be driven by ethical and practical considerations, which closely relates to the following statement.

1.4.6 Resilience is not necessarily good or bad

Investment in resilience-building has to be justified. It might very well be the case that instead of investing in building resilience it may be more prudent to allow the system to cross the threshold. For example, it may not be justified to invest in building resilient housing in coastal areas that will be subject to significant inundation over a period of ten years due to the changing climate. Instead, the best option might be to relocate the settlement to other areas. Therefore, the focus is not on resilience *per se* but on a tailored response to the risks that populations, ecosystems and infrastructures are facing in a given time frame. Again, the question is: Whose risks set the priorities when addressing disasters and climate change?

1.4.7 Resilience of critical infrastructure with supranational significance raises global risk governance issues

When building urban resilience to natural disasters and climate risks it is also important to acknowledge that large cities often host critical infrastructure (CI) with a regional or even global significance. The disruption of properly functioning CIs by disasters could have potential ramifications impacting sectors and territorial jurisdictions, extending far beyond the city itself. Such risks raise numerous questions concerning global risk governance.

1.4.8 Domino effect of risk impact in cities¹⁰

The unique dynamics of risk in urban settings rest in the intricate links between cities and disasters that evolve in two directions: disaster causes the destruction of the built environment, while at the same time, the inherent organizational, spatial, physical and institutional nature of the urban fabric in itself increases the risk: intensifying hazards or creating new ones, exacerbating vulnerabilities, and negatively affecting existing response and recovery mechanisms. The city-disasters nexus needs to be explored from this reciprocal perspective, recognizing that risk can travel across sectors, industries, geographic locations, generations, etc.

1.4.9 Disrupted cause and effect relationships of risk

Such disruption occurs in various dimensions: across generations, geographic borders, jurisdictions, sectors and institutions – a butterfly effect that often escapes our attention. For instance, the factors generating and amplifying risk might be contributed to by one group of actors, whereas the effects of the risk can be significant for another group. Risks we cause today may have an impact over generations (think of climate change, for instance). This requires a more holistic approach in understanding and responding to disaster and climate risks. Resilience-building, therefore, is inevitably linked with the multiplicity and interconnectedness of various risks across different domains that could potentially be triggered or exacerbated by a disaster or climate risks.

FOOTNOTES

¹⁰ This paragraph is indebted to C. Wamsler and E. Brink, "The Urban Domino Effect: A Conceptualization of Cities' Interconnectedness of Risk." Input paper for the *Global Assessment Report on Disaster Risk Reduction (GAR)* 2015. Available at <https://www.unisdr.org/we/inform/publications/48146>.

1.5 Resilience- building indicators and targets

The selection of indicators depends on the assumption of what is being measured or assessed: Is resilience a process or is it an outcome? To be able to measure resilience, it is important to address the following questions: The resilience of what? To what? For whom? For what purpose?

It is difficult to recognize resilience in action. Some would argue that resilience cannot be measured, but only illustrated in perspective (e.g., more resilient than before or more resilient than others). However, there is growing consensus that “measuring resilience provides a potentially powerful way to evaluate both intentional change, as in the change that results from programmes or policies, and unintentional change that comes about as a result of unforeseen system dynamics.”¹¹

Resilience indicators are often designed to address the goal of positive livelihood outcomes rather than resilience *per se*.¹² Thus, from this perspective, resilience can be measured with development indicators. The OECD (2014), for instance, defines various levels and types of indicators including process, output, and proxy impact indicators. In the meantime, according to ODI (2015) findings, a resilient system has certain qualities that define the key set of criteria for resilience indicators: *learning*, *options* and *flexibility*. Learning implies a better understanding of the hazards and vulnerabilities, awareness of risks, and an ability to incorporate lessons learned into resilience strategies and programmes. The options, or diversity, criterion implies access to a variety of means to cope with risks and circumvent the drivers of vulnerability. Flexibility implies that systems can perform and deliver their services under a wide range of conditions, including disasters.

While there have been many attempts to conceptualize resilience measurement and its indicators, there is a practical need to measure resilience using consistent mechanisms, in order to enhance accountability, guide public investment and define the road map for improvement. With regard to measuring urban resilience, there are six significant developments taking place today:

- UN-Habitat is currently developing a set of indicators to support the implementation of the Urban System Model Approach. This is a work in progress.
- The World Bank Global Facility for Disaster Reduction and Recovery (GFDRR)¹³ have developed the CityStrength Diagnostic tool for risk, resilience, and the performance of urban systems. The tool is structured around sectoral modules, including community and social protection, DRM, education, energy, environment, health, water, sanitation, etc.
- The Rockefeller Foundation, together with Arup, has developed the City Resilience Framework¹⁴ that explores the qualities of resilient systems, indicators and categories. Importantly, the focus of this work is on city resilience in all categories, including health and well-being, the economy and society, infrastructure and environment, as well as leadership and strategy.

FOOTNOTES

¹¹ Quinlan et al. 2015, p. 9 (685).

¹² ODI 2015.

¹³ <http://www.worldbank.org/en/topic/urbandevelopment/brief/citystrength>.

¹⁴ http://www.100resilientcities.org/resilience#/-_/.

- The OECD is also investigating how cities can increase their resilience through governance, environment, economy and society.¹⁵
- The Resilient City Connect (RCC)¹⁶ platform has been established as a partnership between UNISDR, the Netherlands' Ministry of Infrastructure and Environment, and the Japan Bosai Platform (JBP), a business association representing 119 small to large corporations based in Japan. The RCC platform is deemed a learning place for cities to know more, to invest wisely and to build more safely. It has become the world's largest association of local governments, with more than 3,000 cities and municipalities signed up to the partnership.
- UNISDR's Making Cities Resilient Campaign¹⁷ focuses solely on building the resilience of cities to natural disasters and climate risks disasters. UNISDR has developed and effectively implemented around the globe the 'Ten Essentials' for city municipalities to comply with in order to make them resilient to disasters. About 3,000 cities had joined the campaign by 2015. From 2017 onward, an updated version of the Ten Essentials is being piloted. The handbook for mayors, governors, councillors and other local government leaders on "How to Make Cities More Resilient" was translated into Arabic and has been widely disseminated in the region. UNISDR provided a self-monitoring tool to all participating cities; the Local Government Self-Assessment Tool (LGSAT) assists local governments to assess DRR progress, and aids them in addressing gaps and challenges.

UNISDR has also committed to support the implementation of the standardized performance measurement of sustainable cities. To measure this, 100 indicators have been defined and included in ISO 37120:2014,¹⁸ developed by the Global City Indicators Facility (GCIF)¹⁹ and coordinated by the World Council on City Data (WCCD).²⁰

To address some of the divergence in tools and approaches to building urban resilience, a new alliance among nine of the world's largest UN and non-UN organizations,²¹ called Medellín Collaboration for Urban Resilience,²² was established at the World Urban Forum in 2014. Its purpose is to foster the harmonization of approaches and tools used in different contexts for assessing strengths and vulnerabilities to natural hazards.

It is important to recognize another aspect of resilience measurement, which is that measuring resilience numerically is impractical. Resilience cannot be measured as a single entity due to the different risks facing people and the varying abilities they may rely on to address those risks.²³

FOOTNOTES

¹⁵ http://www.100resilientcities.org/resilience#/-_/.

¹⁶ <https://www.unisdr.org/archive/43216>.

¹⁷ <https://www.unisdr.org/we/campaign/cities> and <https://www.unisdr.org/campaign/resilientcities/>.

¹⁸ http://www.iso.org/iso/37120_briefing_note.pdf.

¹⁹ <http://cityindicators.org>.

²⁰ <http://www.dataforcities.org/wccd/>.

²¹ The Collaboration includes: UN Office for Disaster Risk Reduction (UNISDR), UN-Habitat, the Rockefeller Foundation's 100 Resilient Cities Acceleration Initiative and C40 Cities Climate Leadership Group, the World Bank, the Global Facility for Disaster Reduction and Recovery (GFDRR), ICLEI – Local Governments for Sustainability, and the Inter-American Development Bank.

²² <http://unhabitat.org/new-global-collaboration-for-urban-resilience-announced-at-wuf7/>.

²³ ODI 2014.

With or without numerical measurements, it is important to understand how societies and communities are changing and how their resilience will evolve in the face of such changes. There is a need to understand why and how resilience fails, and identify resilience successes at the same time. Yet there is insufficient understanding of how the human factors drive or impede resilience, compared with the physical defences and how complex drivers and inhibitors of resilience are interrelated. This will help to determine when to introduce mitigation measures in advance of an event, and when to deploy recovery assets.

The foregoing demonstrates the gravity of the challenge and explains how the work on resilience planning, measurement, indicators, standards and targets is evolving along with resilience thinking. It has yet to be discussed in the Arab region how cities plan to achieve resilience, which indicators are more relevant to the local context, how many of them should be used, and how to identify those targets that address the very specific risks each city faces. This *Report* highlights some of the important drivers and inhibitors of urban resilience in the Arab region.

1.6 Final scoping remark: governance

With growing understanding of the complex relationships between the cause and effect of risk, the attention is shifted from mainly hazard and vulnerability assessment to governance considerations. An effective risk governance mechanism (be it a multi-stakeholder fund, an inter-ministerial committee, an open platform, or another form of collaborative effort) can provide a legitimate basis for risk response across all dimensions, timely risk communication, and effective management of both threats and opportunities. This is an emerging reality that development partners are facing and, most importantly, shaping.

It has become almost a textbook example of UN-Habitat that urban governance is the software that enables the urban hardware to operate.²⁴ From the perspective of resilience to natural hazards, urban governance may be seen as *the* software that enables the urban hardware to function properly by reducing risks to avoid shocks, and to recover when hit by catastrophes.

The importance of risk governance in building resilience to natural hazards was also underlined in the Sendai Framework for Disaster Risk Reduction 2015-2030 as necessary and because it “fosters collaboration and partnership across mechanisms and institutions for the implementation of instruments relevant to disaster risk reduction and sustainable development.”²⁵

This *Report* explores the importance of governance as a primary prerequisite in building resilience to disasters and climate risk.

FOOTNOTES

²⁴ www.unhabitat.org.

²⁵ Sendai Framework for Disaster Risk Reduction 2015-2030 (Geneva, Switzerland; UNISDR, 2015), p. 17.

02

Urban exposure and vulnerability

2.1 Urbanization profile

Table 1
Main urbanization indicators for subregions and countries in 2015

2.1.1 Urbanization: regional trends

Even though urbanization trends vary widely between countries, there is a global trend towards rapidly growing urbanization. In the Arab region, the total population residing in urban areas reached 55.8 per cent in 2015 and will continue to grow to 58 per cent by 2030 (Figure 3). The level of urbanization varies significantly across the different subregions.

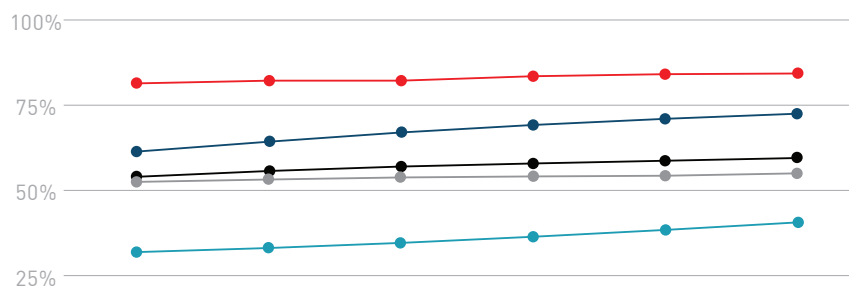
The total population in urban environments is growing in each of the subregions: in the Mashreq – from 88.5 million in 2015 to 121.6 million in 2030, in the Maghreb – from 64.1 million in 2015 to 82.6 million in 2030, in the GCC – from 43.3 million in 2015 to 54.6 million in 2030, and in the STC – from 27.5 million in 2015 to 45.2 million in 2030. The most urbanized subregion is the GCC (82.2 per cent in 2015 and projected at 84.3 per cent in 2030). The least urbanized area is the STC (34.6 per cent in 2015 and 40.6 per cent in 2030). The ranking of the subregion urban population will not change in 2030, but the STC subregion will come very close to the GCC subregion.

Table 1 provides an overview of the key urbanization indicators in the Arab region. The details of the dynamic for each indicator for the period 2015-2030 are given in Annex 5.

Region	Country	% of Population in Urban Areas	Urban Population, 1000	Average Annual Rate of Change of the Urban Population, %	Average Annual Rate of Change of the Percentage Urban, %	Slum population as a percentage of urban population, 2014, %
Mashreq	Lebanon	87.8	4 437	3.18	0.14	-
Mashreq	Jordan	83.7	6 435	3.79	0.29	12.9
Mashreq	Palestine	75.3	3 423	2.81	0.30	-
Mashreq	Iraq	69.5	24 847	3.01	0.13	47.2
Mashreq	Syria	57.7	12 837	1.37	0.70	19.3
Mashreq	Egypt	43.1	36 538	1.68	0.05	10.6
Mashreq Total			88 517			
Maghreb	Libya	78.6	4 962	1.13	0.23	
Maghreb	Algeria	70.7	28 739	2.77	0.93	
Maghreb	Tunisia	66.8	7 510	1.38	0.27	8.0
Maghreb	Morocco	60.2	20 439	2.26	0.85	13.1
Maghreb	Mauritania	59.9	2 442	3.54	1.09	79.9
Maghreb Total			64 093			
STC	Djibouti	77.3	696	1.60	0.09	
STC	Somalia	39.6	4 399	4.06	1.19	73.6
STC	Yemen	34.6	8 837	4.03	1.73	60.8
STC	Sudan	33.8	13 391	2.54	0.43	91.6
STC	Comoros	28.3	218	2.67	0.27	69.6
STC Total			27 541			
GCC	Qatar	99.2	2 333	6.02	0.12	
GCC	Kuwait	98.3	3 524	3.63	0.02	
GCC	Bahrain	88.8	1 207	1.71	0.05	
GCC	Emirates	85.5	8 192	2.87	0.35	
GCC	Saudi Arabia	83.1	24 854	2.10	0.25	-
GCC	Oman	77.6	3 228	8.54	0.65	
GCC Total			43 338			
Grand Total			223 489			

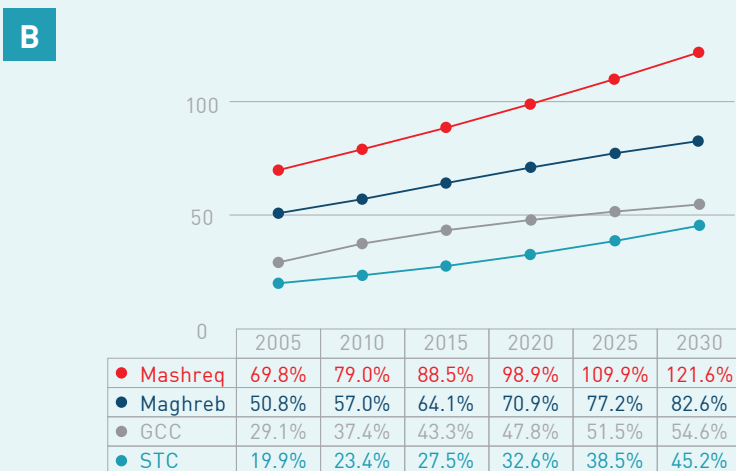
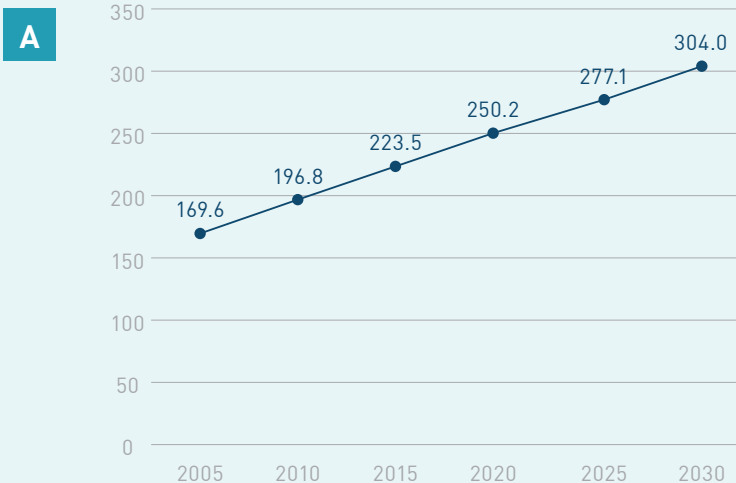
Source: The UN Department of Economic and Social Affairs (DESA)/ UN Population Division (UNPD), World Population Prospects [<https://esa.un.org/unpd/wpp/DataQuery/>].

Figure 3
Urban population percentage of total population, in subregions and total



	2005	2010	2015	2020	2025	2030
● GCC	81.4%	82.2%	82.2%	83.5%	84.1%	84.3%
● Maghreb	61.4%	64.3%	67.0%	69.2%	71.0%	72.5%
● Mashreq	52.5%	53.2%	53.8%	54.1%	54.3%	55.0%
● STC	31.9%	33.1%	34.6%	36.4%	38.4%	40.6%
● Total	54.0%	55.7%	57.0%	57.9%	58.7%	59.5%

Figure 4
Total population (both sexes), in the region (A) and in the subregions (B), 1000



Each subregion has its own pattern of urbanization. In the Mashreq subregion in 2015, the countries with large populations (i.e., Egypt, Iraq and Syria, were less urbanized, while the countries with smaller populations were more urbanized). The average annual rate of change of the urban population was also greater in countries with smaller population size, and also in Iraq. Egypt is expected to continue to exhibit an exceptionally high urbanization rate. Despite this dynamic, will remain the least urbanized country in its subregion by 2030, while Lebanon and Jordan will reach almost 90 per cent urbanization, followed by Palestine with about 78 per cent and Iraq, 72 per cent.

In the Maghreb, with an average urbanization level of more than 50 per cent, Libya was the most urbanized country (78.6 per cent in 2015, reaching 81.8 per cent by 2030). Each of the countries shows a slightly reducing rate of urbanization during the period 2015-2030, with Mauritania, Morocco, and Algeria maintaining the highest rates.

The STC was the subregion with the lowest urbanization level in 2015: the urbanization level in Sudan is 33.8 per cent (population 13.4 million), Yemen – 34.6 per cent (population 8.8 million), Somalia – 39.6 per cent (population 4.4 million). It is, nevertheless, the fastest urbanizing subregion in the Arab region, with Somalia being the fastest urbanizing country in the whole region at 4.05 per cent growth rate in 2015.

The GCC is most urbanized subregion. The urbanization rate for Qatar and Kuwait had reached 99.2 and 98.3 per cent respectively by 2015. Bahrain, the UAE and Saudi Arabia have reached an urbanization rate of more than 80 per cent, while for Oman it was 77.6 per cent in 2015.

2.1.2 Urbanization: focus on Arab cities

The region is characterized by: (a) mushrooming of secondary cities and smaller towns, and (b) growth of large agglomerations with urban population of more than one million. Such agglomerations are scattered throughout all the subregions (Table 2). The following are the largest cities in the Arab region showing positive demographic growth over the period of 2015-2030:

- Cairo (Egypt): from 18.8 million to 24.5 million by 2030
- Baghdad (Iraq): from 6.6 million to 9.7 million by 2030
- Riyadh (Saudi Arabia): from 6.4 million to 7.9 million by 2030
- Khartoum (Sudan): from 5.1 million to 8.2 million by 2030
- Alexandria (Egypt): from 4.8 million to 6.3 million by 2030
- Jeddah (Saudi Arabia): from 4.1 million to 5.0 million by 2030
- Aleppo (Syria): from 3.6 million to 5.1 million by 2030
- Casablanca (Morocco): from 3.5 million to 4.4 million by 2030
- Sanaa (Yemen): from 3.0 million to 5.0 million by 2030
- Kuwait City (Kuwait): from 2.8 million to 3.9 million by 2030
- Mogadishu (Somalia): from 2.1 million to 4.2 million by 2030

Region	Country or Area	Urban Agglomeration	2005	2010	2015	2020	2025	2030	Trend
GCC	Saudi Arabia	Ar-Riyadh (Riyadh)	4 227	5 227	6 370	7 133	7 617	7 940	...
GCC	Saudi Arabia	Jiddah	2 883	3 452	4 076	4 475	4 770	4 988	...
GCC	Kuwait	Al Kuwayt (Kuwait City)	1 551	2 102	2 779	3 202	3 571	3 915	...
GCC	Emirates	Dubayy (Dubai)	1 268	1 778	2 415	2 862	3 189	3 471	...
GCC	Saudi Arabia	Makkah (Mecca)	1 326	1 543	1 771	1 912	2 039	2 146	...
GCC	Saudi Arabia	Al-Madinah (Medina)	942	1 106	1 280	1 391	1 488	1 570	...
GCC	Emirates	Sharjah	640	919	1 279	1 542	1 730	1 890	...
GCC	Emirates	Abu Zaby (Abu Dhabi)	655	876	1 145	1 323	1 471	1 608	...
GCC	Saudi Arabia	Ad-Dammam	765	909	1 064	1 166	1 251	1 321	...
GCC Total			14 256	17 915	22 178	25 006	27 126	28 848	...
Maghreb	Morocco	Dar-el-Beida (Casablanca)	3 301	3 405	3 515	3 736	4 056	4 361	...
Maghreb	Algeria	El Djazaïr (Algiers)	2 282	2 432	2 594	2 835	3 149	3 405	...
Maghreb	Tunisia	Tunis	1 841	1 916	1 993	2 093	2 222	2 347	...
Maghreb	Morocco	Rabat	1 647	1 799	1 967	2 172	2 385	2 574	...
Maghreb	Morocco	Fès	960	1 061	1 172	1 305	1 439	1 559	...
Maghreb	Morocco	Marrakech	837	974	1 134	1 306	1 450	1 572	...
Maghreb	Libya	Tarablus (Tripoli)	1 058	1 095	1 126	1 167	1 249	1 333	...
Maghreb Total			11 926	12 683	13 501	14 614	15 949	17 151	...
Mashreq	Egypt	Al-Qahirah (Cairo)	15 174	16 899	18 772	20 568	22 432	24 502	...
Mashreq	Iraq	Baghdad	5 327	5 891	6 643	7 544	8 602	9 710	...
Mashreq	Egypt	Al-Iskandariyah (Alexandria)	3 919	4 333	4 778	5 225	5 733	6 313	...
Mashreq	Syria	Halab (Aleppo)	2 605	3 078	3 562	4 140	4 600	5 087	...
Mashreq	Syria	Dimashq (Damascus)	2 201	2 401	2 566	2 833	3 116	3 451	...
Mashreq	Lebanon	Bayrut (Beirut)	1 777	1 990	2 226	2 252	2 347	2 437	...
Mashreq	Iraq	Al-Mawsil (Mosul)	1 236	1 447	1 694	1 976	2 276	2 586	...
Mashreq	Syria	Hims (Homs)	1 072	1 341	1 641	1 981	2 225	2 471	...
Mashreq	Syria	Hamah	676	925	1 237	1 581	1 800	2 003	...
Mashreq	Iraq	Irbil (Erbil)	874	1 009	1 166	1 348	1 552	1 766	...
Mashreq	Jordan	Amman	1 062	1 109	1 155	1 162	1 251	1 355	...
Mashreq	Iraq	Al-Basrah (Basra)	837	923	1 019	1 144	1 310	1 491	...
Mashreq	Iraq	Sulaimaniya	696	836	1 004	1 191	1 379	1 571	...
Mashreq Total			37 456	42 181	47 462	52 944	58 622	64 742	...
STC	Sudan	Al-Khartum (Khartoum)	3 979	4 517	5 129	5 905	6 929	8 158	...
STC	Yemen	Sanaa	1 757	2 291	2 962	3 643	4 351	5 071	...
STC	Somalia	Muqdisho (Mogadishu)	1 415	1 426	2 138	2 782	3 441	4 176	...
STC Total			7 151	8 234	10 229	12 330	14 722	17 405	...
Grand Total			70 789	81 013	93 370	104 895	116 419	128 146	...

Source: The UN Department of Economic and Social Affairs (DESA)/ UN Population Division (UNPD), World Population Prospects [https://esa.un.org/unpd/wpp/DataQuery/].

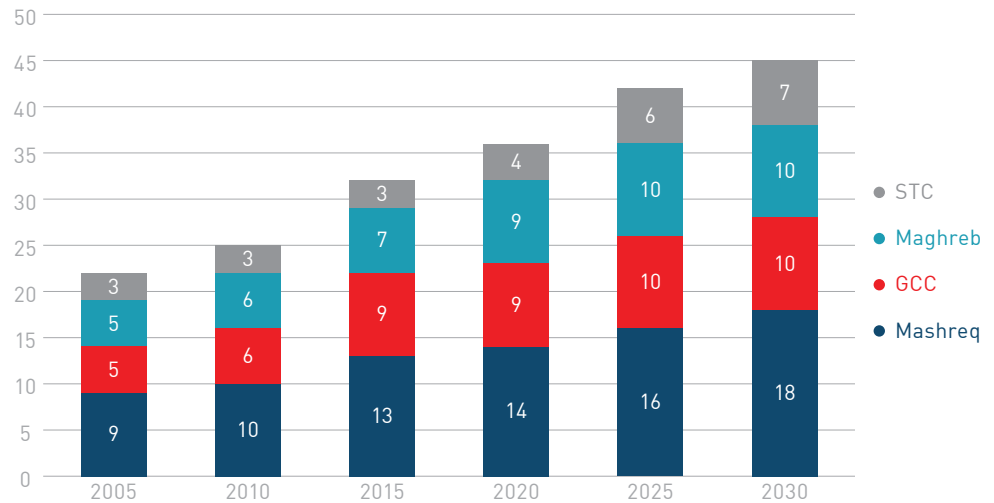
Table 2
Population estimates and projections (2005-2030) for urban agglomerations with one million or more inhabitants in 2014 (thousands)

Table 2 also shows the positive growth trend for each of the cities. These are also the cities with the highest average annual urbanization growth rate. The frontrunner, however, is post-conflict Mogadishu: with a population growth rate of 6.9 per cent, it is considered to be the second fastest growing city in the world.¹ The number of agglomerations with a population of more than one million in the region will grow from 32 to 45 by 2030: with one in the GCC, three in the Maghreb, four in the STC and five in the Maghreb (Figure 5). The total population residing in large agglomerations will therefore rise from 93 million (23 per cent of the total regional population) to 128 million (24 per cent of the total).

FOOTNOTES

¹ http://www.hiiraan.com/news4/2015/Nov/102674/mogadishu_ranked_second_fastest_growing_city_in_the_world.aspx.

Figure 5
The calculated and projected number, per subregion, of urban agglomerations with one million or more inhabitants from 2005 to 2030



2.2 Demographic and socioeconomic profile

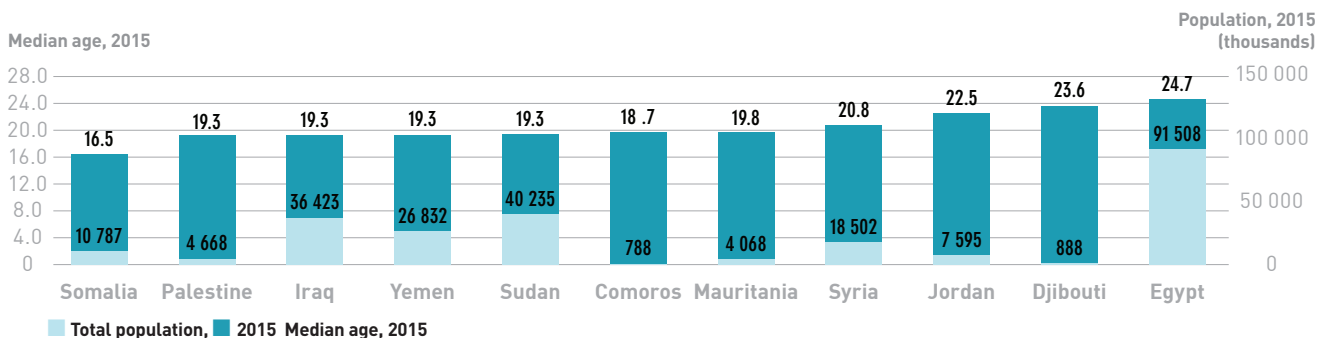
2.2.1 Demographic profile: a regional perspective

Regional demographic change becomes a strategic issue for policy-makers and development partners when addressing resilience-building to disasters and climate risks. Table 3 illustrates the combined elements of demographic context as a whole.² Even though the data for urban settings is largely missing, the experience suggests that the pattern of demographic distribution varies little in urban and rural settings.

There is a positive dynamic of the population growth in the Arab region. By 2030, the total population of the region will increase to 528.8 million (compared with 404.8 million in 2015); the proportions of population growth in the subregions will remain the same throughout the period of 2015-2030, whereby the Mashreq will remain the largest subregion, followed by the GCC countries, the Maghreb, and the STC respectively.

Trending is the proportion of the young males across the whole region, in which the STC population is the youngest. Median age varies from 16.5 (Somalia) to 30.3 (Bahrain).

Figure 6
Countries with the youngest median age in 2015



FOOTNOTES

² All data was taken from the United Nations Department of Economic and Social Affairs Population Division World Population Prospects, the 2015 edition [http://esa.un.org/unpd/wpp/Download/Standard/Population/].

Table 3
Combined table
showing demographic
situation in the Arab
region per subregion
and per country in 2015

Another important characteristic is the net migration rate, which is negative for all countries in the STC, and the Maghreb subregions for the period 2015-2030. The Mashreq will remain the largest migration subregion in 2015-2030. Palestine has negative net migration rate, whereas Lebanon and Jordan experience influx of migrants. Syria is experiencing extreme out-migration due to war, which requires significant corrections of the predictions suggested by the available data. The GCC is the only subregion that exhibits a stable positive net migration rate, with the exception of Oman.

Region	Country	Total Population, 1000	Growth rate %	Sex Ratio, Age 15-25	Median Age, year	Total Fertility	Male 15-49, 1000	Net Migration Rate, %	Number of Migrants, 1000
Mashreq	Egypt	91 508	2.18	104.5	24.7	3.38	23 734	-0.5	-216
Mashreq	Iraq	36 423	3.31	105.1	19.3	4.64	9 133	3.3	549
Mashreq	Syria	18 502	-2.27	109.3	20.8	3.03	4 671	-41.1	-4030
Mashreq	Jordan	7 595	3.06	104.2	22.5	3.51	2 081	6.5	230
Mashreq	Lebanon	5 851	5.99	93.3	28.5	1.72	1 593	49.1	1 250
Mashreq	Palestine	4 668	2.75	104.0	19.3	4.28	1 192	-2.0	-44
Mashreq Total		164 548					42 403		-2 261
Maghreb	Algeria	39 667	1.92	103.3	27.6	2.93	10 833	-0.8	-143
Maghreb	Morocco	34 378	1.37	104.0	28.0	2.56	8 895	-1.9	-311
Maghreb	Tunisia	11 254	1.12	103.6	31.2	2.16	2 991	-0.6	-33
Maghreb	Libya	6 278	0.04	100.9	27.5	2.53	1 745	-16.0	-502
Maghreb	Mauritania	4 068	2.49	103.1	19.8	4.69	1 011	-1.0	-20
Maghreb Total		95 644					25 475		-1009
STC	Sudan	40 235	2.16	102.2	19.4	4.46	9 877	-4.2	-800
STC	Yemen	26 832	2.57	103.7	19.3	4.35	6 848	-0.4	-50
STC	Somalia	10 787	2.37	100.2	16.5	6.61	2 370	-7.9	-400
STC	Djibouti	888	1.33	102.3	23.6	3.30	242	-3.7	-16
STC	Comoros	788	2.42	103.2	19.7	4.60	197	-2.7	-10
STC Total		79 531					19 535		-1 276
GCC	Saudi Arabia	31 540	2.32	101.0	28.3	2.85	10 789	5.7	850
GCC	Emirates	9 157	1.89	186.4	33.3	1.82	5 294	9.3	405
GCC	Oman	4 491	8.45	152.7	29.0	2.88	2 218	65.2	1 211
GCC	Kuwait	3 892	4.81	102.7	31.0	2.15	1 495	29.8	518
GCC	Qatar	2 235	4.72	311.2	30.7	2.08	1 303	36.3	364
GCC	Bahrain	1 377	1.76	153.2	30.2	2.10	597	4.5	30
GCC Total		52 693					21 697		3 377
GrandTotal		392 141					109 110		-1 169

2.2.1a Refugees, internally displaced people (IDPs) and migrant workers

The Arab region is experiencing multiple and complex emergency situations on an unprecedented scale. Understanding the demographic profile of the region and subsequent analysis of urban resilience requires careful consideration of the consequences that current emergencies might trigger at the regional, subregional and national levels. One of the overwhelming challenges is the wave of migration that has hit the region, escalating humanitarian challenges in the region to the highest level. This, in turn, requires careful consideration of migrants' specific vulnerabilities, including the gender dimension, while designing urban resilience strategies, since the proportion of urban-based women-headed households is generally higher than in rural areas.

The UNHCR Global Appeal 2016-2017 highlights the scale of the problem in the Middle East,³ which is largely explained by the gravity of the problem in Arab states.⁴

Table 4
Refugee and IDP
population
in Arab States

Country	IDPs	Refugees
Algeria		94 128
Bahrain		311
Djibouti		20 530
Egypt		236 090
Iraq	3 300 000	271 143
Jordan		
KSA		534
Lebanon	19 719	1 606 709
Libya	434 000	27 964
Morocco		1 216
Mauritania		49 635
Oman		151
Palestine	263 500	
Qatar		133
Somalia	1 107 000	2 729
Sudan	3 100 000	244 430
Syria	6 600 000	677 756
Tunisia		901
UAE		417
Yemen	2 500 000	2 057 098
TOTAL	17 324 219	8 315 636

FOOTNOTES

³ UNHCR lists Israel among the countries of the Middle East.

⁴ UNHCR, "Middle East and North Africa," Global Appeal 2016-2017. [<http://www.unhcr.org/564da0e49.pdf>]. Accessed 25 February 2018.

This region is one of origin, destination and transit of refugees and migrants, whereby the number of IDPs, at 17.3 million, is by far the largest in the world. In the fifth year of the conflict in Syria, there were more than 6.7 million Syrian refugees and some 6.6 million internally displaced persons (IDPs) in the region. Over one million Syrians have sought asylum in more than 90 countries outside the region.⁵ Since the escalation of the conflict in Yemen in March 2015, more than 2.3 million people have been internally displaced and nearly 100,000 more have fled the country. Iraq alone hosts 3.2 million IDPs.⁶ Iraq, Libya, Palestine, Somalia and Sudan are also home to large number of IDPs.

The overwhelming burden of the refugees has been unevenly spread across the Arab states, whereby Lebanon and Jordan had received the largest portion of refugees by the end of 2014.⁷ In fact, the UNHCR reports that Jordan is ranked second in the world for the number of refugees (90) per 1,000 inhabitants. The top country is Lebanon, with a staggering 209.⁸ Algeria, Egypt, Iraq, Sudan, Syria and Yemen are also hosting refugee populations.

Analysing demographic data – total population and median age of population – through the prism of mobility, and based on these two indicators, Egypt, Iraq, Sudan and Yemen remain the top countries of origin for migration.

The Gulf region is also home to 32 million⁹ migrant workers mostly from Asia and the Arab States. Most of the refugees, migrants and IDPs typically live in urban slums and informal settlements¹⁰ which contributes to their vulnerability. Migrant workers make up the majority of the population in Bahrain, Oman, Qatar and the United Arab Emirates, offering a new set of challenges with regards to hazard and climate risks. Most of the migrant workers live in trying conditions (e.g., in isolated camps, informal settlements and crowded houses). Due to the lack of the knowledge of Arabic their understanding of risk situations remain weak. Due to their poor social status they remain among the most vulnerable social groups.

FOOTNOTES

⁵ Ibid: <http://www.unhcr.org/pages/4a02db416.html>.

⁶ Ibid: <http://www.unhcr.org/564da0e49.html>.

⁷ Amnesty International 2014.

⁸ http://foreignpolicy.com/2016/02/02/the-weakest-links-syria-refugees-migrants-crisis-data-visualization/?utm_content=buffer52983&utm_medium=social&utm_source=facebook.com&utm_campaign=buffer.

⁹ <http://www.ilo.org/beirut/areasofwork/labour-migration/lang--en/index.htm>.

¹⁰ IOM 2015.

2.2.1b Demographic profile: subregional perspective

Each subregion has its own demographic dynamic. The Mashreq (with a population of 165 million in 2015 and 221 million in 2030) remains the largest subregion with Egypt the most populous country in the whole Arab region. The region is characterized by a predominantly high population growth rate, which at 2030 will be: 2.47 per cent (Iraq), 2.28 per cent (Syria), 2.27 per cent (Palestine), 1.27 per cent (Jordan) and 1.45 per cent (Egypt). Lebanon is the exception, with negative population growth forecast over the period 2020-2030. It maintains a relatively high sex ratio (males per 100 females) within the 15-25 age group, with Syria having very high sex ratio (109) and Lebanon an unusually low ratio for the region (93.3 but increasing to 103 by 2030). Lebanon is projected to see significant migration out of the country, the highest in the whole region, reaching 27.3 per cent in 2020-2025 and 12.5 per cent in the period 2025-2030. In addition, Lebanon received over one million refugees since 2011.¹¹ And, as of April 2016, about 650,000 refugees were registered in Jordan.¹² This is a massive burden for a country with a population of only 9.5 million. For comparison, should the same proportion arrive to the United States, it would represent more than 22 million refugees. About 250,000 refugees from Syria have settled in Iraq, the majority of whom reside in the Kurdistan Region of Iraq (KRI).¹³

The Maghreb (with a population of 96 million in 2015 and 114 million in 2030) shows a relatively small population growth rate, from 0.59 per cent in Tunisia to 1.2 per cent in Algeria by 2030, except for Mauritania that has a 2.08 per cent growth rate. The population has a relatively high median age and it will continue to show slow growth, ranging from 21 in Mauritania to 36 in Tunisia by 2030. Continuous migration out of the Maghreb over the period 2005-2030 is expected, with Libya experiencing the highest negative net migration rate in the Maghreb: -16 per cent, which is largely explained by the civil war in 2011. There are about 434,900 IDPs in the country.¹⁴

The STC (with a population of 79 million in 2015 and 111 million in 2030) is the youngest subregion with a median age of 18 to 19 years in 2015, with the exception of Djibouti, with a median age of 23.6. It is also the subregion with the highest fertility rate in the Arab region in 2015: 6.1 per cent (Somalia), 4.2 per cent (Comoros), 4.1 per cent (Sudan), 3.9 per cent (Yemen) and 2.9 per cent (Djibouti). By 2030 the total population of this subregion (129 million) will exceed the Maghreb's (114 million). Continuous and stable migration from the subregion is taking place ranging from -7.9 per cent in Somalia to -4.2 per cent in Sudan, -3.7 per cent in Djibouti and -2.7 per cent in Comoros.

As estimated by the Internal Displacement Monitoring Centre (IDMC), there are over 1.1 million IDPs in Somalia (however difficult it is to clearly distinguish IDPs from economic migrants, pastoralists who have moved into urban centres following loss of livestock or

FOOTNOTES

¹¹ <http://data.unhcr.org/syrianrefugees/country.php?id=122>.

¹² <http://data.unhcr.org/syrianrefugees/country.php?id=107>.

¹³ <http://data.unhcr.org/syrianrefugees/country.php?id=103>.

¹⁴ <http://www.unhcr.org/cgi-bin/texis/vtx/page?page=49e485f36&submit=GO>.

¹⁵ <http://www.internal-displacement.org/sub-saharan-africa/somalia/figures-analysis>.

IDP returns).¹⁵ Instead, Djibouti has experienced protracted refugee crisis, having hosted more than 23,000 mainly Somali refugees and more than 5,000 asylum-seekers (December 2015).¹⁶ Human and food insecurity are the main causes for mass movements in this subregion: disasters such as droughts and conflicts shape the IDP landscape in the STC.

The GCC (with a population of 54 million in 2015 and 69 million in 2030) is the only subregion with positive net migration. During 2010-2015, net migration into the subregion was 3.4 million, with 5.8 per cent to the UAE and 8.5 per cent to Qatar. These numbers do not take into account the vast number of illegal migrants in the subregion. The median age is the highest in the region: ranging from 28.3 years (Saudi Arabia) to 33.3 years (United Arab Emirates). The subregion has the highest sex ratio in the whole region's 15-25 age group, especially Qatar (311), UAE (186), Bahrain (153), and Oman (152).

2.2.2 Regional and subregional socioeconomic profile

A look at some of the main socioeconomic indicators reveals some of the underlying drivers of vulnerability. Table 5a provides an overview of the main indicators from 2014. This shows the socioeconomic patterns of subregions and countries at a glance.

Table 5a
Social and economic indicators, 2014

Region	Country	GNI	GNI Per Capita	GDP growth ann., %	Access to elect., % of pop.	Internet users, %	Women in nat. parl., %
GCC	Saudi Arabia	759.3	51 320	3.5	97.7	63.7	20
GCC	Emirates	405.2	67 720	4.6	97.7	90.4	18
GCC	Qatar	200.3	134 420	4.0	97.7	91.5	0
GCC	Kuwait	185.0	79 850	-1.6	97.7	78.7	2
GCC	Oman	65.9	33 690	2.9	97.7	70.2	1
GCC	Bahrain	28.4	17 680	4.5	97.7	91.0	8
Maghreb	Algeria	213.8	13 880	3.8	100.0	18.1	32
Maghreb	Morocco	105.8	7 290	2.4	100.0	56.8	17
Maghreb	Libya	49.0	16 000	-24.0	100.0	17.8	16
Maghreb	Tunisia	46.5	11 020	2.7	100.0	46.2	31
Maghreb	Mauritania	5.0	3 710	6.4	21.8	10.7	25
Mashreq	Egypt	273.1	10 260	2.2	100.0	31.7	2
Mashreq	Iraq	226.3	15 030	-2.1	100.0	11.3	25
Mashreq	Syria	72.0	3 890		96.3	28.1	12
Mashreq	Lebanon	45.6	17 590	2.0	100.0	74.7	3
Mashreq	Jordan	34.1	11 910	3.1	99.5	44.0	12
Mashreq	Palestine	13.1	5 000	-1.5	97.7	53.7	
STC	Sudan	67.3	3 920	3.1	32.6	24.6	24
STC	Yemen	33.3	3 650	4.2	48.4	22.6	0
STC	Somalia	5.7	226	2.6	32.7	1.6	14
STC	Djibouti	1.5	1 878	6.0	53.3	10.7	13
STC	Comoros	0.6	1 430	2.1	69.3	7.0	3

■ Data for 2013. Data for GNI and GDP per capita for Syria, Somalia, Djibouti.

Source: World Bank Indicators [<https://data.worldbank.org/indicator/>].

FOOTNOTES

¹⁶ <http://www.unhcr.org/pages/49e483836.html>.

Table 5b
Unemployment rate in 2016,
by gender and age group

Region	Country	Age	Time	Unemployment rate -- ILO modelled estimates (%)			Unemployment -- ILO modelled estimates (thousands)			Labour force -- ILO modelled estimates (thousands)		
				Total	Male	Female	Total	Male	Female	Total	Male	Female
Maghreb	Algeria	15+	2016	10.2	8.3	18.6	1218	814	403	11937	9769	2168
Maghreb	Algeria	15-24	2016	24.3	20.8	41.7	404	290	114	1664	1391	274
Maghreb	Algeria	25+	2016	7.9	6.3	15.3	814	525	289	10273	8379	1894
Maghreb	Libya	15+	2016	18.4	15.7	26.7	435	281	155	2363	1783	580
Maghreb	Libya	15-24	2016	45.7	38.6	64.3	164	100	64	358	259	99
Maghreb	Libya	25+	2016	13.6	11.9	18.9	272	181	91	2006	1525	481
Maghreb	Mauritania	15+	2016	9.8	8.6	12.6	125	75	50	1273	875	398
Maghreb	Mauritania	15-24	2016	17.8	15.5	22.5	47	27	20	266	176	89
Maghreb	Mauritania	25+	2016	7.7	6.8	9.8	78	48	30	1007	698	309
Maghreb	Morocco	15+	2016	9.4	9.2	9.9	1179	854	325	12542	9270	3272
Maghreb	Morocco	15-24	2016	18.6	19.2	16.8	383	298	85	2056	1552	504
Maghreb	Morocco	25+	2016	7.6	7.2	8.7	796	556	240	10486	7718	2768
Maghreb	Tunisia	15+	2016	15.5	12.6	23.5	633	379	254	4083	3001	1082
Maghreb	Tunisia	15-24	2016	36.4	34.5	40.3	215	140	75	593	407	186
Maghreb	Tunisia	25+	2016	12.0	9.2	20.0	418	239	179	3491	2594	896
Maghreb	Total	15+	2016	11.2	9.7	15.8	3591	2404	1187	32198	24699	7500
Maghreb	Total	15-24	2016	24.6	22.6	31.0	1213	855	358	4936	3784	1152
Maghreb	Total	25+	2016	8.7	7.4	13.1	2378	1548	829	27262	20915	6348
Mashreq	Egypt	15+	2016	12.4	8.6	25.1	3781	2024	1757	30469	23462	7007
Mashreq	Egypt	15-24	2016	34.6	30.6	43.4	1772	1075	697	5120	3512	1608
Mashreq	Egypt	25+	2016	7.9	4.8	19.6	2009	949	1060	25349	19949	5400
Mashreq	Iraq	15+	2016	7.9	6.9	11.9	810	567	243	10235	8193	2042
Mashreq	Iraq	15-24	2016	16.2	14.1	24.2	398	278	120	2465	1969	496
Mashreq	Iraq	25+	2016	5.3	4.6	7.9	411	289	123	7770	6224	1546
Mashreq	Jordan	15+	2016	15.3	13.1	25.7	363	256	107	2378	1961	417
Mashreq	Jordan	15-24	2016	38.5	33.4	60.6	160	113	47	415	338	77
Mashreq	Jordan	25+	2016	10.4	8.8	17.7	203	143	60	1963	1623	339
Mashreq	Lebanon	15+	2016	6.6	5.3	10.5	142	87	55	2164	1638	526
Mashreq	Lebanon	15-24	2016	17.2	15.1	22.0	59	36	23	345	239	106
Mashreq	Lebanon	25+	2016	4.6	3.7	7.6	83	51	32	1820	1400	420
Mashreq	Palestine	15+	2016	26.9	22.2	44.7	353	230	123	1313	1039	275
Mashreq	Palestine	15-24	2016	41.6	36.1	67.1	140	100	40	336	277	59
Mashreq	Palestine	25+	2016	21.8	17.1	38.6	213	130	83	977	762	216
Mashreq	Syria	15+	2016	14.8	10.8	38.1	708	441	266	4786	4088	698
Mashreq	Syria	15-24	2016	35.1	27.8	80.4	378	258	120	1076	927	149
Mashreq	Syria	25+	2016	8.9	5.8	26.6	330	183	146	3710	3161	550
Mashreq	Total	15+	2016	12.0	8.9	23.3	6157	3607	2551	51346	40381	10965
Mashreq	Total	15-24	2016	29.8	25.6	41.9	2907	1861	1046	9757	7262	2495
Mashreq	Total	25+	2016	7.8	5.3	17.8	3250	1746	1504	41589	33119	8470

Region	Country	Age	Time	Unemployment rate -- ILO modelled estimates (%)			Unemployment -- ILO modelled estimates (thousands)			Labour force -- ILO modelled estimates (thousands)		
				Total	Male	Female	Total	Male	Female	Total	Male	Female
GCC	Bahrain	15+	2016	1.2	0.5	4.0	10	3	7	816	641	175
GCC	Bahrain	15-24	2016	5.5	2.6	13.2	5	2	3	87	63	23
GCC	Bahrain	25+	2016	0.7	0.2	2.5	5	1	4	730	578	151
GCC	Emirates	15+	2016	1.6	1.2	4.6	105	69	36	6416	5634	781
GCC	Emirates	15-24	2016	4.9	3.8	9.3	24	15	9	481	386	95
GCC	Emirates	25+	2016	1.4	1.0	4.0	81	54	27	5935	5248	687
GCC	Kuwait	15+	2016	2.2	1.3	4.6	50	21	29	2229	1598	631
GCC	Kuwait	15-24	2016	17.7	7.6	37.5	29	8	21	166	110	56
GCC	Kuwait	25+	2016	1.0	0.8	1.4	20	12	8	2064	1489	575
GCC	Oman	15+	2016	3.3	1.8	13.2	79	37	42	2410	2091	319
GCC	Oman	15-24	2016	8.7	3.8	27.5	26	9	17	296	235	61
GCC	Oman	25+	2016	2.5	1.5	9.9	53	28	26	2114	1856	258
GCC	Qatar	15+	2016	0.1	0.1	0.7	3	1	2	1929	1659	270
GCC	Qatar	15-24	2016	0.4	0.2	2.1	1	0	1	255	219	36
GCC	Qatar	25+	2016	0.1	0.0	0.4	2	1	1	1673	1439	234
GCC	Saudi Arabia	15+	2016	5.6	2.6	21.5	759	288	471	13431	11242	2189
GCC	Saudi Arabia	15-24	2016	24.9	18.2	46.6	215	121	94	864	662	202
GCC	Saudi Arabia	25+	2016	4.3	1.6	19.0	544	167	377	12568	10580	1987
GCC	Total	15+	2016	3.7	1.8	13.4	1005	418	587	27231	22866	4365
GCC	Total	15-24	2016	13.9	9.2	30.6	299	155	144	2148	1676	472
GCC	Total	25+	2016	2.8	1.2	11.4	706	263	443	25083	21191	3892
STC	Comoros	15+	2016	4.4	4.1	4.6	9	5	4	205	120	85
STC	Comoros	15-24	2016	9.9	11.3	8.6	2	1	1	21	10	11
STC	Comoros	25+	2016	3.7	3.4	4.1	7	4	3	184	110	74
STC	Djibouti	15+	2016	5.8	5.2	6.7	22	12	11	380	221	159
STC	Djibouti	15-24	2016	11.6	10.9	12.3	8	4	4	73	37	36
STC	Djibouti	25+	2016	4.5	4.1	5.0	14	8	6	307	184	123
STC	Somalia	15+	2016	6.0	5.8	6.8	213	164	49	3528	2807	721
STC	Somalia	15-24	2016	11.0	10.8	12.0	102	79	23	927	734	192
STC	Somalia	25+	2016	4.2	4.1	4.9	110	84	26	2601	2072	528
STC	Sudan	15+	2016	12.7	9.1	23.1	1381	734	647	10847	8048	2800
STC	Sudan	15-24	2016	27.3	21.3	42.8	595	335	260	2182	1574	608
STC	Sudan	25+	2016	9.1	6.2	17.7	786	399	387	8666	6474	2192
STC	Yemen	15+	2016	13.7	12.6	26.5	859	725	134	6257	5750	507
STC	Yemen	15-24	2016	25.2	24.1	35.9	407	355	52	1618	1473	145
STC	Yemen	25+	2016	9.7	8.6	22.8	452	369	82	4639	4277	362
STC	Total	15+	2016	11.7	9.7	19.8	2484	1639	845	21217	16945	4271
STC	Total	15-24	2016	23.1	20.2	34.3	1115	775	340	4821	3829	992
STC	Total	25+	2016	8.3	6.6	15.4	1369	864	505	16396	13116	3280

Source: ILO modelled estimates, May 2018

[http://www.ilo.org/ilostat/faces/oracle/webcenter/portalapp/pagehierarchy/Page3.jspx?MBI_ID=2].

Accessed 24 September 2018.

This table shows two extremes of economic development across the region: Gcc with the highest Gni per capita, and the STc with the lowest. For comparison, Qatar has 134,420 Gni per capita (the highest in the whole region), whereas Somali has the lowest at 226. The Maghreb and the Mashreq regions are approximately on the same level of well-being. The Maghreb countries, except Libya, show positive trends in GDP growth. In the Maghreb, the highest value of Gni per capita is in Libya (USD 16,000), despite a significant fall in this indicator (-24 per cent) following the overthrow of Kaddafi, and in Algeria (USD 13,880). The lowest value is in Mauritania (USD 3710). The STC is the poorest region. All available data about GDP per capita correspond to low income countries. The World Bank has no data for Djibouti, but Wikipedia shows GDP 1.6 billion (2004) and GDP per capita USD 1878. Two countries in this region – Somalia and Yemen – are in civil war.

All the countries in the region exhibit positive annual growth in GDP with exceptions of Libya (-24 per cent), Iraq (-2.1 per cent), Palestine (-1.5 per cent) and Kuwait (-1.6 per cent). This indicator is absent for Syria, but it is obvious that after seven years of civil war in Syria, it will be negative and high in absolute value.

The unemployment rate in the GCC countries is relatively low, only high unemployment rates are scored by the age group 15-24 years in Saudi Arabia (24.9 per cent), Kuwait (17.7 per cent), and Oman (8.7 per cent). In the Mashreq and the Maghreb, the unemployment rate is moderate, the exceptions being Libya (45.7 per cent) and Tunisia (36.4 per cent) in the Maghreb, and Palestine (41.6 per cent) in the Mashreq. Similarly, male unemployment in the age range 15-24 is very high, especially in Libya (38.6 per cent), Palestine (36.1), Tunisia (34.4) and Jordan (33.4 per cent). This can induce social instability risks. In all the region, female unemployment is higher than male unemployment, particularly among the 15-24 age groups. In the GCC subregion, this inequality is particularly high in Saudi Arabia and Kuwait with female unemployment in the 15-24 age range at 46.6 and 37.5 per cent, respectively, compared to 18.2 and 7.6 per cent of young male unemployment respectively. The only exception is in Morocco where such inequality tends to disappear and even to be reversed, with 19.2 per cent of male unemployment against 16.8 per cent of female unemployment in the 15-24 age range. (See Table 5b)

Another indicator of gender disparity is the percentage of seats held by women in national parliaments. Countries with an extremely low value for this indicator are: Qatar, Kuwait, Oman (Gcc), Egypt, Lebanon (Mashreq), Yemen, Comoros (STc), where there are zero to three women in the national parliaments. There are eight to eighteen women in parliament in Bahrain, the UAE (Gcc), Syria, Jordan (Mashreq), Djibouti, Somalia (STc), Libya, and Morocco (Maghreb). The highest value for this indicator across the whole region is in Algeria (31) and Tunisia (31).

The level of access to electricity is very high in the GCC, the Mashreq and the Maghreb countries – almost 100 per cent, except for Mauritania in the Maghreb (21.8 per cent). This indicator is very low, however, in the STC, especially in Sudan (32.6 per cent), Somalia (32.7 per cent), Yemen (approximately 48 per cent), and Comoros (70 per cent). According to the International Telecommunication Union (ITC), the internet access indicator is sufficiently

high in the GCC countries (e.g. in UAE, Qatar and Bahrain more than 90 per cent of population has access to internet). In the Maghreb, the highest values for this indicator are in Morocco (57.08 per cent) and Tunisia (48.52 per cent). In the Mashreq the highest levels are in Lebanon (74 per cent), Palestine (57.42 per cent) and Jordan (53.4 per cent). Internet access in the STC is very low. The highest levels are in Sudan (26.61 per cent) and Yemen (25.6 per cent).

2.2.3 Urban poverty and urban slums

Two important factors to consider while exploring urbanization in the Arab region, are the percentage of urban slums and the level of urban poverty. Both factors are tightly linked to inequalities (and deprivation) and the rights-based approach to development.

2.2.3a Urban Poverty

Urban poverty has become a global challenge. Even though the understanding of urban poverty has advanced significantly during the last 20-25 years, there is still little attention to urban poverty and a significant conceptual disarray in defining and measuring urban poverty. Should it entail the level of income or the level of expenditures, or perhaps, access to basic needs and services, or even the quality of housing? The dollar-a-day poverty line (and its adjustment to USD 1.90) is one example of the use of overly simplistic income-based poverty line. It implies that the income needed to avoid poverty is the same everywhere (whether in large cities, smaller urban centres or rural areas), whereas personal and household expenditures increase proportionally to urbanization level.¹⁷

There is a massive lack of basic data about urban poverty,¹⁸ but there are different attempts to measure urban poverty. Acknowledging that urban poverty has multiple dimensions, for the purpose of this report, the Alkire-Forster Multidimensional Poverty Index (MPI) is used to explore urban poverty in the Arab states.¹⁹ The AF MPI uses micro survey data to reflect on household deprivation across three areas: education, health and living conditions. Even though the AF MPI is a global tool for monitoring progress and measuring poverty, no up-to-date data gathered through nationally representative surveys is available for the Arab region as a whole. Nevertheless, some indications can be drawn based on already existing data.

Among the 1.7 billion people worldwide defined by the AF MPI as living in multidimensional (MD) poverty, 2.5 per cent live in Arab States, which means 41.225 million people are MD poor in this region. There are also 21.5 million people vulnerable to or at risk of MD poverty in the region, and 18.8 million “severely poor,” representing 9.3 per cent and 7.9 per cent respectively of the total population of 231.1 million urban people in 2010.²⁰

FOOTNOTES

¹⁷ Mitlin 2014.

¹⁸ Tacoli 2015.

¹⁹ Nawar 2014.

²⁰ Ibid.

When comparing urban rural MD poverty, the Arab region is shown to have a higher ratio of rural to urban poverty (3.5) than all other developing regions. *“The MPI at subnational levels reveals that high social deprivations – and therefore low resilience – are inflicting much suffering on ordinary citizens in rural and certain geographic areas within the Arab States.”*²¹ It must be noted that even though the ratio of rural poverty is higher in terms of percentage, given the prevailing and constantly growing urban population in the region, in absolute terms urban poverty in Arab region affects millions of people.

2.2.3b Urban Slums

Another indication of urban poverty is the percentage of urban slums. There is little data available also on urban slums in the Arab region, but Table 6 shows that urban slums remain a significant issue. The slum population percentage has not changed visibly for Comoros, Somalia and Yemen over the period 1990-2014. Slums have been reduced significantly in Egypt and Morocco, and slightly in Jordan, over the same period. The highest percentage of the urban population living in slums is in Sudan (91.6 per cent), Mauritania (79.9 per cent), Somalia (78.6 per cent), Comoros (69.6 per cent) and Yemen (60.8 per cent). Even though the percentage is smaller in other countries – like Morocco (13.1 per cent), Jordan (12.9 per cent), Egypt (10.6 per cent), Syria (19.3 per cent) or Tunisia (8.0 per cent) by 2014 – the absolute number of people living in slums or informal settlements in these countries is still in the millions.

Table 6
Slum population
as a percentage
of urban population
for selected Arab
States (1990-2014)

COUNTRY	1990	1995	2000	2005	2007	2009	2014
Comoros	65.4	65.4	68.9	68.9	68.9	68.9	69.6
Egypt	50.2	39.2	28.1	17.1	14.4	13.1	10.6
Iraq	16.9	16.9	16.9	52.8	52.8	52.8	47.2
Jordan	-	-	-	15.8	17.7	19.6	12.9
Lebanon	-	-	-	53.1	-	-	-
Mauritania	-	-	-	-	-	-	79.9
Morocco	37.4	35.2	24.2	13.1	13.1	13.1	13.1
Saudi Arabia	-	-	-	18.0	-	-	-
Somalia	-	-	-	73.5	73.6	73.6	73.6
Sudan	-	-	-	-	-	-	91.6
Syria	-	-	-	10.5	22.5	-	19.3
Tunisia	-	-	-	-	-	-	8.0
Yemen	-	-	-	67.2	76.8	-	60.8

Source: United Nations Statistics Division 2015 (data for all available Arab states).

FOOTNOTES

²¹ Ibid.

2.3

Urbanization in progress: challenges and opportunities for urban resilience

Despite many cultural and historical commonalities, countries in the region vary dramatically. Yet, there are certain dynamics that are quite articulated at the subregional urban level and provide entry points to ground resilience-building activities in the region.

The Arab region is witnessing an unprecedented rate of urbanization. According to our calculations based on World Bank indicators, the region already exhibited an average urbanization growth rate of 3.1 per cent in 2015, which is well above the world average of 2.067 per cent. Most of the population resides in urban areas, with the urban population in the GCC ranging between 75 and 100 per cent. The STC however remains the least urbanized subregion (34.5 per cent of urbanization in 2015), yet for the 2015-2030 period it is projected to show the highest urbanization growth. In 2015 there were already 32 agglomerations in the region with more than one million inhabitants. This number will grow to 45 by 2030, with total population exceeding 128 million, with the largest urban populations in Cairo (Egypt), Baghdad (Iraq), and Alexandria (Egypt), with 24.5 million, 9.7 million, and 6.3 million inhabitants, respectively (UN DESA, 2014).

Box 1 Cairo Population

The Greater Cairo province is home to 20 per cent of Egypt's population, while its area is no more than two per cent of the total land surface. The Supreme Council for Urban Planning and Development (under the Council of Ministers) formulated a strategy for comprehensive development in Egypt until 2050, which indicates that the population distribution is not proportionate to the surface area of the inhabited regions and outlines the country's need for an additional 40,000 feddans* a year in order to accommodate the population increase.

* A unit of area equivalent to 4200m² / 0.42 hectares / 1.038 acres.

The population growth dynamic remains positive across the whole region, in which the higher fertility rate is reflected in the least developed countries in the STC, which also have the highest percentage of slums: Sudan (91.6 per cent), Comoros (69.6 per cent), Mauritania (79.9 per cent) and Somalia (73.6 per cent).

The region is characterized by a very young population; more than half the region's population is under the age of 25. Median age varies from 16.5 years in Somalia to 30.3 years in Bahrain. Populations in the STC are both the youngest and the fastest growing. The positive dynamic created by the growing percentage of the young male population (age 15-24) throughout the whole region is accompanied by high youth unemployment in all subregions. Finally, the Maghreb and the Mashreq have the highest average male (respectively 22.6 and 25.6 per cent) and female (respectively 31.0 and 41.9 per cent) youth unemployment.

Socioeconomic progress is unevenly distributed over the region. Although the average GNI per capita is more than USD 26,000 in the GCC, it remains at around USD 10,000 in the Maghreb and the Mashreq, reaching its lowest extreme in the STC at just over USD 2,000. Internet coverage in the region (excluding GCC) remains relatively modest, at around only 26 per cent.

The gender disparity manifests itself in various aspects of the region's social fabric. The predominantly high sex ratio throughout the region, with a disproportionately high ratio in the GCC (Qatar: 265.5, UAE:274, Oman: 197, Bahrain: 163), will inevitably have a major impact on the demographic structure, and eventually the urban and socioeconomic profile of each country in the region. Another indicator of gender disparity is the number of seats in national parliament held by women, which is very small throughout the whole region, with the Maghreb countries having on average the highest numbers of women in parliament (16-32 on average).

Countries in the region are both source, transit and recipient ones of large migrants flows. In non-oil-producing countries, driven by the high level of unemployment and rising cost of living, the young male population migrates to cities in search of economic opportunities. The demographic risk of migration is articulated particularly in Egypt, Sudan, Iraq and Yemen. Oil-producing countries are largely the recipients of migrants. In Kuwait and Qatar, for example, refugees and migrants make up more than 70 per cent of the population.

Wars and internal conflicts over the past 50 years have caused political instability, damage to the infrastructure and stunted economic growth. By the end of 2012, rulers had been forced from power in Tunisia, Egypt, Libya and Yemen. Protests, some major (in Algeria, Iraq, Jordan, Kuwait, Morocco, Sudan and Bahrain), and some minor (in Mauritania, Oman, Saudi Arabia, Djibouti and Palestine) were seen during the Arab Spring uprising. Today, the Arab region is immersed in ongoing wars with civil unrest in Syria, Yemen, and Libya; undergoing the long-drawn-out and periodically escalating tensions in the State of Palestine, Iraq, and Somalia; and still experiencing the ramifications of recent conflicts in their history (e.g., in Egypt and Sudan). This situation jeopardizes further growth and prosperity in the region as a whole, and threatens the major cities facing migration influxes and further escalations of socioeconomic tensions.

Today, the Arab region has the largest number of internally displaced persons (IDPs) in the world (in Iraq, South Sudan and Syria), in which about 40 per cent of the Syrian population or about 6.6 million people, are currently displaced.²² Since 2011, the Yemeni crisis has left some 21.1 million people (84 per cent of the total population) fully dependent on humanitarian aid.²³ The spillover effect of this situation is felt throughout the region. Jordan and Lebanon, for example, host the highest proportion of refugees in the region, disproportionately high compared to the total population of those countries. Meanwhile, Iraq and Sudan host the world's third and fourth largest IDP populations (over 3.3 million and 3.1 million, respectively). Palestine is facing the largest and longest refugee crisis in the history of the world: about 5.1 million refugees according to UNHCR.

FOOTNOTES

²² Internal Displacement Monitoring Centre (IDMC). Displacement in Syria as of 21 October 2014 [<http://www.internal-displacement.org/middle-east-and-north-africa/syria/2014/displacement-in-syria-as-of-october-2014>].

²³ <http://www.unocha.org/yemen>.

When looking at urban, demographic, socioeconomic and political drivers, there are key trends that are contributing to an increased risk exposure throughout the Arab region:

- increased population density;
- high percentage of urban slums predominantly in the STC, as well as some parts of the Mashreq and the Maghreb;
- high unemployment rates in all subregions, apart from the GCC;
- significant disruption of gender parity;
- uneven socioeconomic progress between countries, subregions and cities. This in turn implies urban poverty, poor quality housing, infrastructure and services, poor land-use planning, etc.;
- violent conflict.

These demographic and urbanization changes, triggered by both natural and human-caused events, inevitably increase the pressure on limited natural resources, stretching the generative capacity of ecosystems, particularly in urban settings. The high population density and regular influx of people from rural areas, with large sections of the urban population living in informal housing and slums, in addition to unplanned urban expansion often on risky sites with a concomitant concentration of solid and liquid wastes, may disrupt the normal functioning of the cities' socioecological systems, rendering a vast proportion of the population even more vulnerable to disasters and climate risks. The widening disparities aggravate perceptions of injustice and social exclusion, thereby multiplying the challenges that municipal authorities face when addressing sustainable urban development in the region.

In this context, it is critical to find the best ways to balance the ecological and social constituents of cities, to ensure that they are actually inclusive, safe, resilient and sustainable, as targeted by Goal 11 of the SDGs.

It is widely recognized that urbanization is a powerful force for economic growth and the eradication of poverty. Cities also serve as catalysts for collective action, decision-making and accountability. It has been also proven that *“urbanization provides the potential for new forms of social inclusion, including greater equality, access to services and new opportunities, and engagement and mobilization that reflects the diversity of cities, countries and the globe.”*²⁴

The region is characterized by the rise of large agglomerations with more than one million inhabitants. One of the aspects of agglomeration essential to economics and productivity is density:²⁵ population density, economic density and infrastructure density – all of which allow easy connectivity within and between cities. Meanwhile, population density is the key source of greater exposure of people, infrastructure and settlements to the risks of natural hazards. The critical question is how to unlock the greater potential of Arab cities in order

FOOTNOTES

²⁴ UN Habitat 2015.

²⁵ World Bank 2009.

to increase resilience and thus ensure sustainable urban development. To this end, it is important to define the natural hazards facing Arab cities and the range of existing and emerging risks they will have to confront in order to ensure resilient sustainable development and prosperity in the future.

03

Hazards, exposure and risks

3.1 Hazard exposure of the Arab states: general overview

Table 7
Overview of number and types of disaster events per country

This chapter provides a general overview of the hazard profile of the region and further explores two main hazards: hydrometeorological and geophysical. It also highlights some vulnerabilities and risks that may be expected in relation to the main hazards at both national and urban levels.

There is very little disaster-related data available for the region. The occurrence and impact of disasters in terms of losses and damage has also been largely underreported.¹ Reliance to date has been on two databases: the Emergency Events Database (EM-DAT)² and the multi-stakeholder initiative on Disaster Inventory Management System – DesInventar.³ The Global Disaster Loss Collection Initiative rolled-out by UNISDR in collaboration with UNDP has helped ten Arab countries to implement their own national disaster damage and loss databases. These countries are Comoros, Djibouti, Egypt, Jordan, Lebanon, Morocco, Palestine, Syria, Tunisia and Yemen.

Despite some discrepancies between the data sets available in both databases, (while EM-DAT has information about almost all the countries in the region, the DesInventar data include more indicators) and pros and cons of each of them, these databases help to understand the main hazards faced across the region. Table 7 below provides an overview of the number and the type of disasters affecting each country, based on the data sets from EM-DAT and the national disaster damage and loss databases.

Number of events in 22 Arab countries (30 year period from 1982 to 2011)

Countries	Earthquakes	Forest Fires	Landslides	Floods	Cyclones	Flash Floods	Other	Total
Comoros	0	0	0	2	4	0	7	13
Djibouti	10	0	7	110	0	0	233	360
Egypt	12	0	0	1	0	1	42	56
Jordan	16	26	7	94	0	49	401	593
Lebanon	35	1 363	64	91	1	156	697	2 407
Morocco	6	624	0	66	0	0	10	706
Palestine	3	5	1	66	0	0	262	337
Syria	0	3 176	13	93	2	8	4 003	7 295
Tunisia	17	77	4	336	1	0	1 235	1 670
Yemen	70	0	137	112	3	42	1 098	1 462

Number of events in 22 Arab countries (30 year period from 1982 to 2011), EM-DAT

Algeria	12	2	1	0	0	5	38	58
Bahrain	0	0	0	0	0	0	0	0
Emirates	0	0	0	0	0	0	0	0
Iraq	1	0	0	0	0	4	3	8
Kuwait	0	0	0	0	0	1	0	1
Libya	0	0	0	1	0	0	0	1
Mauritania	0	0	0	6	0	1	15	22
Oman	0	0	0	0	4	0	1	5
Qatar	0	0	0	0	0	0	0	0
Saudi Arabia	0	0	0	0	0	1	11	12
Somalia	0	0	0	0	1	7	31	40
Sudan	0	0	0	13	0	3	26	42

Source: EM-DAT

FOOTNOTES

¹ Ezzine 2015, pp. 38, 40.

² <http://www.emdat.be>.

³ DesInventar Official Website [<https://www.desinventar.org/en/>]. DesInventar Sendai [<http://www.desinventar.net/>].

An analysis of the nature of disasters in Arab states, based on the information from the national databases, reveals that, in the period 1982 to 2011, the region experienced 14,477 hydrometeorological and 422 geophysical events (i.e., 97 per cent compared to 3 per cent).⁴ Thus, since 1982, hydrometeorological events have been much more frequent and destructive than geophysical events, although the geophysical hazards are more concentrated in space and have longer return period. Flooding is the most common natural hazard experienced in the region, followed by droughts, storms and fires.

The following sections offer more detailed analysis of the two main hazards in the Arab region: hydrometeorological and geophysical events.

This section presents the main results of recent regional hydrometeorological modelling projections from a climate change perspective, and the risks it poses to Arab states and Arab cities in general. It further highlights some important vulnerabilities to hydrometeorological hazards in the main Arab cities.

3.2 Hazard profile: hydrometeoro- logical hazards

3.2.1 Climate and hydrometeorological hazards

Climate change induced temperature increases, rainfall variability, droughts, tropical storms and flooding have been already observed across the Arab region.⁵ Transition to increased aridity with recurrent drought spells have been experienced in the region since the mid-twentieth century. The droughts have worsened over the last decades especially in Morocco, Syria, Somalia and Djibouti.

According to UNISDR, "climate change has an impact on the frequency and intensity of extreme weather events. High variations of rainfall with an increase in flood events impact the Arab region."⁶ In general, hydrometeorological disaster scenarios are facing an upward trend since the second half of last century. Flood mortality risk has increased. The rate of flash flooding occurrence in the region has also doubled over the last two decades.⁷

The recurrence of droughts is projected to increase further in the medium- and long-term future.⁸ From 2006 to 2011, the region suffered some of its worst droughts on record, contributing to famine in Somalia, the widespread loss of millions of farm-based livelihoods in Syria, Iraq and Yemen, and the displacement of millions across the region.⁹

FOOTNOTES

⁴ Ezzine 2015, p. 42.

⁵ Osman-Elasha 2010.

⁶ UNISDR 2013.

⁷ UNESCO 2010.

⁸ Erian 2013.

⁹ Kelley et al. 2015.

Sea level rise (SLR) has the potential to affect two to four million vulnerable farmers of the Nile Delta in Egypt. Moreover, SLR is predicted to affect other major cities in the region including Alexandria, Algiers and Tunis. In addition, the rate of extreme weather events, including tropical cyclones, coastal erosion, sand storms, strong winds, heat and cold waves, is increasing across Arab countries. For instance, an estimated 700,000 persons were internally displaced as a result of climate-induced severe flooding which affected the low-lying Wadi Hadramout and Al-Mahra in Yemen in 2008.¹⁰

The following section highlights more about the impact of climate change on the growth of disaster risks in the region.

3.2.1a Regional climate

As estimated by the UN after the secession of South Sudan,¹¹ the Arab region covers 13.15 million km² (more than 2.5 times the size of Western Europe) and stretches from the Atlantic Ocean to the Zagros Mountains in South-West Asia. The region extends into both the African and Asian continents, with 72 per cent of the area (9,975,508 km²), and 67 per cent of the inhabitants (260,718,000) in Africa. The population density, however, is a little higher in the Asian Arab countries than in the African.¹²

The climate of Arab countries ranges from Mediterranean, with warm and dry summers and wet rainy winters, through subtropical zones, with variable amounts of summer monsoon rains, to deserts with virtually no rain. During the winter, variability in the North Atlantic Oscillation (NAO) influences storm tracks; annual variations in rainfall in Western and Central North Africa (the Maghreb), most of the Mashreq and the Arabian Peninsula are largely governed by this NAO effect. The eastern part of the region (the Mashreq, the Gulf, and Centre regions) – where it rains mainly during the winter – is almost without rainfall in summer. The south-eastern area of the region (Yemen and Oman) is influenced by the Indian monsoon system, which is largely controlled by the position of the Inter-Tropical Convergence Zone (ITCZ)¹³ and therefore has a secondary summer rainfall maximum. Occasionally, these countries also experience serious consequences due to tropical cyclones. Environmental challenges in the Arab region include water scarcity, with the lowest fresh water resource endowment in the world; very low and variable precipitation; and excessive exposure to extreme events, including drought and desertification.

FOOTNOTES

¹⁰ Yemen 2015.

¹¹ <http://data.un.org/Search.aspx?q=arab+world+surface+area>. Accessed 13 December 2016.

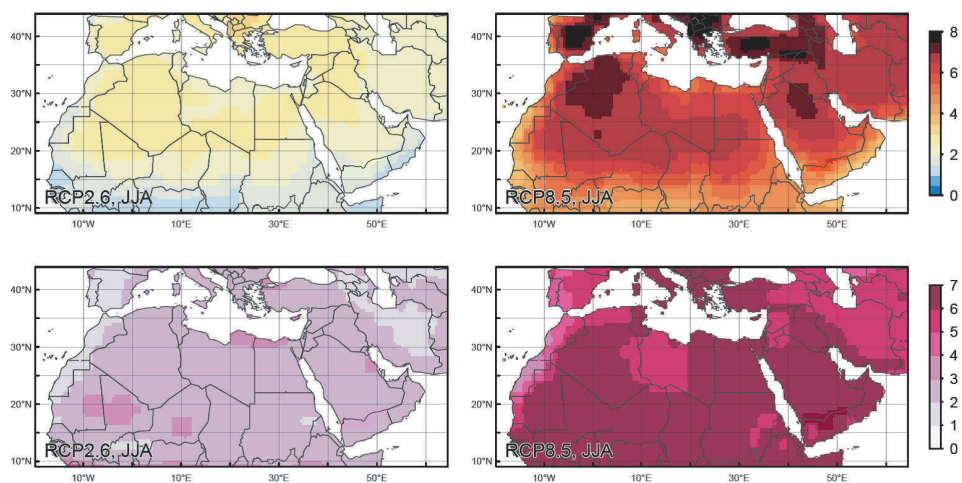
¹² Al-Madhari and Elberier 1996.

¹³ The Inter-Tropical Convergence Zone is an equatorial zonal belt of low pressure near the equator where the northeast trade winds meet the southeast trade winds. As these winds converge, moist air is forced upward, resulting in a band of heavy rainfall. This band moves seasonally (IPCC Glossary: https://www.ipcc.ch/publications_and_data/ar4/wg1/en/annexessglossary-e-o.html).

3.2.1b Regional patterns of climate change: expected temperature change and heat extremes in the Arab region

Warming of 0.2°C per decade has been observed in the region since 1961–1990, and since then, the warming has been at an even faster rate. Geographically, the strongest warming is projected to take place close to the Mediterranean coast. Here, as well as in the hinterland of Algeria, Libya and large parts of Egypt, warming by 3°C (in a 2°C world) is projected by the end of the century. In a 4°C world, the probability density function of monthly temperatures (associated with the year-to-year variability of monthly temperatures) shifts by six standard deviations toward warmer conditions across all regions, from the Sahara to the Arabian Peninsula to the eastern Mediterranean coast. Such a large shift implies that summer temperatures here will move to a new climatic regime by the end of the twenty-first century. Such a dramatic change would be avoided in a 2°C world; (World Bank 2014, p. 122). Even then, however, a substantial shift is expected to take place: the mean summer temperatures are expected to be up to 8°C warmer in parts of Algeria, Saudi Arabia and Iraq by the end of the century (Figure 7).

Figure 7
Multi-model mean temperature anomaly for Representation Concentration Pathway (RCP) 2.6 (2°C world, left) and RCP 8.5 (4°C world, right) for the months of June-July-August (JJA) in the Middle East and North African region.



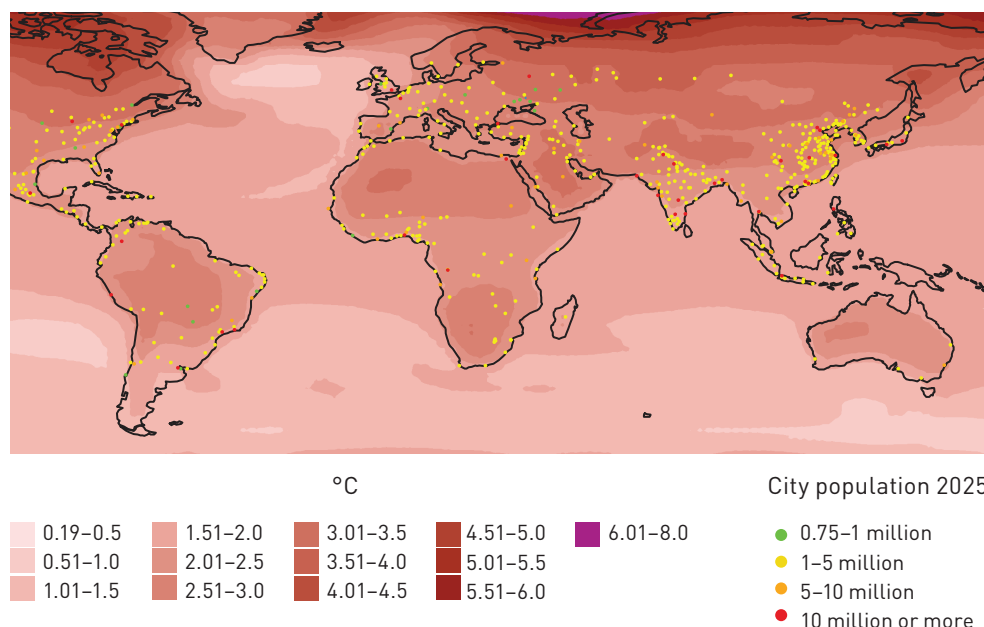
*Temperature anomalies in degrees Celsius (top row) are averaged over the time period 2071–2099 relative to 1951–1980, and normalized by the local standard deviation (bottom row).

Source: World Bank 2014, p.121.

3.2.1c Urban temperature in Arab countries

With the increase in temperature, the frequency of hot days and warm spells will increase and exacerbate urban heat island (UHI) effects. Figure 8 shows that the population living in the largest urban agglomerations (based on their 2025 populations) will be exposed to a minimum 2°C temperature rise over pre-industrial levels, excluding UHI effects. Climate change will modify UHI effects, causing a mean rise of 3.5°C in some cities, resulting in a combined rise of more than 5°C. Peak seasonal temperatures could be even higher. Recent studies using physically-based models (McCarthy et al. 2010, Früh et al. 2011, Oleson 2012) show mixed results, with reductions in UHI effects in many areas of the world and increases elsewhere in response to climate change.¹⁴

Figure 8
Large urban agglomerations 2025 with projected climate change for the mid-twenty-first century using RCP 8.5 scenario



Source: IPCC 2014

3.2.1d Regional patterns of climate change: precipitation trends in Arab region

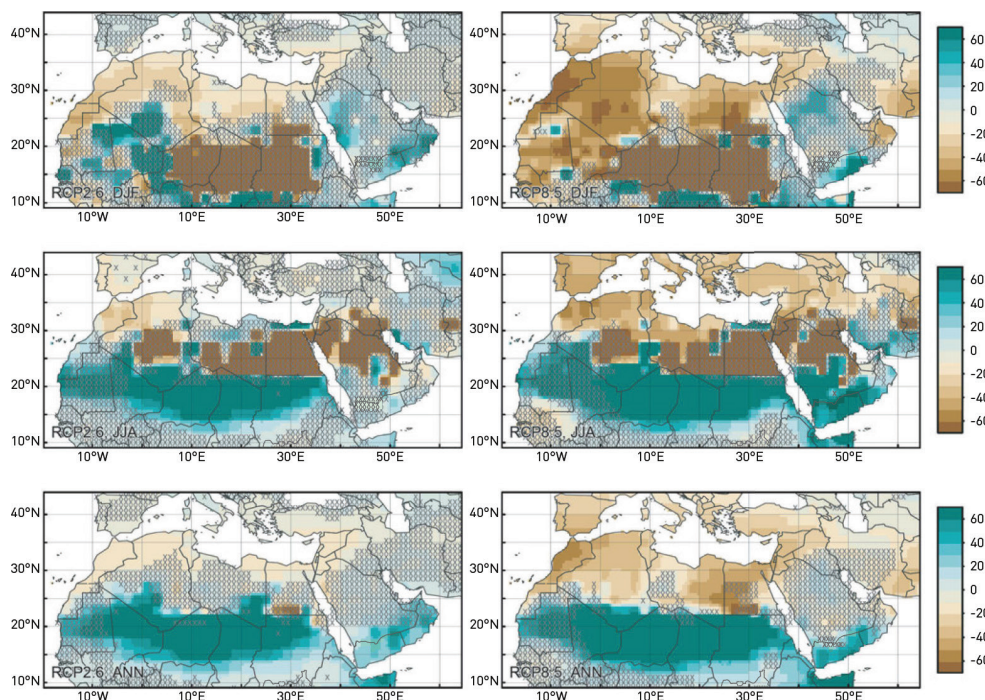
The multi-model percentage changes for the annual mean precipitation (averaged over 2046–2065) are:

- 10 to +24 per cent for mid-twenty-first century of RCP 2.6;
- 9 to +22 per cent for late twenty-first century of RCP 2.6;
- 19 to +57 per cent for mid-twenty-first century of RCP 8.5; and
- 34 to +112 per cent for late twenty-first century of RCP 8.5 (figure 9).

FOOTNOTES

¹⁴ Climate Change 2014: Impacts, Adaptation, and Vulnerability, IPCC <http://www.ipcc.ch/report/ar5/wg2/>

Figure 9
Multi-model of the mean percentage change in winter (DJF, top), summer (JJA, middle) and annual (bottom) precipitation for RCP 2.6 (2°C world, left) and RCP 8.5 (4°C world, right) for the Middle East and North Africa by 2071–2099 relative to 1951–1980



Source: World Bank 2014, p. 124

Trends in aridity lead to changes in annual water discharge that can be taken as a first-order approximation of the water resources available to humans. Profound changes in river run-off are already evident for a 2°C world. Although the Arab region occupies 10 per cent of the planet, it owns less than one per cent of the world's fresh water resources, with available water resources of less than 1,000 m³ per capita per year in all Arab states except Iraq, Syria and Lebanon.

Figure 10 shows the percentage change in the aridity index (AI).¹⁵ AI is designed to identify regions with an ongoing precipitation deficit¹⁶ and is a standardized measure of water demand. "Changes in the AI are primarily driven by changes in precipitation causing an increase in the AI (wetter conditions) south of 25° N (i.e., the Sahel and the most southern part of the Arabian Peninsula) and a decrease in AI (drier conditions) north of 25° N. The relative increase in AI values in the southern region is similar to the relative increase in annual mean precipitation (about 50 per cent wetter conditions), as the change in potential evapotranspiration is small. Note that this relative increase in AI south of 25° N is superimposed on an already very low AI value, which results in AI values still classified as arid."¹⁷

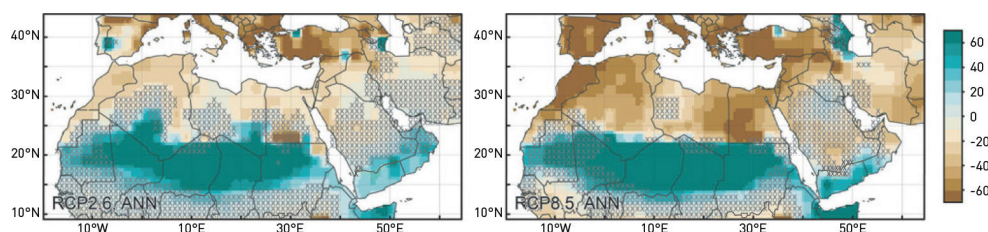
FOOTNOTES

¹⁵ AI is calculated as the total annual precipitation divided by the annual potential evapotranspiration (World Bank 2014, p. 126).

¹⁶ Ibid, citing Zomer et al. 2008.

¹⁷ Ibid.

Figure 10
Multi-model mean of the percentage change in the aridity index under RCP 2.6 (2°C world, left) and RCP 8.5 (4°C world, right) for the Middle East and North Africa by 2071–2099 relative to 1951–1980.



Source: World Bank 2014, p. 126

Climate change projections show stark differences in the effects across the region. Although runoff in North Africa and the eastern Mediterranean (including the headwaters of the Euphrates and the Tigris) is expected to drop by up to 50 per cent, Southern Saudi Arabia and East Africa (including the headwaters of the Nile) will experience increases in runoff by up to 50 per cent. Consequently, climate change is projected to reduce water supplies in the northern and western parts of the Arab region and to increase the supply in Egypt and the southern part of the region.

Eastern Mediterranean and the Arabian Peninsula are projected to become drier, especially in the rainy season. Studies on “*the projected change in the monthly mean rainfall over the eastern Mediterranean [...] found a significant decrease in rainfall, on the order of 40 per cent, at the peak of the rainy season (December and January) over the Mashreq. This change is due to a reduction in both the frequency and duration of rainy events. Before and after the rainy season, the situation is less clear, with some areas projected to get wetter and others drier.*”¹⁸

3.2.2 Risks to urban systems

Due to climate change and the resulting increase in intensity, frequency and duration of extreme events, stress upon environment “*is becoming important in fragile ecosystems and drylands with limited natural resources as in the Arab region. On the one hand, demographic growth and high per capita consumption have increased the demand for environmental resources. On the other hand, environmental depletion and degradation have reduced both the quantity and the quality of renewable resources. In addition to this supply/demand-induced dynamic, the unequal distribution of environmental resources must be considered. These combined trends would create a serious deficit of environmental resources in poor countries and fuel pre-existing grievances such as ethnic, religious or economic marginalization.*”¹⁹

Changing climate patterns and the increased risk of hydrometeorological disasters in the region, strain the ability of Arab States and cities particularly, to provide sufficient water for people, the economy and ecosystems. “Current projections show that by the year 2025 the water supply in the Arab region will be only 15 per cent of what it was in 1960.”²⁰ Sustainable urban development in the region, therefore, is very much about water scarcity and the relationship between water and other economic sectors: agriculture, energy,

FOOTNOTES

¹⁸ World Bank 2012, p. 60, citing Black 2009.

¹⁹ Erian et al. 2014, p. 32.

health, ecosystem and security. For instance, Yemen has all the chances to become the first country to run out of water.²¹

Figure 11 demonstrates the general projected impact of climate change on key sectors in the Arab region.²² It is also important to highlight the interdependencies and correlations between various risks across sectors. In the Arab region the nexus between water-food security and social unrest is becoming more entwined, with potential destabilizing effects on some countries. The direct and indirect impact of hydrometeorological hazards can potentially trigger a wide range of different risks for urban systems.

Direct impact

- Changes in precipitation patterns and water cycles will increase the existing problems of water supply and water quality.
- Cities like Alexandria, located in deltas, are more likely to be affected by coastal flooding as they may have a lower elevation, suffer natural subsidence to a greater or lesser extent and, in some cases, receive more water discharge from melting snow-fed rivers (Basra).
- Climate change is expected to increase environment-related diseases. Warmer and/or wetter breeding seasons will provide ideal conditions for the proliferation of mosquito-borne diseases, such as puddles where malaria-carrying mosquitoes breed.
- Lack of sanitation and potable water will increase water contamination and food-borne diseases like cholera, typhoid, diarrhoea, hepatitis and gastroenteritis. Warmer cities will also lead to an increase in respiratory diseases due to pollution, whose effects are reinforced by higher temperatures.
- Warming will be felt more in cities because of the urban heat island (UHI) effect that makes cities warmer than their surroundings by 2°C to 6°C due to the modification of the land surface and waste heat produced by high energy use. Heat waves that can kill hundreds of people may become more frequent and intense. The increase of UHI will cause heat-related health problems²³ and, possibly, increased air pollution.²⁴ It is expected that energy demands will be increased for warm season cooling.²⁵ UHI in the Arab region and its effect on the population require additional studies.
- Storms, floods and coastal/delta flooding that are expected to be more frequent will put infrastructure at greater risk. This includes transportation (i.e., roads, railways, bridges, ports and airports) and communication networks, water supply, sewage, gas pipelines, drainage, flood and coastal defence systems, power and telecommunication infrastructure, industrial units and processing plants. In terms of buildings, informal and traditional housing are the most vulnerable to storms and floods.²⁶

FOOTNOTES

²⁰ UNDP 2013a, p. IV.

²¹ <http://science.time.com/2010/12/14/what-if-yemen-is-first-country-to-run-out-of-water/>.

²² World Bank 2014, p. xxxiv.

²³ IPCC 2014a, p. 554, citing Hajat et al 2010.

²⁴ Ibid, citing Campbell-Lendrum and Corvalán 2007.

²⁵ Ibid, citing Lemonsu et al. 2013.

²⁶ <http://base.d-p-h.info/pt/fiches/dph/fiche-dph-8632.html>

Indirect impact

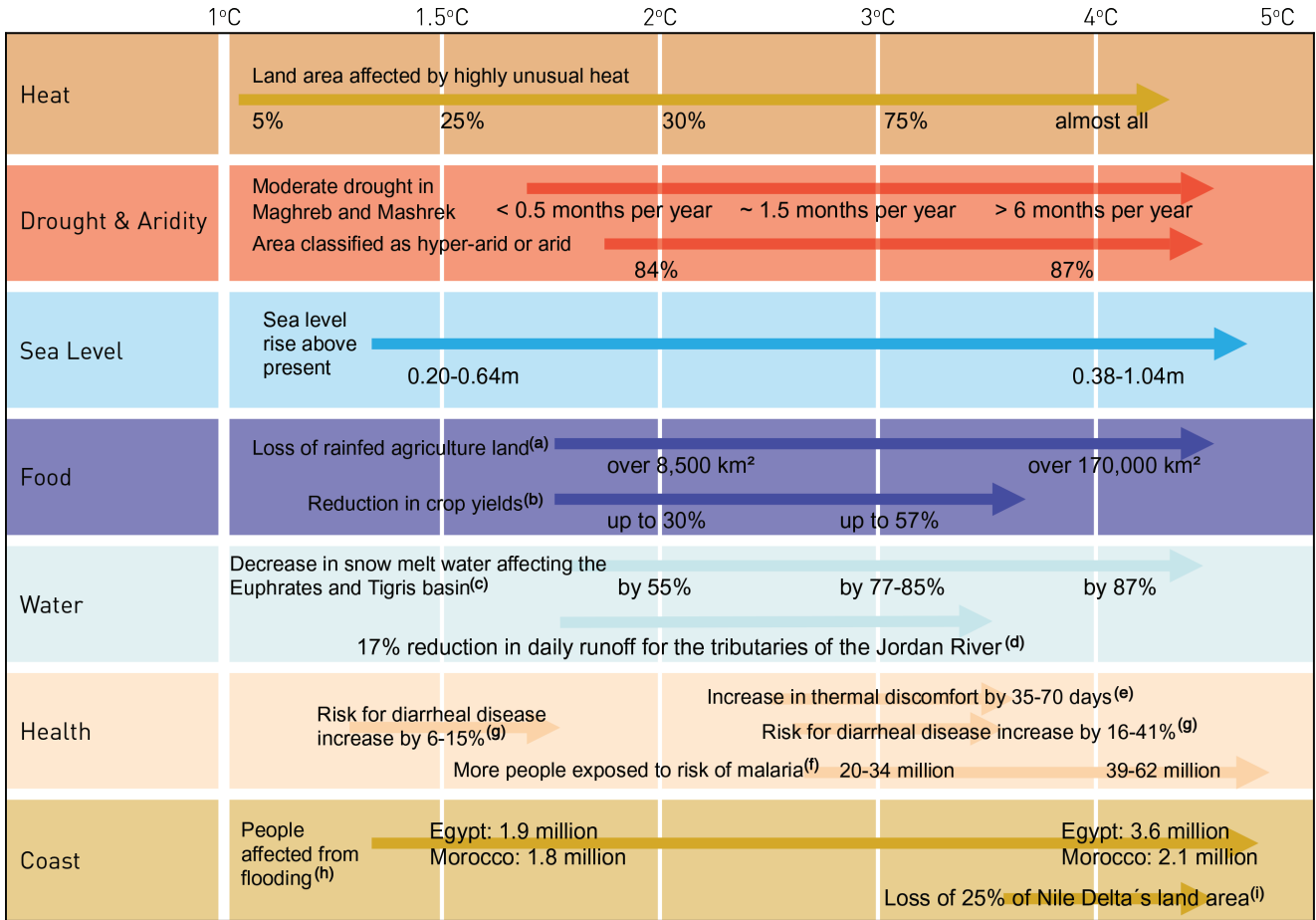
- “Continued urban expansion into hazard-prone areas means that a growing proportion of urban populations will be at risk of climate-related extreme events and rising food prices, and thus of increasing poverty levels among urban groups.”²⁷ In this context, “Mauritania and Yemen stand out as the most food-insecure countries.”²⁸
- In combination with non-climatic pressures, a decline in rural livelihood options could trigger further urban migration, potentially exacerbating urban vulnerability and intensifying the potential for conflict. Migrants are generally the most vulnerable group in any city. With no access to the city’s livelihood network and lacking skill sets to enable them to thrive, these people live in illegal slums with no access to basic amenities. This group is thus highly vulnerable to a variety of risks arising from living in such hazardous conditions (e.g., environmental health risks due to poor sanitation and inadequate water supply, little or no drainage or solid waste disposal services, air and water pollution, as well as the constant threat of eviction).
- Risk of food insecurity and the breakdown of food systems due to warming, drought and flooding, as well as precipitation variability and extremes, most particularly affecting poorer populations in urban and rural settings, as indicated by IPCC (2014a).
- Heat waves could have a major impact on the economy. Episodes of heat cramps, heat exhaustion and heat stroke would affect the population, primarily the large poorer section of society. As the immune system weakens due to heat stress, susceptibility to disease would further increase. The health care expenditure incurred by individuals as a result would escalate, leading to greater stress. This vicious cycle would therefore lead to a reduction in human resources. As temperatures increase, the number of days available for heavy work, like construction, will decrease which may also have a negative impact on economic growth.
- Climate change may act as a threat multiplier to the security situation in the region by bringing additional pressures on already scarce resources and by reinforcing pre-existing threats related to migration following forced displacement.²⁹

FOOTNOTES

²⁷ World Bank 2014, p. xxii, box 2.

²⁸ Harrigan 2014, p. 35.

²⁹ World Bank 2014, pp. xxvi, 116, 157.



Source: World Bank 2014, p. xxxiv

Figure 11
Projected impacts of climate change on key sectors in the Middle East and North Africa region

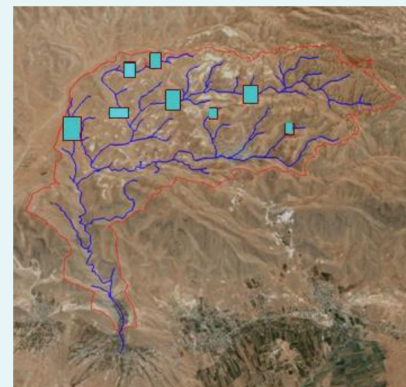
There are large differences among Arab urban centres to the extent to which their economies are dependent on climate-sensitive resources (including commercial agriculture, water and tourism). Cities in high-income countries (Gulf Cooperation Council) and many in middle-income countries, for example, have become relatively more resilient to extreme weather (and other possible catalysts for disasters) through a range of risk response measures that have already been put in place. There are many practices worth sharing across the region.

Box 2 Flood management measurements at Arsal, al-Fakeha and al-Qaa cities in Beqaa – Lebanon

Northern Beqaa urban areas, such as al-Fakeha and Ras Baalbek, are surrounded by a mountainous terrain that drains into these areas causing frequent flooding with the destruction of homes and roads. Major events have occurred in 1987, 1994 1999, 2001, 2004 and 2007.

The vegetation cover in the vicinity of al-Fakeha city was increased in order to mitigate land degradation from water erosion and reduce the impact of flash floods on the city and the agricultural land located downstream of the watershed. Two different types of structures were built to reduce the volume of flood water before it reaches al-Fakeha city. Surface run-off was diverted into storage structures such as percolation ponds (hafir). Smaller dispersed structures were built to provide in situ retention of rainfall, such as stone contour bunds, stone walls, and check dams.

Author: Wadid Erian, Egypt



3.2.3 Special focus area: risk of drought in the main Arab cities

Climate change is likely to increase the frequency of meteorological droughts (aridity and the duration of dry periods), agricultural droughts (less soil moisture), and hydrological droughts (shortfalls in water supply) in presently dry regions by the end of the twenty-first century. Annual maximum wet-bulb temperature (TW_{max}) increases monotonically in different locations surrounding the Gulf. Thus, the severest values of annual TW_{max} occur in Kuwait and Al Ain, where the 60°C threshold will be frequently exceeded several times by the end of the century.³⁰ In these locations, 50°C events will become normal during July, August and September. Rainfall is predicted to decline in parts of the region by 20 to 40 per cent in a 2°C world and by up to 60 per cent in a 4°C world. Such a combination creates all the necessary preconditions for drought risk in the region, with widespread consequences for various systems.

FOOTNOTES

³⁰ Pal and Eltahir 2015, p. 2 [198], considering both dry-bulb temperature [T] and wet-bulb temperature [TW], specifically their daily maxima averages over 6 hours [which is considered the maximum duration fit humans can survive at 35°C] denoted by Tmax and TWmax respectively. [Ibid. p. 1[197]].

Table 8
SPEI change
over 50 years
in main Arab cities
by population

Table 8 shows the ranking of Arab cities according to the Standardized Precipitation-Evapotranspiration Index (SPEI)³¹ with the change difference that took place between two periods: (Average for the years 2001-2010) and (Average for the years 1961-1970).

Country	City Name	Current Total Population	Average SPEI in different decades calculated for all year					SPEI change in 50 years (2001 to 2010) minus (1961 to 1970)	SPEI change in Summer months (July August September) for 50 years
			y617_0	y7180	y8190	y91_00	y00_10		
Algeria	In Salah	32 518	1.50	2.50	0.75	-0.70	-3.49	-4.99	-3.9
Libya	Ghadames	10 000	1.25	1.50	0.75	-0.30	-3.49	-4.74	-3.5
Sudan	Wadi Halfa	15 725	1.25	1.00	1.50	0.25	-3.49	-4.74	-3.2
Saudi Arabia	Jeddah	3 400 000	1.25	0.25	0.50	-0.20	-3.49	-4.74	-3
Saudi Arabia	Makkah	1 675 368	1.25	-0.10	0.75	-0.20	-3.49	-4.74	-2.8
Egypt	Aswan	290 327	1.25	0.50	1.50	0.75	-3.49	-4.74	-2.5
Libya	Murzuq	12 746	0.50	1.50	0.75	-0.30	-3.49	-3.99	-2.2
Sudan	Khartoum	6 527 500	1.25	0.50	-0.60	0.25	-3.49	-4.74	-2
Sudan	Omdurman	2 395 159	1.25	0.50	-0.60	0.25	-3.49	-4.74	-2
Algeria	Tindouf	45 966	0.75	1.50	-0.30	-0.10	-3.49	-4.24	-1.9
Sudan	Bur Sudan	489 725	1.25	0.25	-0.60	0.25	-3.49	-4.74	-1.8
Iraq	Baghdad	7 216 040	0.50	1.00	0.50	-0.60	-3.49	-3.99	-1.4
Saudi Arabia	Ar Riyad	5 700 000	0.25	0.25	0.50	0.25	-3.49	-3.74	-1.3
UAE	Abu Dhabi	1 500 000	1.25	-1.94	0.25	-0.50	-0.40	-1.65	-1.3
Kuwait	Kuwait City	1 375 000	0.25	1.00	-0.50	-0.20	-3.49	-3.74	-1.2
Algeria	Oran	759 645	0.75	1.50	-0.20	-0.70	-0.60	-1.35	-1.2
Libya	Banghazi	435 886	0.50	0.25	0.25	0.50	-3.49	-3.99	-1.2
Iraq	Basra	2 750 000	0.25	1.00	-0.30	0.25	-3.49	-3.74	-1.1
Libya	Tripoli	1 126 000	0.25	1.00	0.25	-0.50	-3.49	-3.74	-1
Tunisia	Sfax	330 440	0.25	1.00	0.25	-0.30	-3.49	-3.74	-1
Yemen	Aden	760 923	0.75	-1.94	1.50	0.25	-0.60	-1.35	-1.1
Qatar	Doha	900 545	0.50	-0.40	-0.20	-0.10	-0.50	-1.00	-1
Yemen	Sanaa	1 937 451	1.25	-1.94	-0.30	0.25	0.25	-1.00	-0.9
Morocco	Fes	1 112 000	0.75	1.00	-0.60	-0.50	-0.50	-1.25	-0.9
Morocco	Marrakech	928 850	0.50	0.25	-0.10	0.25	-0.70	-1.20	-0.9
West Bank	Jerusalem	890 428	0.25	0.50	0.50	-0.10	-3.49	-3.74	-0.9
Egypt	El-Giza	3 628 062	-0.20	0.25	1.50	-0.10	-3.49	-3.29	-0.5
Somalia	Mogadishu	1 280 000	0.75	-0.50	0.25	-0.40	-0.20	-0.95	-0.9
Algeria	Tamanrasset	92 635	0.50	0.50	0.25	-2.00	-0.30	-0.80	-0.9
Saudi Arabia	Al Madinah	1 180 770	0.25	0.50	0.75	0.50	-0.70	-0.95	-0.8
Mauritania	Nouakchott	958 399	0.50	-0.30	-0.50	0.25	-0.50	-1.00	-0.7
Iraq	Mosul	1 500 000	0.50	0.50	0.25	-0.40	-0.50	-1.00	-0.7
Oman	Muscat	1 288 330	0.50	-1.94	0.25	0.50	-0.40	-0.90	-0.7
Jordan	Amman	4 000 000	0.25	0.75	0.25	-0.50	-0.60	-0.85	-0.7
Morocco	Casablanca	3 359 818	0.50	0.75	-0.50	-0.50	-0.20	-0.70	-0.7
Syria	Homs	652 609	0.50	0.50	-0.20	-0.50	-0.20	-0.70	-0.5
Syria	Damascus	1 711 000	0.25	0.50	0.25	-0.30	-0.40	-0.65	-0.5
Egypt	Cairo	10 230 350	-0.10	0.25	1.50	0.25	-0.70	-0.60	-0.5
Djibouti	Djibouti	623 891	0.25	-1.94	0.75	0.50	-0.30	-0.55	-0.5
Tunisia	Tunis	1 056 247	0.25	0.75	-0.30	-0.50	-0.30	-0.55	-0.5
Syria	Aleppo	2 132 100	0.25	0.25	0.25	-0.20	-0.40	-0.65	-0.4
Algeria	Algiers	3 574 000	0.25	1.50	-0.40	-0.60	-0.40	-0.65	-0.3
Lebanon	Tripoli	850 000	0.50	0.50	-0.20	-0.70	-0.10	-0.60	-0.3
Egypt	Alexandria	4 546 231	-0.30	0.50	0.75	-0.20	-0.60	-0.30	-0.2

FOOTNOTES

³¹ The SPEI is a multi-scalar drought index based on climatic data. It can be used for determining the onset, duration and magnitude of drought conditions with respect to normal conditions in a variety of natural and managed systems such as crops, ecosystems, rivers, water resources, etc. More information is available at <http://sac.csic.es/spei/index.html>.

The results confirm that the major Arab cities can be classified into cities with extreme, moderate and slight drought (as an average for all months).

- Cities with **extreme drought**: Ain-Salah and Tindouf (Algeria); Ghadames, Murzuq, Benghazi and Tripoli (Libya); Wadi Halfa, Port Sudan, Khartoum and Omdurman (Sudan); Jeddah, Makkah and Riyadh (Saudi Arabia); Aswan and Giza (Egypt); Baghdad and Basra (Iraq); Kuwait City (Kuwait); Sfax (Tunisia); and Jerusalem (Palestine).
- Cities with **moderate drought**: Abu Dhabi (United Arab Emirates); Oran (Algeria); Marrakech and Fes (Morocco); and Aden (Yemen).
- Cities with **slight drought**: Doha (Qatar); Sanaa (Yemen); Nouakchott (Mauritania); Mosul (Iraq); Mogadishu (Somalia); Al Madinah (Saudi Arabia); Muscat (Oman); Amman (Jordan); Tamanrasset (Algeria); Casablanca (Morocco); Homs, Damascus and Aleppo (Syria); Algiers (Algeria); Alexandria and Cairo (Egypt); Beirut and Tripoli (Lebanon); Djibouti (Djibouti); Tunis (Tunisia); Rabat (Morocco); and El Obeid (Sudan).

The **most affected cities** during summer could be ranked as follows: Rabat, Tamanrasset, Doha, Casablanca, Mogadishu, Djibouti, Tunis, Sanaa, Oran, Asmara, Al Madinah, Cairo, Addis Ababa, Amman, Aden, Abu Dhabi, Ain-Salah, Muscat, Damascus, Marrakech, Ghadames, Fes, Homs, Nouakchott, Mosul, Wadi Halfa, Alexandria, Makkah, Aleppo, Jeddah, Murzuq, Aswan and Tripoli.

3.2.4 Special focus area 2: coastal zones

The coastal zone of the Arab region is 34,000 km long in total, more than half of which is inhabited. *“Most of the Arab cities and towns from Gulf, to Levant, to Egyptian Delta and North Africa are located along the Arabian Sea, Red Sea and on either side of the Mediterranean Sea. In North Africa over 70 per cent of Tunisian and Libyan population lives in cities along the coast. The Egyptian Delta, with almost 40 per cent of the total Egyptian population, is sandwiched between the Mediterranean and Red Seas. The coast of Lebanon is an extended sprawl of towns and cities, so is the Saudi Arabian coast on Red Sea. In the Arabian Sea, in addition to archipelago of Bahrain, all major urban centres of Kuwait, Oman, Saudi, Qatar and UAE lay on the seaside.”*³²

Coastal cities like Agadir, Alexandria, Algiers, Aqaba, Basra, Bosaso, Beirut, Casablanca, Djibouti, Jeddah, Tripoli and Tunis are international commercial hubs.

FOOTNOTES

³² UNDP, Arab Cities Disaster Resilience Programme 2014-2017, available at:

http://procurement-notice.undp.org/view_file.cfm?doc_id=54089. Accessed 18 January 2017.

Box 3 Coastal zones: the case of Egypt

Ninety per cent of the Egyptian population lives along the Nile Delta. Protection of coastal zones remains a priority issue for Egypt with about 15 per cent of the population residing on the country's Mediterranean and Red Sea coasts. Along the Mediterranean Sea coast are the governorates of Matrouh, Alexandria, Beheira, Kafr el-Sheikh, Dakahlia, Damietta, Port Said and North Sinai. The governorates of South Sinai, Suez and the Red Sea are located along the Red Sea coast.

An increase in sea level as a result of changing climate poses risks to the coastal population, infrastructure and environment. It is therefore of strategic importance for Egypt to build resilience against natural hazards while pursuing its developmental priorities. In order to further improve the understanding of vulnerabilities of major coastal cities, the Arab Academy of Science, Technology and Maritime Transport, in partnership with the World Bank (WB), is evaluating climate scenarios for Alexandria 2030.

[Magda Stepanyan, Research note for the present report](#)

"All coastal cities in the Arab region remain especially vulnerable to multiple hazards associated with climate change; e.g., sea level rise, coastal inundation, salinization, etc."³³ The coastal areas of the Maghreb and Mashreq are vulnerable to earthquakes, flash flooding and tsunamis. Flood and cyclone-related urban disasters could lead to economic losses amounting to billions of dollars. Cyclone Gonu, for example, resulted in losses amounting to USD 4.2 billion, while flooding in Jeddah led to losses amounting to more than USD 1 billion. The potential impact could go as far as severe damage to urban housing, transport networks, motor traffic, ports, office buildings, educational institutions and drainage systems. "The World Bank estimates that climate change in the Arab region will expose 80-100 million people to water stress and 6-25 million people to coastal flooding by 2025."³⁴ The consequences could reach well beyond the confines of regional geography.

Box 4 Critical infrastructure: the case of the Strait of Hormuz

The narrow Strait of Hormuz^{*} is considered one of the most, if not the most, strategic straits of water on the planet. Sixty per cent of the world's total oil exports is transported from Bahrain, Iran, Iraq, Kuwait, Qatar, Saudi Arabia and the UAE through the Strait of Hormuz alone.

The Strait of Hormuz is an exclave of Oman (Musandam governorate), strategically located on the north coast of Iran and the south coast of the UAE. The importance of the Strait of Hormuz is critical not only to the economy of the City of Hormuz, but also to the economy of other oil-producing countries in the region (the GCC countries) as well as

FOOTNOTES

³³ Ibid.

³⁴ Serageldin et al. 2016, p. 46.

the stability of the global economy at large.

Therefore, building resilience to disaster and climate risks is of the utmost importance in safeguarding the critical regional and global infrastructure.

Magda Stepanyan

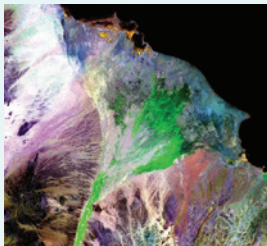
FOOTNOTES

*. <http://www.heritageinstitute.com/zoroastrianism/hormozgan/peoplePlaces2.htm>. Accessed 25 January 2017.

The coastal zones are, to varying extents, exposed to environmental pressures resulting from irrational development and pollution from several onshore and offshore sources, including industry, agriculture and urban development. These zones are also exposed to coastal erosion, Nile Delta inundation, seawater intrusion, soil and groundwater salinization, and similar environmental problems.

Box 5

Coastal zones: the case of Sudan's Tokar Delta



The Tokar Delta is located in the north-east of Sudan. The centre of the area is roughly about 90 km south of Suakin. It resembles an equilateral triangle with sides of about 70 km each. The climate in Tokar is arid; the average annual rainfall is 90 mm. It is hot and dry during the late spring, summer and early autumn months.

An important feature of the climate of Tokar Delta is the wind. These winds blow for several months in a southerly or south-westerly direction. They may blow constantly, often without let-up for several days, and cover the entire delta with a vast blanket of dust. Many people leave Tokar during such times. These haboob dust storms have beneficial effects. They bury or submerge in the sea the cotton debris that may harbour diseases. A less beneficial side effect of these winds is the shifting and reshaping of the dunes. The resulting erosion and soil blowing onto unprotected land has caused considerable damage.

The Baraka River and its main tributaries are the major streams in the area. It rises in the Eritrean highlands south of Keren and has two main branches. Baraka flood waters usually occur in a number of "flashes" and cover the delta during the months of July to September. The floods cut off the main road that links Tokar City with Suakin and the port of Sudan, fill the city streets with water and disrupt everyday activities. From the end of May until the beginning of October, both the dust storms and flooding bring to a halt all outdoor activities, except those that are absolutely necessary. The Government of Sudan is therefore working to relocate the town of Tokar Delta away from here. The government has started to build the new town of Tokar Delta beyond the confines of the area to which the population of the old city escapes to avoid the floods.

Wadid Erian

3.2.5 Main findings

- (a) Climate change will significantly alter the ecologically important attributes of hydrologic regimes in rivers and wetlands, and exacerbate the impact of human water use in developed river basins, thus having a direct impact on water quality and availability for most cities, exerting pressure on fresh water supplies, sewage, the built environment and public health.
- (b) The Arab region is a global hotspot for worsening extreme heat, drought, aridity and flash flood conditions.
 - (b1) Projections indicate that in a 4°C world more than 90 per cent of summers will have unusually high heat extremes, compared to between 20-40 per cent of summers in a 2°C world.
 - (b2) Oasis cities and hinterlands will be increasingly subjected to extreme heat, aridity and dust storms, which would lead to economic, environmental and public health problems.
 - (b3) The eastern Mediterranean and Arabian Peninsula are projected to become drier, especially during the rainy season.
- (c) Extreme heat, drought, aridity and flash floods will increase social vulnerability, instability, poverty, inequality and migration; all of which are becoming increasingly complex to manage.
- (d) High density cities could bring efficiency gains and technological innovation while reducing resource and energy consumption.
- (e) Many cities will become increasingly dependent on groundwater and desalinated water as a major source for potable water.
- (f) Rapid urbanization and the growth of large cities has been accompanied by the development of highly vulnerable urban communities living in informal settlements, many of which in areas exposed to extreme weather.

This section examines the status, issues and challenges in relation to the regional seismic and geophysical hazard profile of the Arab states and cities. It further highlights some important vulnerabilities related to the seismic and geophysical hazards facing the main Arab cities.

3.3.1 Seismic and geophysical risks: regional context

The seismicity of Africa is mainly concentrated in two main subregions: North Africa and South-East Africa (Figure 12). Seventy-two per cent of the area of the Arab States (9,975,508 km²), home to 67 per cent of the population (260,718,000), lies in North Africa. Outside of the East African Rift System (EARS), Africa does not appear to be vulnerable to potentially dangerous seismic activity, although there are a couple of peaks elsewhere. The Middle Eastern region is also significantly vulnerable to seismic risks. The 1,000-km

3.3 Hazard profile: geophysical hazards

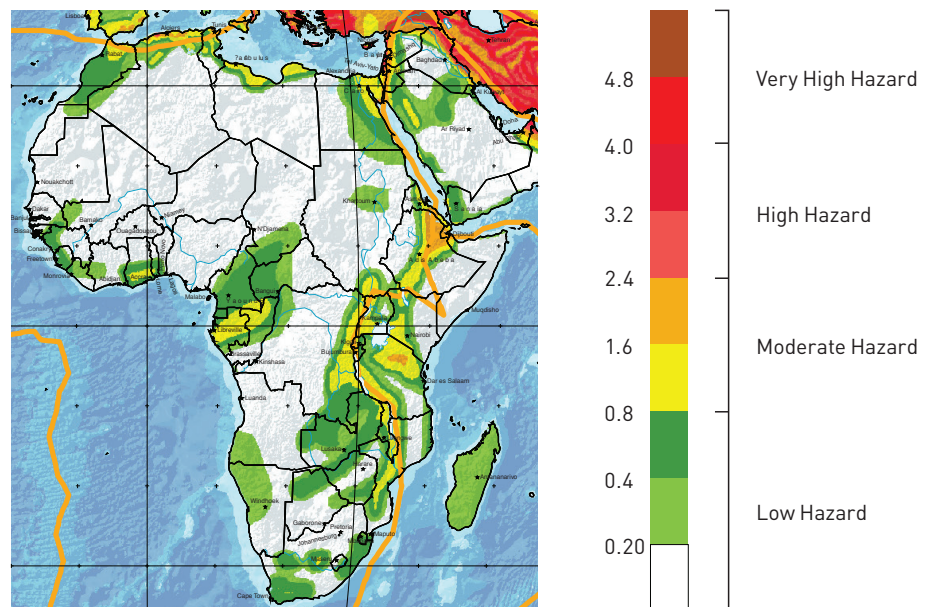
long western boundary of the Arabian plate is a complex plate boundary, extending from zones of sea-floor spreading in the Red Sea to zones of plate convergence in Turkey, and lies along the line of the Gulf of Aqaba, the Dead Sea rift, the Bekaa Valley and the a-Ghab depression. The Horn of Africa has a significant seismic hazard associated with the EARS.³⁵ The GCC region, due to its location on the Arabian plate, has low exposure to seismic and geophysical hazards.

$PGA \leq 0.10$ g corresponds to low seismic hazard

$0.10 \text{ g} < PGA \leq 0.30$ g corresponds to moderate seismic hazard

$PGA > 0.30$ g corresponds to high seismic hazard

Figure 12
Seismic hazard in the Maghreb, the Mashreq, the Gulf countries and the Southern Tier



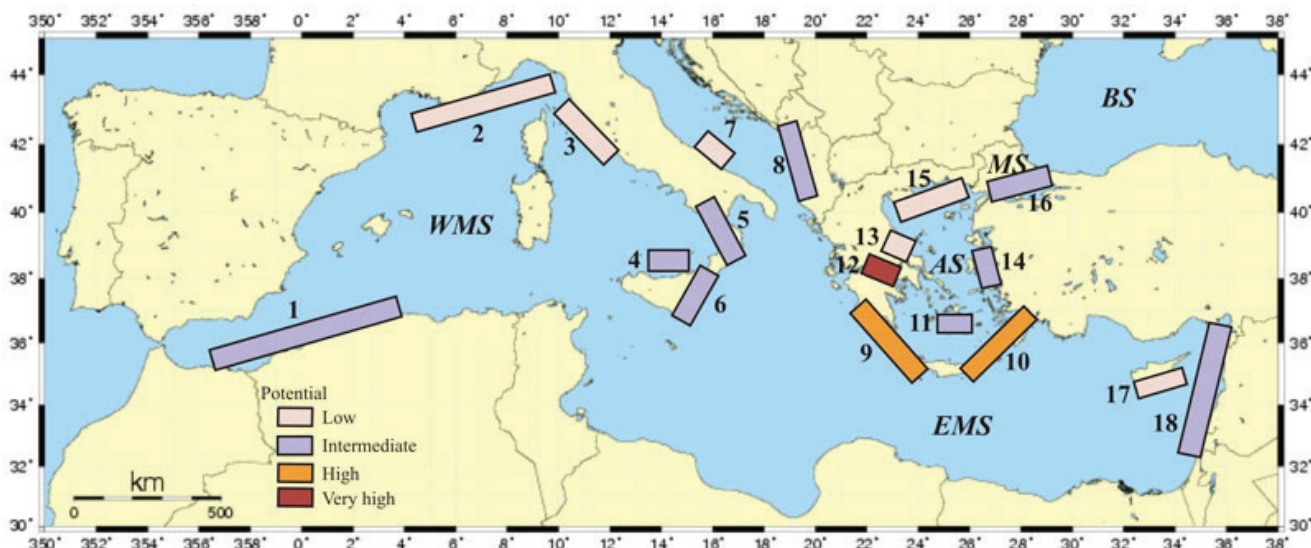
Tsunami records (prehistoric, historical and instrumental) show a long history of tsunami occurrences in the whole Mediterranean Basin from east to west.³⁶ In the Maghreb, the Moroccan Atlantic coast is highly exposed to tsunamis generated by submarine earthquakes. "The [Atlantic coastal] area of Rabat and Salé is particularly affected by tsunami hazard as reported by historical documents in which inundation related to the tsunami of 1755 reached a maximum distance of 2000 m inland."³⁷ Since about the second century BC until the present, there are more or less 22 reliable records of events in the eastern Mediterranean basin. The entire Lebanese coast is also exposed to tsunami hazard. According to Heidarzadeh et al. (2006), the Arabian Gulf cannot be classified as a tsunamigenic zone, but it is exposed to a high-level tsunami hazard due to its proximity to the Makran subduction zone. Figure 13 shows that only western Algeria, eastern Morocco, Syria, Lebanon, Palestine and Egypt may be affected with an intermediate potential tsunami hazard.

FOOTNOTES

³⁵ PreventionWeb, Horn of Africa: earthquake hazard map. [<http://preventionweb.net/go/3870>]. Accessed 22 January 2017.

³⁶ Tinti et al. 2013.

³⁷ Atillah et al. 2011, p. 3397.



Source: Papadopoulos 2005.

Figure 13
Tsunami prone areas and the tsunami risk in the Mediterranean

3.3.2 Seismic and geophysical hazards in the Maghreb

Earthquake hazard constitutes a constant threat to human life and the environment in the whole of North Africa including Algeria, Egypt, Libya, Morocco and Tunisia. In particular, Algeria, Morocco and Tunisia are the most earthquake-prone areas of the Western Mediterranean basin. Table 9 lists historic events involving magnitudes of more than 6 on the Richter scale. Several devastating earthquakes have occurred in these countries, some even triggering a tsunami, causing heavy loss of life and considerable economic damage in the region.

Table 9
Earthquakes with a magnitude of more than 6 in the Maghreb

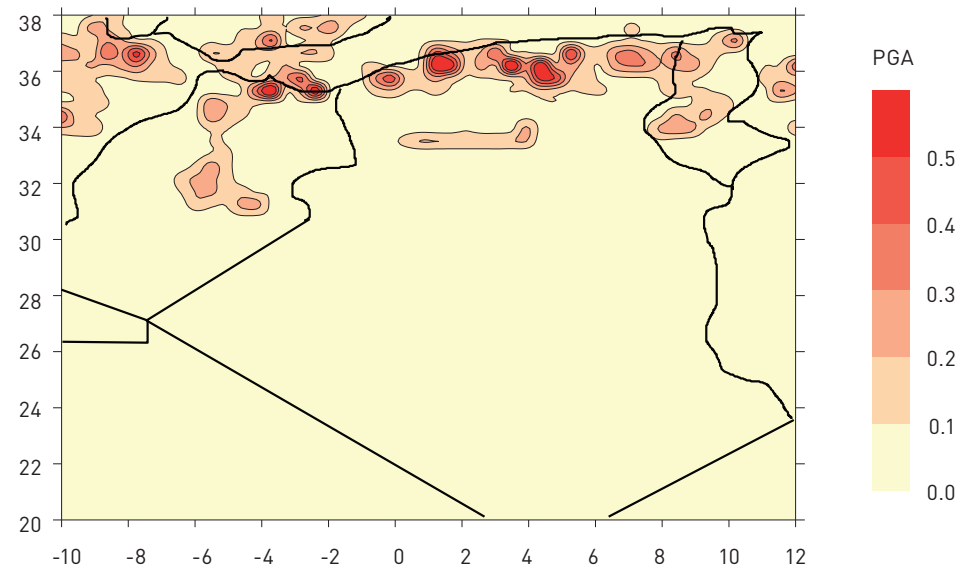
Country	Magnitude above 6 earthquakes in the period (1900-2015)*
Algeria	1910 June 24 Aumale, (M 6.6); 1954 Sep. 9 El-Asnam (actually Cheliff), (M 6.8); 1980 Oct. 10 El-Asnam (actually Cheliff), (M 7.2); 1994 August 18 Mascara, (M 6.0); 2003, May 21 Boumerdès, (M 6.8)
Morocco	2004, Feb. 24 Al Hoceima, (M 6.2)
Tunisia	1915 July 11 Tunis, (M 6.2); 1941 December 27 Tunis, (M 6.8)
Mauritania	NONE
Libya	1935 April 19, Al Qadahia, (M 7.1)

* Magnitudes of earthquakes earlier than 1935, or of those for which there are no instrumental data, are derived from macroseismic observations (using calibration relationships). For more details, see Benouar 1999.

The maximum values obtained for the peak ground acceleration (PGA) in these countries range between 0.15 g and 0.63 g and are located mainly in northern Algeria, eastern Tunisia, around Tripoli in Libya, around the Gulf of Aqaba, and at the entrance of the Gulf of Suez in

Egypt. A detailed analysis^{38, 39} of the seismicity of Algeria, Morocco and Tunisia (Figure 14) indicates a value of about 0.4g in Al Hoceima (Morocco), Cheliff, Blida, Setif and Boumerdès (Algeria) and in Tunis (Tunisia).

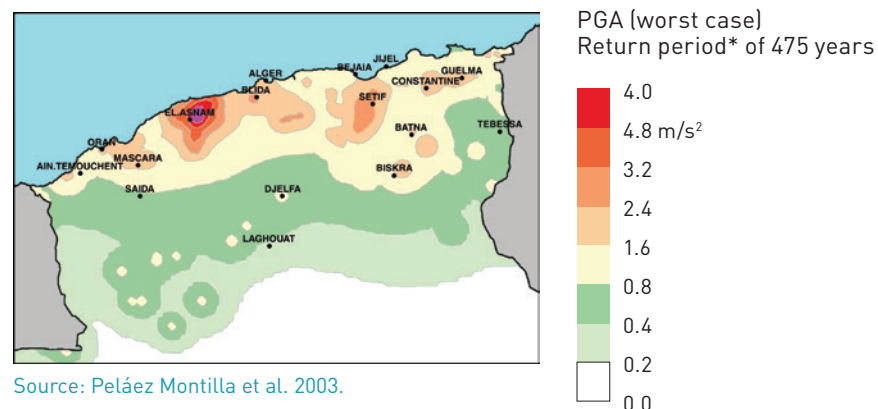
Figure 14
PGA for a 10 per cent probability of exceedance in a 50-year period (475-year return period)



Source: Benouar 1994.

Algeria: Earthquake hazard in Algeria poses an incessant threat to human life and the environment. Rapid urbanization, the development of critical structure, such as dams and oil facilities, the industrialization of cities, and the concentration of population in hazardous areas are all matters of growing concern in Algeria. Figure 15 shows that the PGA values vary from 0.40 g to 0.45 g for a return period of 475 years in El-Asnam (actually Cheliff), with mean values of 0.35 g in Algiers, Boumerdès, Tipaza and Blida and their surroundings, and 0.20 g for the city of Setif. Most of the northern area of Algeria has a mean value of 0.12 g with a mean value of 0.06 g for the southern region, including the cities of Saida, Djelfa, Laghouat and Tebessa. Further south, the Sahara is an earthquake-free region due to its intraplate location.

Figure 15
PGA values for the main cities in Algeria



Source: Peláez Montilla et al. 2003.

FOOTNOTES

³⁸ Benouar 1994.

³⁹ Benouar et al. 1996.

Table 10
PGA values for 475-
year return period
for 12 selected cities
in Algeria

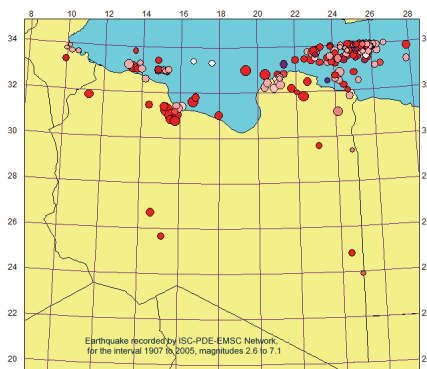
City	PGA (g)	City	PGA (g)
Echeliff	0.45	Guelma	0.19
Algiers	0.35	Oran	0.19
Boumerdès	0.35	Mascara	0.18
Blida	0.35	Batna	0.16
Tipaza	0.35	Bejaia	0.14
Setif	0.25	Aïn Temouchent	0.11
Constantine	0.20	Jijel	0.10

Source: Peláez Montilla et al. 2003.

Algeria is also prone to landslides, with the city of Constantine most affected. The landslides are caused by both natural and anthropogenic factors: the rugged topography of the area, water infiltration mainly due to the obsolescence of the water supply network, unplanned urbanization, the levelling of hill summits by colonial authorities to build residential neighbourhoods for the settlers, and the creation of vast alluvial surfaces to support the construction. The most devastating cases⁴⁰ of landslides occurred in 1910 (a slippage of the Sidi Rached bridge) and in 1911 when a huge landslide carried about 200,000 m³ of earth to the bottom of the north side facing Moulin Carbonnel.

Libya: The whole country is characterized by low to moderate levels of seismic activity, however, a number of earthquakes are reported to have occurred in Libya, including a major earthquake of M = 7.1 on 19 April 1935. Seismic activity in Libya is concentrated in the northern part of the country particularly in the Hun Graben and Al Jabal Al Akhdar regions. The number of earthquakes recorded in Libya is not representative of the actual total number because of the limitations on instrumental sensitivity before 1950, as well as the lack of seismological stations in Libya itself. Suleiman et al. (2001) suggest, however, that for the period 1935-2001 most of the activity has been clustered in two areas: the NNW trending Hun Graben and the Al Jabal Al Akhdar to the north-east of Libya.⁴¹ The highest levels of activity are concentrated in Cyrenaica (north-eastern region) and around the Hun Graben (north-central region). The southern part of Libya is considered to be seismically stable.⁴²

Figure 16
Distribution of
seismicity in Libya



Source: Elmelade 2012.

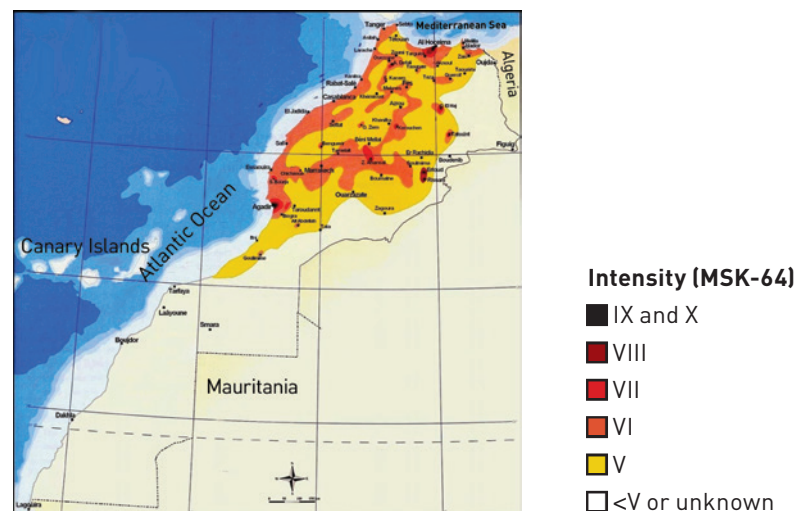
FOOTNOTES

⁴⁰ Benazzouz 1991.
⁴¹ Suleiman et al. 2004, p. 553.
⁴² Hassen 1983.

Mauritania: Mauritania is located south of Morocco within the Africa intraplate. According to several bibliographical sources, Mauritania is not affected by earthquakes.

Morocco: Analysis of the macro-seismic and instrumental data for Moroccan seismic activity over more than a century (1901-2010) shows that seismic activity there is relatively moderate compared to other Mediterranean countries. There have been, however, a few earthquakes with a magnitude greater than 6. A review of historical documents shows that much larger earthquakes have occurred in Morocco in the past, and cities like Fez, Meknes, Melilla and those along the Atlantic coast between Tangier and Agadir have suffered damage several times due to earthquakes.⁴³ The Agadir earthquake in 1960, for example, destroyed the city along with several villages, causing 12,000 deaths. The Moroccan seismicity map shows that seismic activity is concentrated in the Rif domain, mainly in the Al Hoceima region, in the Middle and High Atlas and in the Western Rif where a significant NW-SE seismic line is observed, starting roughly in the vicinity of Fez and passing between Larache and Asilah, through Ouezzane.

Figure 17
Map of maximum intensity observed in Morocco from 1901 to 2010



Source: Cherkaoui and El Hassani 2012.

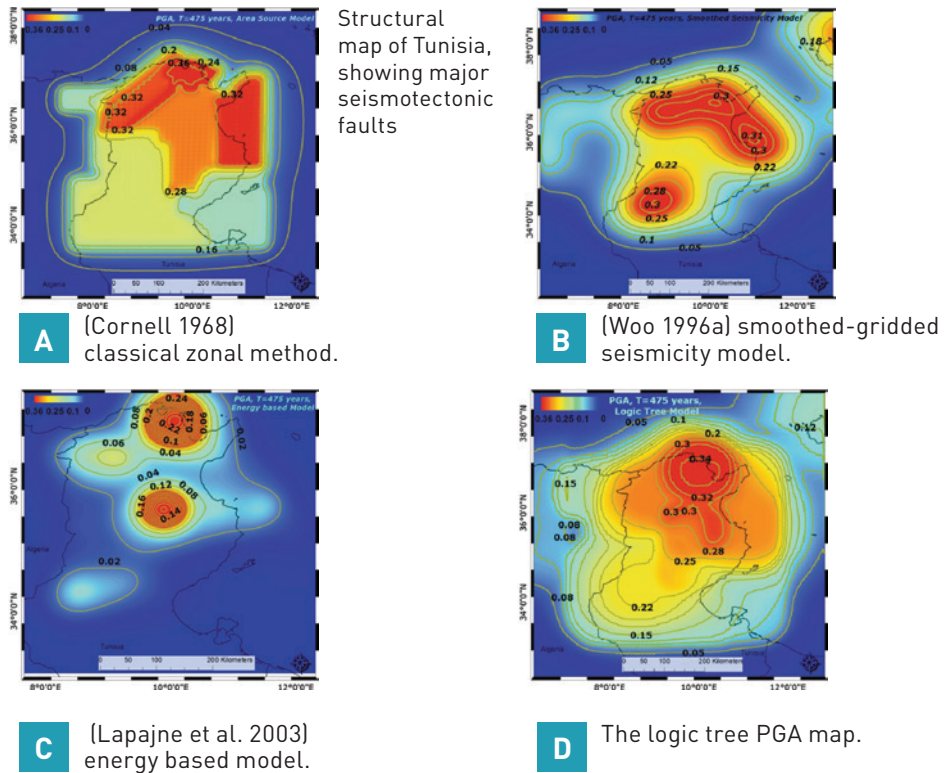
Tunisia: The seismicity of Tunisia is considered moderate when compared to its neighbouring countries (the PGA does not exceed 0.36 g for an area source in 50-year time period). Most instrumental magnitudes fall in the range between 2.0 and 5.5, according to the local seismic bulletin. However, with a level of acceleration of 0.3 g, the location of Tunis places it at an intolerable level of seismic risk, especially when combined with the local building regime in the old city of Tunis as well as the older nineteenth century buildings in the modern city. In addition, given the specific lithological context of Tunis, it is expected to reach a considerable level of amplified acceleration and consequently suffer greater seismic losses. A seismic hazard assessment for Tunisia was conducted using different PGA maps based on three different seismic source models.⁴⁴ The findings are shown in Figures 18a, 18b and 18c according to three source models, and Figure 18d shows the combined PGA for a return period of $T = 475$ years.

FOOTNOTES

⁴³ Cherkaoui and El Hassani 2012.

⁴⁴ Ksentini and Bouden Romdhane 2014.

Figure 18
Major seismotectonic structures of Tunisia and PGA maps according to different seismic source models.



PGA (in g) for a 475-year return period

g: A unit of gravitational force equal to that exerted by the earth's gravitational field. Near the Earth's surface, gravitational acceleration is approximately 9.8 m/s².

Source: Ksentini and Bouden Romdhane 2014.

3.3.3 Seismic and geophysical hazards in the Mashreq

The Middle East lies at the intersection of three major tectonic plates (i.e., the African, Arabian and Eurasian plates), resulting in very high tectonic activity. Seismic activity in the Eastern Mediterranean region (EMR) is mainly associated with the northward movement of the Arabian plate.⁴⁵ Total displacement is estimated at about 107 km since the Oligocene era, with an annual rate of about 0.5 cm over the past 7-10 million years. Due to this tectonic setting, seismicity and topography, the EMR has been subjected to earthquake disasters throughout the past two thousand years. Some of the most significant earthquakes in the Middle East affected two countries in the region.⁴⁶

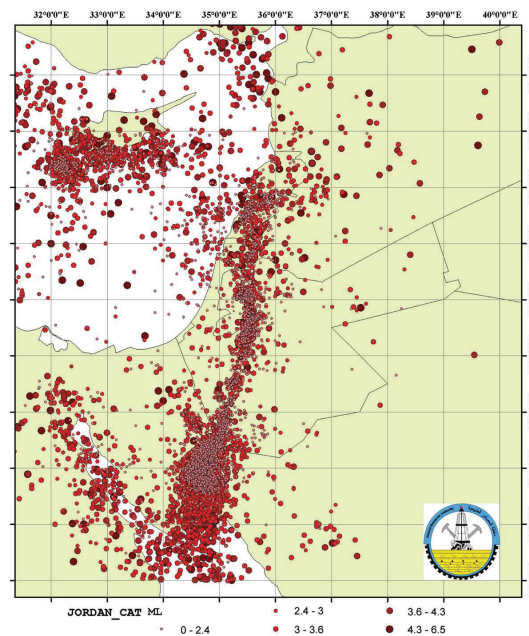
Figure 19 shows the seismogenic zone and epicentres of Gulf of Suez, Gulf of Aqaba, Jordan, Syria and Lebanon.

FOOTNOTES

⁴⁵ Jreisat and Yazjeen 2013.

⁴⁶ M. Erdik et al., "Assessment of seismic hazard in the Middle East and Caucasus: EMME (Earthquake Model of Middle East) Project", Proceedings of fifteenth World Conference on Earthquake Engineering (Lisbon, Portugal, 2012), Paper No: 2100.

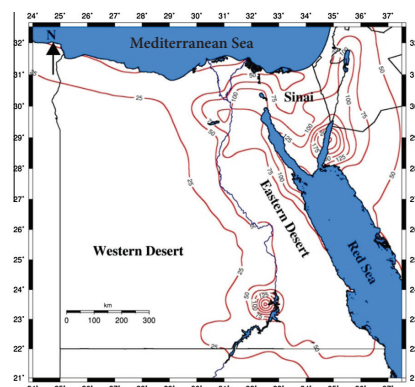
Figure 19
Earthquake
distribution in
Jordan and the
Middle East from
1900 to 2005.



Jreizat and Yazjeen 2013.

Egypt: There are four major seismic zones in Egypt, known as the Northern Red Sea-Gulf of Suez-Cairo-Alexandria trending NW-SE; the Gulf of Aqaba-Levant Fault, NNE-SSW; the Eastern Mediterranean-Cairo-Faiyum, NE-SW; and the Egyptian Mediterranean Coast, E-W.⁴⁷ The PGA across Egypt ranges from 0.02 g in middle area of the Western Desert to 0.22 g in the most north-eastern part of Egypt near to the geological origin of the Gulf of Aqaba, with earthquakes of a magnitude 7.2 for a 475-year return period. The most recent seismic hazard assessment for Egypt identified the Aqaba region (Jordan–Egypt border) as the area with relatively highest seismic hazard in the country, which is characterized by moderate seismic activity. The second active area is the entrance to the Gulf of Suez. In the southern part of Egypt, high seismic activity is observed around the Aswan area. There are also some areas with relatively higher seismic activity than their surroundings, such as the Dahshour area, the Cairo area Suez District, the Beni Seuf area and the Abou-Dabbab area.⁴⁸

Figure 20
Mean PGA (cm/s²)
on rock sites with 10
per cent probability
of exceedance in
50 years (475-year
return period) for
Egypt



Source: Abou Elela et al. 2012.

FOOTNOTES

⁴⁷ Amos Salmon et al., "Seismotectonics of Sinai subplate-eastern Mediterranean region", *Geophysical Journal International*, vol 155, No. 1 (September 2003), pp. 149-173, doi:10.1046/j.1365-246X.2003.02017.x.

⁴⁸ Abou Elela 2012.

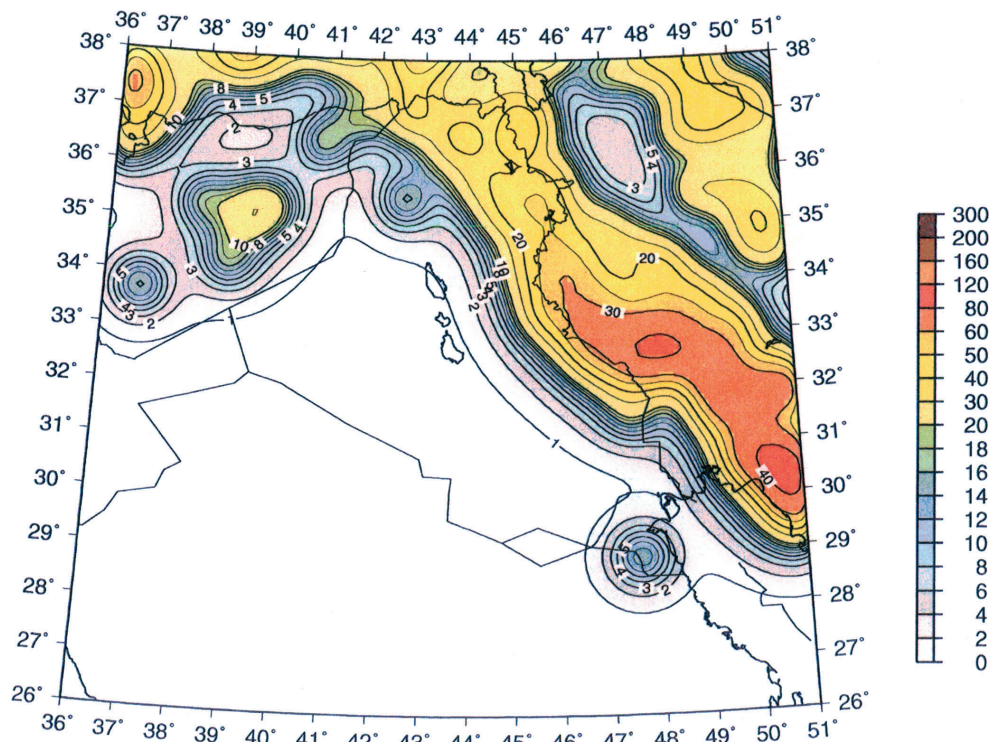
Iraq: Tectonically, Iraq is located in a relatively active seismic zone on the north-eastern boundary of the Arabian plate. Iraq has a well-documented history of seismic activity, with annual activity of varying strengths. An earthquake catalogue has been published for Iraq for the period 1900-1988, which contains 1,031 historical events with magnitudes ranging between 3.7 and 7.4 on the Richter scale.⁴⁹

Seismic hazard investigations have also been carried out and a seismic zoning map compiled, in addition to a seismicity index map, a seismic source map, an iso-acceleration map and a seismic regionalization map. Relatively large and destructive earthquakes cannot be ruled out in this region.

City	PGA (g)
Baghdad	0,02 g
Mosul	0.09 g
Kirkuk	0.09 g
Basra	0.01 g

According to Schwark (2005), north-eastern areas of Iraq lie within a region of high seismic hazard. Since the country does not appear to enforce a system of seismic building codes, major cities, such as Kirkuk, Mosul, Erbil and even the capital Baghdad, are at significant risk of severe damage and loss of life in the event of even a moderate magnitude earthquake. Similar to Mosul, Kirkuk is located in the seismically northern portion of the country and therefore lies within the region of high seismic hazard that may experience 10 per cent probability of exceedance for 50 years a PGA of 0.15 g.

Figure 21
Seismic hazard map for Iraq showing PGA for the 10 per cent probability of exceedance in 50 years



Source: Schwark 2005, p. 55.

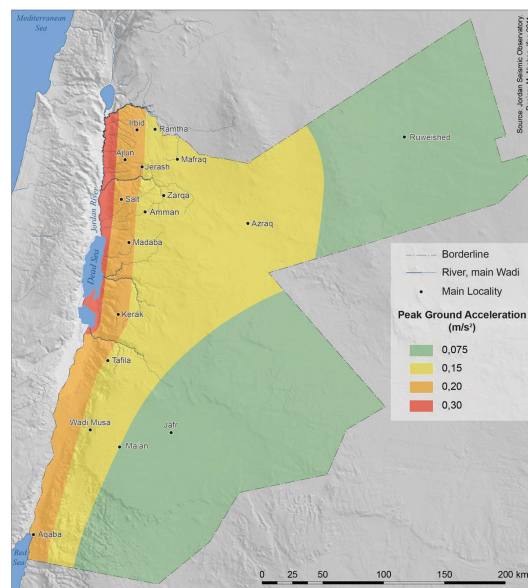
FOOTNOTES

⁴⁹ The use of the Richter scale for events occurring before its invention is roughly explained in Table 9, note *

Jordan: “Jordan covers the north-western part of the Arabian plate which is separated from the African Plate along the most profound tectonic event on the earth’s crust: the Aqaba-Dead Sea-Jordan Valley rift. This is an active pull-apart with left-lateral motion. The amount of left-lateral motion along the Transform in the Dead Sea region has been estimated at 105 km⁵⁰ (with an annual rate of about 0.5 cm over the last 7-10 million years). The Jordan valley, a major part of the Dead Sea Transform (DST), is the most seismically active region in the Middle East, with a history of four thousand years of documented destructive earthquakes.⁵¹ The occurrence of strong earthquakes along the DST fault system is a major threat to the public safety and economy of the Middle East.

The Jordanian National Building Code divides the country into four seismic zones: 1, 2A, 2B and 3 with increasing hazard towards the Dead Sea Transform.

Figure 22
Peak ground acceleration for a 10 per cent probability of exceedance for a 50-year timespan, corresponding to 475-year return



Source: Jreisat and Yazjeen 2013.

Landslides in Jordan have caused numerous problems over the past 40 years. The most critical slides occurred during the period 1991-1992 following exceptionally heavy rain and snowfall.⁵²

Palestine: Palestine shares the same tectonics along its border with Jordan. All seismic hazard studies include both countries. Figure 24 shows the seismic hazard for a 10 per cent probability of exceedance of the PGA in a 50-year timespan (i.e., a 475-year return period) based on Boore et al. (1997) in the Levant, including all of Palestine (Quennell 1958; Freund et al. 1970). It should be noted that the PGA in Gaza is estimated at between 0.05 g and 0.10 g, in Al-Quds between 0.10 g and 0.15 g, in Nablus between 0.15 g and 0.20 g, and about 0.30 g in Ariha.⁵³

FOOTNOTES

⁵⁰ Jreisat and Yazjeen 2013, citing Quennell 1958; Freund et al., 1970.

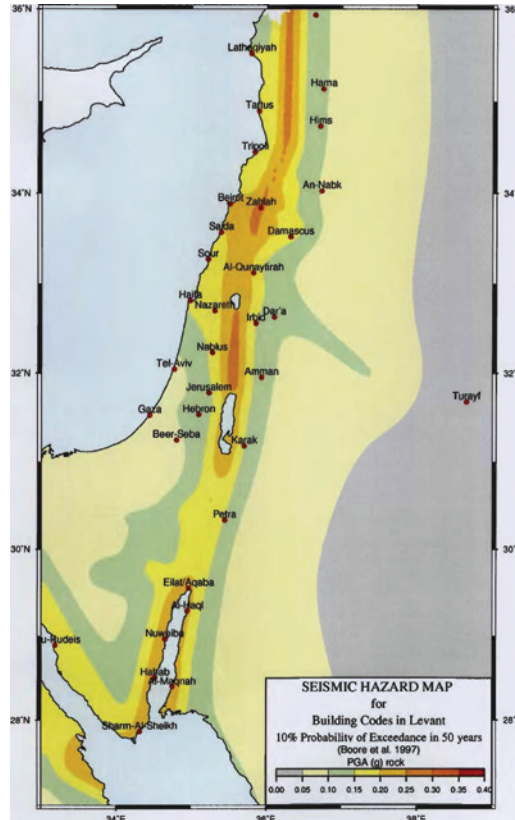
⁵¹ Shapira et al. 2007.

⁵² Abdallah et al., 1996.

⁵³ Shapira et al. 2007.

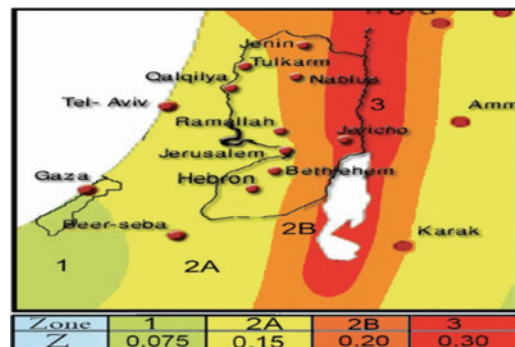
Figure 23
Seismic hazard
for a 10 per cent
probability of
exceedance of the
PGA in a 50-year
timespan (475-year
return period)

Source: Shapira et al. 2007, p. 73.



Source: Shapira et al. 2007, p. 73.

Figure 24
Seismic zoning map
of central Palestine
and Jordan



Lebanon: “The country lies along the 1,000-km long left-lateral Levant fault system (LFS)... This fault system is responsible for a significant number of seismic events in the eastern Mediterranean.”⁵⁴ The PGA for a 50 year timespan (a 475-year return period) in the Lebanese territories varies between 0.2 g in the eastern part of the country to 0.30 g in the western part near the coastal area between Saida and Tripoli, where most of Lebanon’s population and capital investments are located. This implies that all civil engineering facilities, including buildings and bridges, that have still to be constructed in the coastal zone between Saida and Tripoli should be designed to a “high seismic hazard” standard according to the design and reinforcement requirements as laid down in international codes of practice.⁵⁵ Further

FOOTNOTES

⁵⁴ Huijjer, Harajli and Sadek 2011, p. 68.

⁵⁵ Ibid.

to the combined effects of natural and human-caused factors, floods and landslides cost Lebanon around 10-15 million dollars per year, along with numerous fatalities and injuries.⁵⁶

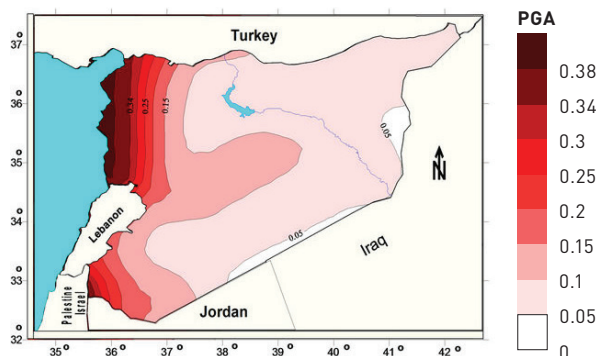
Figure 25
Seismic hazard map of Lebanon, distribution of PGA for 50-year period (return period of 475-years).



Source: Huijjer, Harajli and Sadek 2011. p. 78.

Syria: Syria lies on the northern part of the Arabian plate. The seismicity of Syria may be qualified as moderate if the period of study is restricted to the last two centuries. "The Syrian territory can be divided into three main tectonic regimes: The first one is the Dead Sea rift system, which is represented by an N-S left-lateral strike-slip faults system. The second one is the Palmyrides mega-tectonic shear zone, which is characterized by highly repeated folding and the NE-SW faults system. The third tectonic zone is the Euphrate system, which is characterized by the NW-SE normal faults system."⁵⁷ Figure 26 demonstrates that "the maximum expected design value of PGA (0.46 g to 0.5g for R.P.⁵⁸ 475 years) is concentrated at the north-western part of Syria (i.e., the cities of Iskenderun, Latakia and Tartous). According to the Syrian Building Code (1995), the design PGA value (0.4 g for R.P. 1000 years) applies to all western parts of Syria (Idlib, Aleppo, Iskenderun, Latakia, Tartous, Dara, as well as some parts of Hama, Homs, Damascus and Swaida cities). Also some parts in the centre of Syria (Palmyra)."⁵⁹

Figure 26
Seismic hazard map of Syria, distribution of PGA for a return period of 475 years



Source: El Ssayed et al. 2012, p. 853.

FOOTNOTES

⁵⁶ UNESCO 2010, p. 15, citing Khawlie 2000.

⁵⁷ El Ssayed et al. 2012, p. 847, citing Cornell University 2001.

⁵⁸ return period.

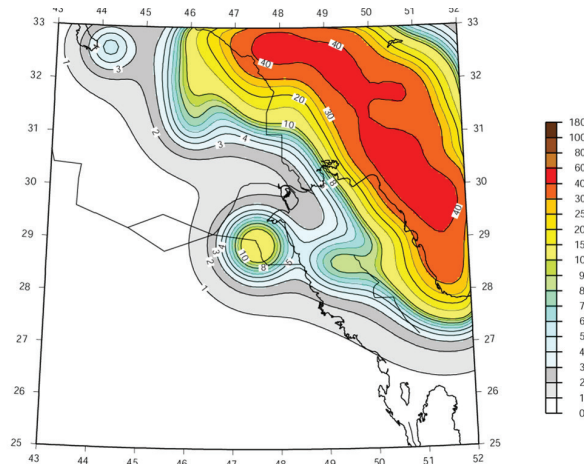
⁵⁹ Ibid, p. 854.

3.3.4 Seismic and geophysical hazards in the Gulf Arab States

All Gulf countries are found on the Arabian plate, which is considered to be a stable continental region.⁶⁰ Until quite recently, the seismic hazard in the Arabian Gulf states was considered to be negligible. Dubai, Abu Dhabi, Bahrain and Doha were classified as zone 0 (i.e., no seismic design requirements).⁶¹ However, “the publication of the Global Seismic Hazard Assessment Program (GSHAP) map (Shedlock et al. 2000) as well as the recent occurrence of locally felt earthquakes, such as the March 11, 2002 Masafi event, have led to a perceived need for revision of this assessment.”⁶²

Kuwait: The State of “Kuwait is located to the south-west of the Zagros belt which is capable of producing strong earthquakes with magnitudes of up to 7.5. Local seismicity in Kuwait has been characterized by several local earthquakes of magnitudes up to 5, mainly in the southern part of the Minagish oil fields.”⁶³ Earthquakes with local magnitudes near and above 4 have occurred in Kuwait in the last decade.⁶⁴ The mean PGA for a return period of 475 years varies from 0.002 g to 0.020 g.⁶⁵

Figure 27
Seismic hazard map of Kuwait, distribution of PGA with 10 per cent Probability of Exceedance for 50-year timespan (return period of 475 years).



Source: Al-Enezi 2006.

FOOTNOTES

⁶⁰ EPRI 1994.

⁶¹ Al-Haddad et al. 1994.

⁶² Pascucci et al. 2008.

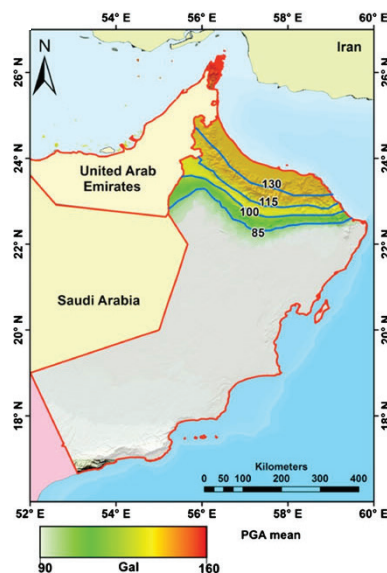
⁶³ Sadek 2001.

⁶⁴ Al-Awadhi and Midzi 2001.

⁶⁵ Al-Enezi 2006.

Oman: The Sultanate of Oman forms the south-eastern area of the Arabian plate, which is surrounded by relatively high active tectonic zones. Deterministic seismic hazard assessment maps suggest the relatively higher seismic hazard activity in the north-eastern part of the country. The mean PGA across Oman ranges from 0.08 g in the south and central areas, up to about 0.16 g in the extreme north (Figure 28). “The seismo-tectonic settings around Oman strongly suggest that large earthquakes are possible, particularly along the Arabian plate boundaries.”⁶⁶ Therefore, it is important that critical structures, such as airports, harbours, telecommunications, hospitals, schools and other services, are resilient to earthquakes. A large part of the Sultanate of Oman falls into a seismic zone where a MM Intensity VII seismic event could occur.

Figure 28
Deterministic seismic hazard assessment for Oman.



Source: Deif et al. 2012.

United Arab Emirates (UAE): The UAE has a low to moderate seismic hazard potential. Large parts of the UAE lie within zone 0 with less than 50 cm/s² (0.05 g). Greater Abu Dhabi area lies in zone 1, where the PGA is between 0.05 g and 0.10 g. Zone 2A, where the PGA is between 0.1 g and 0.20 g, covers the Greater Dubai, Sharjah and Ajman area. The highest PGA in the Fujairah area approaches 0.20g (Figure 29). No part of UAE lies within zone 2B or zone 3.⁶⁷ “There are currently no well-established seismic code requirements for structures in the Arabian Peninsula states. However, both the Abu Dhabi and Dubai municipalities recommend that for buildings of five or more stories the Zone 2A design criteria in UBC 1997 should be applied. Further recommendations on seismic hazard levels in the Arabian Peninsula can be found in the Guide to Design of Concrete Structures in the Arabian Peninsula prepared by the Concrete Society (2007), which indicates a moderately low seismic hazard for most of the cities in the Arabian Gulf region.”⁶⁸

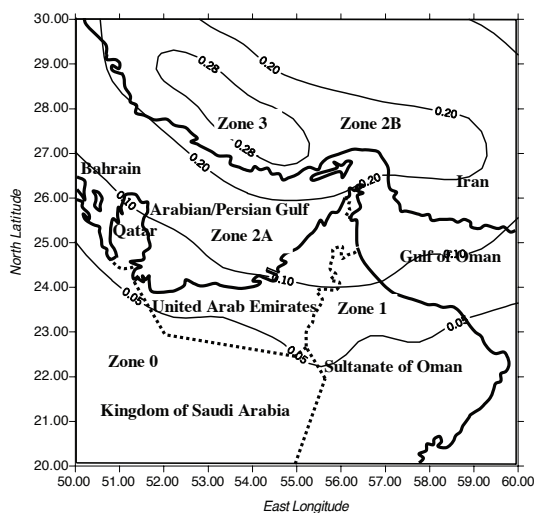
FOOTNOTES

⁶⁶ Deif et al. 2012.

⁶⁷ Abdalla and Al-Homoud 2004.

⁶⁸ Pascucci et al. 2008.

Figure 29
Seismic zoning map
for UAE, Bahrain,
and Qatar showing
five zones (0, 1, 2A,
2B and 3) for 475-
year return period.



Source: Abdalla and Al-Homoud 2004.

Bahrain and Qatar: Bahrain and Qatar are located in seismic zone 1 and the probabilistic seismic hazard assessment for these two Gulf countries, with a 10 per cent exceedance probability for a timespan of 50 years (475-year return period), varies between 0.04 g and 0.12 g.

Saudi Arabia: Saudi Arabia forms the largest part of the Arabian plate. Harrat Al-Shaqah is one of the provinces in western Saudi Arabia, (also known as Harrat Lunayyir) to experience recent volcanic activity in which there was an “intense earthquake swarm due to magmatic intrusion. Numerous small to moderate size earthquakes occurred in May-July 2009 [...] recorded by the Saudi National Seismic Network (SNSN) operated by Saudi Geological Survey (SGS). More than 27,000 earthquakes occurred, 207 of which were felt in and around Harrat Al-Ahaqah [*sic*], up to distances of more than 210 km. The most intense activity was 17-19 May when a ML 5.39 earthquake occurred.”⁶⁹ The seismic hazard potential⁷⁰ in Saudi Arabia is fairly low with an expected bedrock horizontal PGA in the range of 0.04 g to 0.06 g for a return period of 475 years.⁷¹

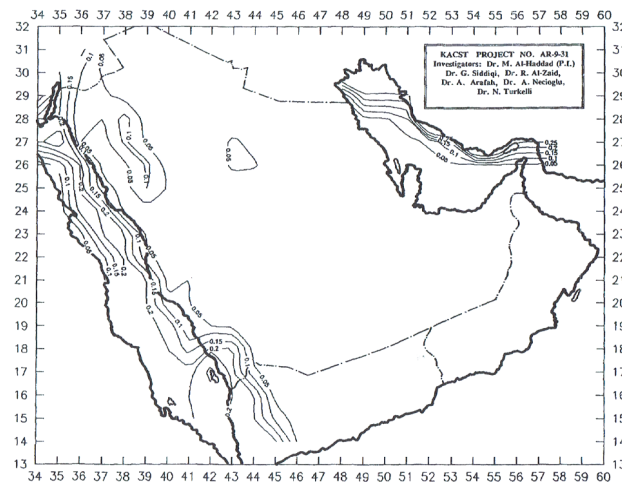
FOOTNOTES

⁶⁹ EPRI 1994.

⁷⁰ H. Zahran and Yousef Salah El-Hadidy, “The 2009 volcanic and seismic activity in Harrat Al- Shaqah (Lunayyir), western Saudi Arabia,” *Reduction of Earthquake Losses in the Extended Mediterranean Region (RELEM)* Workshop Report Lisbon, Portugal, 26-29 October 2009 (Paris: UNESCO 2010).

⁷¹ Pascucci et al. 2008.

Figure 30
PGA (cm/s²) with
a 10 per cent
probability of
exceedance in a 50-
year timespan (475-
year return period)



Source: Abdalla and Al-Homoud 2004.

3.3.5 Seismic and geophysical hazards in the southern tier countries

The northern Nubia-Somalia rift zone between Eritrea, Djibouti, Somalia and Ethiopia is a source of earthquake and volcanic hazards in this region. The great EARS constitutes the complex boundary between the Nubian and Somalia plates and is also the geological home to other significant solid-earth geohazards, namely volcanoes and landslides, including large-scale submarine landslides or continental slope slumping.⁷²

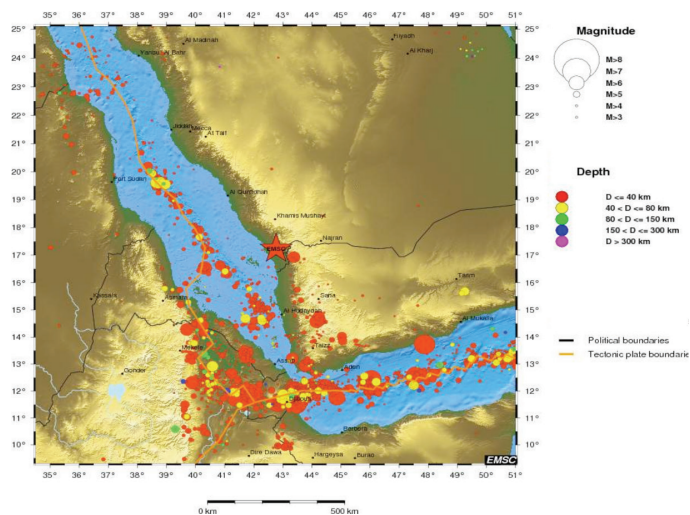
Djibouti: Djibouti is located in a geographic area where the process of stretching and dislocation of the crust causes earthquakes and volcanic eruptions. The magnitudes observed by the Geophysical Observatory of Arta are generally between 2.0 and 4.0. Findings show that Djibouti may experience PGA varying from 0.16 g to 0.24 g, which may impact seriously on all types of constructions. In Djibouti, the earth crust is very thin and, because of its high temperature, relatively ductile and therefore less brittle. All this explains the low magnitude of the earthquakes registered in Djibouti. However the situation with particular faults (faults transforming) that cut crosswise over the rift (e.g., between Arta and Tadjourah) may involve higher energies that could trigger earthquakes (fortunately much rarer) of magnitudes 5 or even 6. The 1973 earthquake was the most violent in the last 40 years, although its intensity did not exceed 7.0 on the Mercalli scale. In recent years, urbanization has accelerated, especially in the capital. The expansion of the city to the north, backfilled on land reclaimed from the sea, and south towards Ambouli Wadi, may constitute a real risk in the event of an earthquake. The situation could be further exacerbated due to the exposure to tsunamis.⁷³

FOOTNOTES

⁷² Chris Hartnady, "Tsunami potential on East African coast, western Indian Ocean island states," *Disaster Reduction in Africa - ISDR Informs*, No. 5 (Nairobi: UNISDR 2005), pp. 22-24.

⁷³ Stratégie nationale de gestion des risques et des catastrophes de Djibouti (2014).

Figure 31
Earthquake
epicentre map for
Djibouti and its
surroundings in the
period 1960 to 2014
(EMSC)



Source: Earthquake epicenter map of Djibouti and its vicinity from 1960 to 23 January 2014 European-Mediterranean Seismological Centre (EMSC) Manual location.

Somalia: According to GSHAP,⁷⁴ in Somalia the seismic hazard is very low, varying from less than 0.01 g to 0.03 g, which is too small to cause any damage to the built structures, even those which are highly vulnerable.

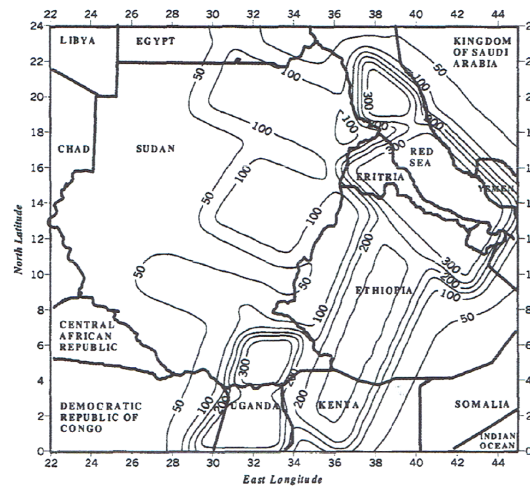
Sudan: Sudan lies within an intraplate region (Nubian Plate) in the centre of Africa. This region is bounded by active tectonic features, such as the Red Sea Rift to the north-east and the EARS to the south and south-east. The seismicity map of Sudan shows that large parts of Sudan, specifically western and north-western Sudan, lie in zone 0. South-western Sudan lies in zone 1, where the PGA is between 0.05 g and 0.10 g, and covers most of central Sudan and north-western Sudan. Although there has been an increase in the magnitude and frequency of seismic events in many parts of the Sudan, most buildings and structures have not yet been designed and constructed in accordance with earthquake provisions, nor has any consideration been given to earthquake effects.⁷⁵ The seismic vulnerability of buildings is high in moderate and high seismic zones.

FOOTNOTES

⁷⁴ GSHAP 1999.

⁷⁵ Abdel Wahab, Mohamedzein and Abdalla 1999, pp. 36-46.

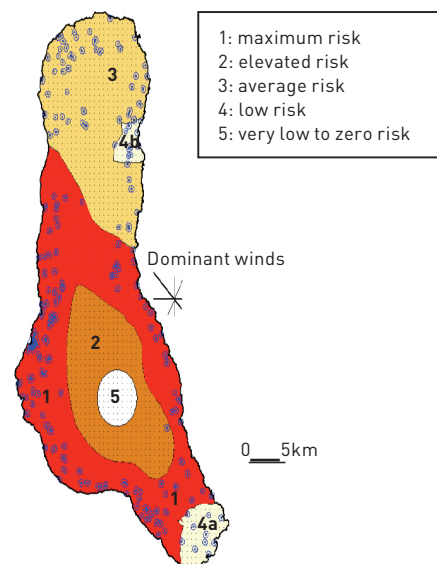
Figure 32
PGA (cm/s²) for a
50-year timespan
(475-year return
period)



Source: Abdel Wahab, Mohamedzein and Abdalla 2001.

The Comoro Islands: The seismicity of Comoros is governed by the Karthala volcano in Grande Comore and is generally of low magnitude ($M < 2$). Despite the vulnerability of buildings and structures, the impact of earthquakes remains small. Mainly the island of Grande Comore is subject to volcanic hazard because the Karthala volcano is still active. There is a real threat to the capital Moroni and most other towns and villages on the island. Figure 33 shows the volcanic hazard according to the Karthala Volcano Observatory (OVK).⁷⁶

Figure 33
Distribution of
seismic events on
Grande Comore



Source: OVK 2014.

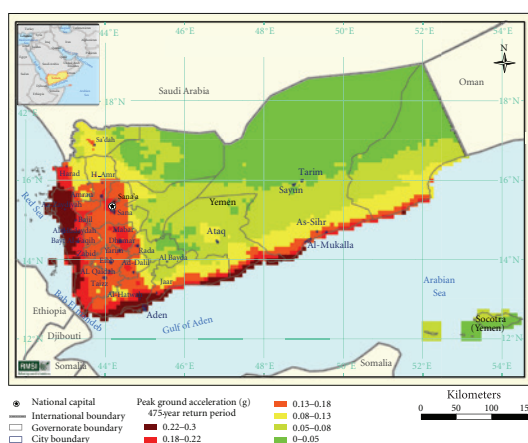
FOOTNOTES

⁷⁶ OVK 2014.

Yemen: The tectonic movement and interaction of the Arabian and the African plates – constituting the rifts of the Red Sea and the Gulf of Aden – are the principal causes of earthquakes in Yemen.^{77,78} Generally, the seismic history of Yemen predicts major earthquakes recurring with intervals of 20 to 30 years. The Dhamar earthquake of 13 December 1982 (M = 6) was the deadliest earthquake in Yemen, in which more than 15,000 people were killed or injured and about 1,500 settlements were destroyed.⁷⁹

Figure 34 provides an analysis of the seismic hazard for Yemen with a 10 per cent probability of being exceeded in 50 years (475-year return period). This map shows that the western and southern parts of Yemen are subject to the highest level of seismic hazard (up to 0.3 g), while the hazard is low across central and eastern parts (0.05 g to 0.08 g). The territory of Yemen can be subdivided into three seismic zones. Sanaa (the capital) and the Dhamar area are found within the highest hazard level area (zone 1).

Figure 34
PGA probabilistic seismic hazard map for 10 per cent probability of exceedance in 50 years (475-year return period).



Source: Mohindra et al. 2012.

Table 11
Estimated probabilistic seismic hazard for 475-year return periods for major cities in Yemen

City	475-year return period PGA in g	City	475-year return period PGA in g
Aden	0.29	AL-Hatwah	0.22
Sanaa	0.24	Zabid	0.21
Al-Hudaydah	0.24	Dhamar	0.19
Bajil	0.24	As-Sihr	0.19
Az-Zaydiyah	0.24	Amran	0.19
Bayt al-Faqih	0.23	Jaar	0.19

Source: Mohindra et al. 2012.

FOOTNOTES

⁷⁷ J. P. Poirier and M. A. Taher, "Historical seismicity in the near and Middle East, North Africa and Spain, from Arabic documents (VIIth-XVIIth century)," *Bulletin of the Seismological Society of America*, vol. 70, No. 6 (1980), pp. 2185-2201.

⁷⁸ S. A. Alsinawi and A. Al Aydrus, *Seismicity of Yemen* (Sanaa: Obadi Studies and Publishing Centre, 1999).

⁷⁹ Arya et al. 1985.

3.3.6 Main findings:

The main findings of this section show that several cities, particularly coastal cities, in the Arab region are at significant threat of earthquake risk. The cities (located in the zones with $PGA > 0.30 g$) with high risk of earthquake across the Arab States region are as follows: Echeliff, Algiers, Tipaza, Boumerdès (Algeria), Beirut (Lebanon), Ariha (Palestine), Tartus, Latakia, Dara (Syria), Aden, Dhamar (Yemen).

It is important to note that the critical infrastructure in these cities and their surroundings consists of physical networks and assets (such as government and economic institutions, hydro lines, dams, storage tanks, oil and gas facilities, bridges, hospitals, IT facilities, etc.), which if disrupted, damaged or destroyed, would seriously affect the health, safety, security and economic well-being of the population and the functioning of public services.

The critical infrastructure in Arab cities subject to the threat of earthquakes is found in the following sectors: energy and utilities (electrical power, natural gas and oil transmission systems), communications (telecommunications and broadcasting systems), services (financial services, food distribution and health care), transportation (air, rail, marine and overland), safety (emergency services) and government services (major government facilities and information networks). Together, these sectors constitute a complex network of interdependent and interacting services as well as a great many people involved in the social and economic activities of many Arab countries.

04

Urban governance and resilience building in Arab cities

4.1 Urban governance for disaster and climate resilience: framework for analysis

This chapter provides an overview of the proposed analytical framework for urban governance for resilience-building against natural hazards. It also reflects, as data allows, on current state and emerging governance dynamics with special focus on the governance regime for resilience-building in the Arab States. The governance and resilience-building praxis in Arab cities is further explored through case studies.

If governance is the software that enables the urban hardware to operate, the question is how to design a software that will enable avoiding the potential devastating consequences of disaster risk.

UNDP (2012) has defined disaster risk governance (DRG) as *“the way in which public authorities, civil servants, media, private sector and civil society coordinate at community, national and regional levels in order to manage and reduce disaster and climate-related risks. This means ensuring that sufficient levels of capacity and resources are made available to prevent, prepare for, manage and recover from disasters. It also entails mechanisms, institutions and processes for citizens to articulate their interests, exercise their legal rights and obligations and mediate their differences.”*

A broader definition of risk governance is offered by the International Risk Governance Council (IRGC 2008): *“Risk governance deals with the identification, assessment, management and communication of risks in a broad context. It includes the totality of actors, rules, conventions, processes and mechanisms and is concerned with how relevant risk information is collected, analysed and communicated, and how management decisions are taken. It applies the principles of good governance that include transparency, effectiveness and efficiency, accountability, strategic focus, sustainability, equity and fairness, respect for the rule of law and the need for the chosen solution to be politically and legally feasible as well as ethically and publicly acceptable.”* This approach emphasizes the shift from disaster-centred to risk-centred governance at all levels, highlighting the conditions necessary to effectively address risks as they evolve. It also leaves room to address risks that have emerged from a complex interplay of various domains: natural, economic, social, or political.

A resilience approach requires understanding of the complexity of urban settings by acknowledging risks in their interconnected and networked nature as well as the cascading effect they may trigger across sectors, generations and jurisdictions. Some indications of such a shift towards risk-centred development are noticeable in the Sendai Framework.¹

Urban governance can be explained in terms of an enabling environment requiring adequate legal frameworks, efficient political, managerial and administrative processes, as well as strong local institutions capable of responding to the citizens' needs.² It is based on the principle of decentralization and expressed as:

FOOTNOTES

¹ Issue Brief: Disaster Risk Governance, UNDP, 2013. [http://www.undp.org/content/dam/undp/library/crisis%20prevention/20121112_Issue_brief_disasterriskgovernance.pdf]

² UN-Habitat 2015b.

- political decentralization based on the principle of subsidiarity that guarantees a degree of independence for a lower authority in relation to a higher body or for a local authority in relation to central government;
- fiscal decentralization or the availability of sufficient resources through own revenues (e.g., local taxes), grants, etc.;
- institutional decentralization providing channels that encourage proper accountability among all stakeholders (state and non-state).

Therefore, from the perspective of resilience-building against natural hazards, urban risk governance is concerned with the enabling application of autonomy (political, fiscal, and institutional) of all the relevant local decision makers (the municipal authorities in the first place) in terms of how they identify, assess, manage and communicate risks of disasters and climate change while planning and implementing service provision (basic infrastructure services, social services, quality of life services).³ It is also concerned with the entire spectrum of measures necessary to implement if risk materializes, which includes disaster response and recovery. Importantly, such enabling autonomy needs to be compatible with the “risk footprint” (i.e., ensure involvement of those who could directly contribute to or be impacted by a risk). This should help avoid a fundamental, but less visible, weakness of decentralization: placing responsibility for risk management on those who can only address local-level causes of vulnerability,⁴ leaving thereby deep-rooted issues unaddressed.

Urban governance is exercised with the aim both to *develop capacities* and actually *implement* resilience-building interventions ranging from risk assessment and risk response through preparedness, disaster response, and post-disaster recovery (covering the whole spectrum of disaster risk management). Such a perspective provides a room for varying interpretations of governance: *multilevel governance* (emphasizing the multiplicity of actors at different levels contributing or being affected by risk), *preventive governance* (emphasizing the focus on prospective or emerging risks through a broad set of governance instruments), *adaptive governance* (emphasizing governance of common pool natural resources and environmental assets), etc. – all emphasizing one or more aspects of coping with risk.

The importance of effective decentralization is highlighted in the New Urban Agenda: “*Effective decentralization*, based on the principles of subsidiarity and the recognition of local-self-governance, that strengthen urban governance and management, with co-responsibility and effective contributions from local authorities as well as civil society, within a transparent and accountable framework”.⁵ For the analysis of urban governance of resilience-building against disaster and climate risk in Arab cities, this report provides an indicative analytical framework that addresses decentralization of building resilience capacities.

FOOTNOTES

³ UCLG 2013.

⁴ Twigg 2004.

⁵ UN-Habitat 2016, p. 3.

Obviously, the principles of good and democratic governance⁶ (fostering inclusive participation, strengthening accountable and responsive governance institutions, and respecting international principles)⁷ are applicable across the whole framework. Table 12 illustrates the proposed analytical framework.

The separate components of the framework provide the focus for this analysis.

- 1. Develop risk anticipation capacities and anticipate risks:** This encapsulates the efforts of municipal government as well as other stakeholders towards building capacities to identify and assess risks, by setting up processes, mechanisms and structures to ensure that risks are identified and assessed. This implies the need for legal and regulatory provisions as well as the allocation of funds and a proper accountability system to ensure inclusive and accurate risk assessment. This entails both gaining scientific knowledge and understanding how risks are interpreted by various stakeholders.
- 2. Develop risk management capacity and manage risks:** This includes collective and individual efforts of multiple stakeholders to respond to various risks, including risk reduction strategies, risk transfer (through insurance), risk mitigation, adaptation, etc.
- 3. Develop coping capacity and cope with disaster:** This encapsulates the entire spectrum of disaster preparedness and response capacities that need to be cultivated and available to effectively cope with a disaster. Again, this requires legal and financial provisions by municipal authorities, as well as an adequate accountability mechanism for implementation.
- 4. Develop disaster recovery capacity and recover from a disaster:** This covers the need for an enabling environment (i.e., legal, fiscal, institutional) to ensure effective recovery based on the “build back better” principle.
- 5. Develop adaptive capacity and adapt/transform (by learning) to a changing context:** This relates to the importance of building capacities, raising awareness and crafting learning processes across the spectrum of resilience-building. Importantly, the learning should encompass lessons learned from the past, as well as upfront learning from understanding possible risk scenarios and the capacity gap to respond to those scenarios.

The UNISDR-promoted ‘Ten Essentials’ could be seen through the prism of this framework:

1. Organize for disaster resilience (the foundational essential that covers the whole spectrum of resilience-building processes).
2. Identify, understand and use current and future risk scenarios (extends across the whole spectrum of resilience-building processes).
3. Strengthen financial capacity for resilience (extends across the whole spectrum of resilience-building processes).
4. Pursue resilient urban development and design (for the case of urban risk governance this essential covers the whole spectrum of efforts to build capacities and respond to risk).

FOOTNOTES

⁶ Despite the variability of its definitions provided by UN, OECD, WB, and other stakeholders.

⁷ Decentralized Governance for Development in The Arab States: A background paper on decentralization and local governance policies, legal frameworks, programs, lessons learned and good practices, UNDP, 2003.

5. Safeguard natural buffers to enhance the protective functions offered by natural ecosystems (this is a specific effort that is largely covered by risk response and learning processes).
6. Strengthen institutional capacities for resilience (goes through the whole vertical of institutional decentralization across the whole processes of resilience-building).
7. Understand and strengthen societal capacity for resilience (covers all resilience-building processes).
8. Increase infrastructure resilience (zooms in to a specific sector – infrastructure; however, this requires the whole spectrum of resilience-building processes to be activated and therefore, this essential could be included in all sections in the urban risk governance framework).
9. Ensure effective disaster response (requires the whole strength of risk governance for this particular resilience-building process).
10. Expedite recovery and build back better (requires the whole strength of risk governance for this particular resilience-building process).

Table 12
Analytical framework: urban risk governance for building resilience to natural hazards

Processes	Political (decision-making) decentralization	Fiscal decentralization	Institutional (accountability) decentralization
Develop risk anticipation capacities to AND anticipate risk	1, 2, 3, 4, 7, 8	1, 2, 3, 4, 7, 8	1, 2, 3, 4, 6, 7, 8
Develop risk management capacities to AND manage risks	1, 2, 3, 4, 7, 8	1, 2, 3, 4, 7, 8	1, 2, 3, 4, 6, 7, 8
Develop coping capacity AND cope with disaster, crisis, stress, disruptions	1, 2, 3, 4, 5, 7, 8, 9	1, 2, 3, 4, 5, 7, 8, 9	1, 2, 3, 4, 5, 6, 7, 8, 9
Develop disaster recovery capacity AND recover from a disaster, crisis, stress, disruptions	1, 2, 3, 4, 7, 8, 10	1, 2, 3, 4, 7, 8, 10	1, 2, 3, 4, 6, 7, 8, 10
Develop adaptive capacity AND adapt (by learning) in a changing context	1, 2, 3, 4, 5, 7, 8	1, 2, 3, 4, 5, 7, 8	1, 2, 3, 4, 5, 6, 7, 8

This analytical framework, with the ten essentials designated by their respective numbers, identifies performance domains where governance is to be exercised to ensure urban resilience against natural hazards. However, due to data limitations at the city level, instead of exploring each and every aspect of this analytical framework, the report addresses only some aspects, leaving a more comprehensive analysis for the next editions.

Importantly, future reports should also address the new urban forms – megacities, urban corridors, metropolises – which requires revisiting the notion of urban and therefore, a more careful look at the urban governance for resilience-building against disaster and climate change.

4.2

Governance and praxis of urban resilience-building

4.2.1 National and urban governance in Arab States

There are many similarities and differences between countries in the quality of the governance regime in general, and governance for resilience in particular. However, the latter should be seen through the prism of the general governance regime (political, fiscal and institutional) in each country.

Prior to colonial rule, the Arab region was regulated according to a decentralized power structure.⁸ While building post-colonial nation States, some countries (like Morocco, Tunisia, Lebanon and Jordan) used centralization to consolidate state power, while others (such as Yemen) preferred to use it as a tool to balance the power of the regions. Today, the Arab region has several monarchies: Morocco and Jordan, where kings rule as individuals, and the GCC countries or dynastic monarchies governed by extended families.⁹ However, all the countries in the region have enacted decentralization policies and laws, strongly supported by the international donor community.

Despite years of public administration reforms, most countries in the region are still “characterized by a top-down, personalized and highly concentrated and noncontestable mode of governing. Economically, the region exhibits highly skewed income and asset accumulation, as well as resource allocation.”¹⁰ Local municipal budgets are centrally-controlled in all countries of the region, with the exception of Palestine, where local political and fiscal autonomy is relatively strong due to the territorial fragmentation caused by Israeli occupation.

The general governance indicators as defined and measured by the World Bank across all countries in the region raise multiple concerns (Table 13). The parameters of all indicators demonstrated no significant improvement over time and revealed minor difference between subregions. Thus, the corruption indicator shows the lowest parameter for Somalia (-1.69), Yemen (-1.55), Sudan (-1.45) and Libya (- 1.61). The indicator on governance effectiveness is lowest in Somalia (-2.48), Syria (-1.44), Sudan (-1.61), Yemen (-1.41). There are some exceptions among the GCC countries (UAE, Qatar and Oman) where five out of six governance indicators have positive parameters: namely, corruption control, government effectiveness, political stability and absence of violence/terrorism, regulatory quality, and rule of law. The parameters for “voice and accountability” are negative across all countries of the Arab region.

FOOTNOTES

⁸ Mona Harb and Sami Atallah, “An assessment of decentralization and service delivery in the Arab world,” *Local Governments and Public Goods: Assessing Decentralization in the Arab World*, edited by Mona Harb and Sami Atallah (Beirut: The Lebanese Center for Policy Studies, 2015), p. 228.

⁹ F. Gregory Gause, “Kings for all Seasons: How the Middle East’s monarchies survived the Arab spring,” Brookings Doha Centre Analysis, paper No. 8, September 2013.

¹⁰ Daniel Kaufmann, “Governance and the Arab world transition: reflections, empirics and implications for the international community,” *From Aid to Global Development Cooperation, The 2011 Brookings Blum Roundtable Policy Briefs* (Washington, DC: Brookings, 2011), p. 29.

Table 13
All governance
indicators per
country in 2014

Region	Country	Control of Corruption	Government Effectiveness	Political Stability and Absence of Violence/Terrorism	Regulatory Quality	Rule of Law	Voice and Accountability
STC	DJIBOUTI	-0.49	-0.97	-0.72	-0.55	-0.85	-1.41
STC	COMOROS	-0.53	-1.67	-0.19	-1.14	-0.94	-0.33
STC	SUDAN	-1.45	-1.61	-2.36	-1.39	-1.15	-1.73
STC	YEMEN	-1.55	-1.41	-2.53	-0.84	-1.17	-1.34
STC	SOMALIA	-1.69	-2.48	-2.49	-2.11	-2.39	-2.13
Mashreq	JORDAN	0.15	0.13	-0.56	0.08	0.48	-0.77
Mashreq	PALESTINE	-0.57	-0.53	-1.99	0.28	-0.44	-0.85
Mashreq	EGYPT	-0.59	-0.82	-1.58	-0.75	-0.60	-1.19
Mashreq	LEBANON	-1.06	-0.38	-1.72	-0.22	-0.76	-0.42
Mashreq	IRAQ	-1.34	-1.13	-2.47	-1.25	-1.36	-1.21
Mashreq	SYRIA	-1.55	-1.44	-2.76	-1.67	-1.34	-1.80
Maghreb	TUNISIA	-0.09	-0.13	-0.93	-0.35	-0.12	0.03
Maghreb	MOROCCO	-0.26	-0.14	-0.39	-0.01	-0.06	-0.70
Maghreb	ALGERIA	-0.61	-0.51	-1.17	-1.21	-0.73	-0.93
Maghreb	MAURITANIA	-0.92	-1.05	-0.58	-0.70	-0.82	-0.91
Maghreb	LIBYA	-1.61	-1.64	-2.32	-2.19	-1.52	-1.15
GCC	UAE	1.23	1.48	0.81	0.98	0.71	-1.06
GCC	QATAR	1.09	0.99	1.00	0.57	0.99	-0.98
GCC	BAHRAIN	0.30	0.59	-0.94	0.70	0.45	-1.32
GCC	OMAN	0.25	0.29	0.66	0.69	0.58	-1.05
GCC	SAUDI ARABIA	0.10	0.23	-0.24	-0.01	0.27	-1.78
GCC	KUWAIT	-0.26	-0.15	0.14	-0.13	0.05	-0.65

* Estimates range from approximately -2.5 (weak) to 2.5 (strong)

Source: <http://info.worldbank.org/governance/wgi/index.aspx#home>.

An alternative measurement of governance index among African states is offered by The Ibrahim Index of African Governance (IIAG)¹¹ and could be a useful tool to compare governance performance among African states and across various subcategories: safety and rule of law, participation and human rights, sustainable economic opportunity, and human development. The governance context and the policy process in Arab region could probably best be described as “‘opaque’. Rarely do we get a sense of the interplay of public opinion, interest groups, legislatures, executive authorities and international actors that set agendas, formulate policies, and apply them.”¹²

The city configures as a weak entity in the governance framework in the Arab States, barring exceptions. The administrative tiers revolve around the National, Governorate (Mohafazah, Wilaya, Department), District and Commune levels.¹³ The concept of an autonomous city government does not exist as such, except in the metropolises in North Africa, in special economic zones and in weak states like Palestine and Lebanon. Nationally the city administration falls within the mandates of the Ministry of Decentralization, the Ministry of Interior, the Ministry of Local Affairs or the Ministry of Municipalities, which manages the affairs of cities and towns through its local officials (e.g., governors, mayors, administrators, etc.). The delivery of services to citizens is directly managed by the respective sectoral line ministries. In the absence of autonomous city governments, the budget allocations for urban development are received in the form of the sectoral budget of line ministries to be spent at the local level. Municipal governments receive limited funds from the government centre for operating costs. The share of local governments in GDP in the Arab States is about 5 per cent, compared to 20 per cent in the OECD.¹⁴ In some countries, the governments have established funds for the municipal governments to borrow money to meet their expenses (e.g., the Independent Joint Municipal Fund in Lebanon). Bahrain and Kuwait also allow cities to “get loans” to meet expenses. Such funds, however, disburse money at high interest rates. Due to weak and financially starved municipal governments wherever they exist, many municipal services are subcontracted to the private sector by the sectoral ministries or governorate governments. The role of the private sector is therefore highly important in urban management in the Arab region, unlike elsewhere. An additional factor that adds to the complexity is that, due to the lack of a democratic system, the bureaucratic and technocratic officials responsible for urban management are appointed as local agents of their mother departments (ministries, governorates), rather than being elected representative of their constituencies. The development agenda of these officials is driven by the priorities defined by their mother departments to serve a political system that relies upon elite patronization rather than public service. Due to the fragmented nature of urban stakeholders, cities lack a commonly-defined vision and development agenda. This system of urban governance has led to many pitfalls, including poor urban planning, weak stakeholder coordination, poor citizen participation, lack of transparency and accountability, and poor service delivery. Consequently, the majority of Arab cities suffer from chronic challenges of water supply, waste management, public transport, pollution, protection of natural resources,

FOOTNOTES

¹¹ <http://mo.ibrahim.foundation/iiag/downloads/>.

¹² John Waterbury, *The Political Economy on Climate Change*, AHDR Research Series, 2013, p. 14.

¹³ UCLG 2008.

¹⁴ *Ibid.*

informal settlements and urban sprawl. In this context, promoting urban resilience remains a remote concern in spite of the fact that many cities face recurrent flooding, storms, heatwaves, and industrial and urban fires.

Civil society and media, two important players in advocating issues of common concern, remain very weak in the region, primarily due to the autocratic nature of the regimes where space for dialogue and advocacy is extremely limited. Lobbying is a more common strategy to seek policy changes. It is however highly personalized due to the culture of *wasta* - , using one's political connections and influence to get things done.

The governance landscape in the Arab cities is changing, however, due to the opportunities offered by tourism, trade and investment. Many cities have been transformed into autonomous entities in order to exploit the full potential of growth and development. A few of these include cities in Jordan (Aqaba, Petra), UAE (Dubai, Abu Dhabi and Sharja) and Iraq (Erbil). The growing complexity of urban management has also encouraged some countries to set up more efficient urban governance systems. For example Algeria and Saudi Arabia have established a system of urban observatories to monitor urban development and management indicators, and provide feedback to authorities to introduce improvements in a timely manner.

4.2.2 Urban resilience-building against disaster and climate risks

With growing urbanization, urban risk governance is emerging as an important concern. The idea of urban resilience, however, is new to most cities. Disaster risk management, a key element of urban resilience-building, remains predominantly a Civil Defence issue. Civil Defence is the focal point agency on disaster risk issues in 14 out of the 22 member states of the Arab League,¹⁵ especially at the local level. There has been notable progress at the national level to improve coordination mechanisms for multisectoral engagement in disaster risk management. Various countries have set up specific entities for multisectoral coordination, including Algeria, Djibouti, Egypt, Lebanon, Morocco, Somalia and the United Arab Emirates. In other countries however, the National Civil Defence Councils remain the primary forum for coordination and policy development. The Civil Defence councils do not meet regularly in times of peace. Their meetings are mostly held in the aftermath of a disaster with the aim of organizing response. These meetings are attended by political leadership to the exclusion of managerial and technical experts. The specialized coordination mechanisms that have been established by different countries (listed above), have certainly helped to shift the focus of national efforts from response to preparedness and in some cases to disaster risk reduction. However, such entities lack organizational presence beyond the national level, and especially at the city level. Therefore, even in these countries at the local level, the Civil Defence by default remains the primary department concerning disaster risks (e.g., Algeria, Egypt, Lebanon, Morocco). Like the sectoral ministries, the Civil Defence has a presence

FOOTNOTES

¹⁵ National HFA reports and websites of the Civil Defense Department of the Arab States.

at the national, governorate and local levels, where it is typically stationed in the district headquarters. Due to the competing sectoral priorities and the sporadic nature of disaster events, the Civil Defence remains a weak link in the national bureaucratic machinery. The department is starved of financial, technical (personnel) and material resources (equipment and machinery). The Civil Defence department, also by its mandate, remains concerned primarily with disaster response and to a lesser extent with preparedness. In terms of its multidisciplinary coordination role, unlike the National Civil Defence Councils, coordination councils are either non-existent or non-functional at the governorate and local levels. The only exception to this rule seems to be the Algerian Civil Protection that has, over the years, transformed into an effective entity for disaster risk reduction.

In spite of the weaknesses of the Civil Defence system, some countries have achieved significant success in promoting urban resilience to disaster and climate risks. Among these are Algeria, UAE and, to a lesser extent, Jordan and Lebanon. In Algeria, the work has been led by the Civil Protection, mainly as a response to high level of risks faced by the country from earthquakes and other disasters. In the UAE, the National Emergency Crisis and Disaster Management Authority (NCEMA) has been engaged in a nationwide disaster preparedness process, including urban resilience.¹⁶ According to Nathalie Zaarour, UNDP's National Disaster Reduction project manager in Lebanon, many Arab cities (280 municipalities) have joined the Making Cities Resilient campaign, although over 80 per cent of those cities are in Lebanon. This is not to say that a large number of municipalities in Lebanon are on track with building resilience to natural hazards: far from it. Although the first step of committing to Making Cities Resilient (MCR) is important, it is even more important to actually start building capacities and integrating risk consideration in urban planning. To this end, there is only one city in the region that has made a significant progress and has become a role model for MCR: Aqaba City, where UNDP has been implementing its Arab Cities Disaster Resilience Programme.

In other countries, the role of international aid organizations has been more important in promoting urban resilience in the region. Among these are included UNDP, UN-Habitat, UNISDR, the World Bank and the Rockefeller Foundation through its 100 Resilient Cities project.¹⁷ Through the Arab Cities Disaster Resilience Project, UNDP has supported cities in Jordan (Aqaba, Amman and Petra), Lebanon (Sidon, Metn, Byblos and Baalbek), Sudan (Khartoum) and Tunisia (Ain Draham) to improve city level governance and capacities for DRR. In Lebanon, UNDP has worked with the Unions of Municipalities to promote joining of Making Cities Resilient Campaign by Lebanese cities. UNISDR has reached out to cities in numerous countries to enrol them in the Making Cities Resilient Campaign and to implement the Local Government Self-Assessment Tool (LG SAT) including Egypt, Lebanon, Palestine and Tunisia. The World Bank has conducted risk assessments of Djibouti city (Djibouti), Alexandria (Egypt) and Tunis (Tunisia) concerning climate change and it is supporting capacity development there. UN-Habitat is working with the Saudi government to implement the Future Saudi Cities Programme to promote sustainable development in 17 cities. It has also worked with the Governments of Madagascar, Malawi, Mozambique and the Union of Comoros to establish the

FOOTNOTES

¹⁶ <http://www.ncema.gov.ae/en/home.aspx>.

¹⁷ <http://www.100resilientcities.org>.

Technical Centre for Disaster Risk Management, Sustainability and Urban Resilience (DiMSUR) in 2014. The 100 Resilient Cities project of the Rockefeller Foundation is supporting Amman (Jordan), Byblos (Lebanon), Luxor (Egypt) and Ramallah (Palestine) in developing city resilience strategies and building capacity.

Climate change is anticipated to have severe impact upon the Arab region, in terms of chronic challenges in the areas of water, food, health, agriculture, environment and economy, as well as in terms of greater frequency and intensity of disasters (e.g., droughts, flooding, sandstorms, cyclones, forest fires and coastal inundation, among others). However, climate change adaptation, like DRR, remains a lower priority for many governments. The mandate for climate change adaptation remains sectoral, broadly having been assigned to the Ministries of Environment or Water Resources. Few countries have established national level committees or councils for multisectoral coordination on climate change adaptation (CCA). Such coordination mechanisms are lacking at the governorate and city levels and it remains the job of the concerned ministry to address CCA issues. National financing for climate change adaptation remains absent. The least developed countries (LDC) in the region have initiated numerous local level projects on CCA with financing through global mechanisms; e.g., the GEF, Green Climate Fund (GCF), Special Climate Change Fund (SCCF) and the Least Developed Countries Fund (LDCF), especially Djibouti, Egypt, Lebanon, Morocco, Somalia, Sudan, Tunisia and Yemen.¹⁸

Another important consideration while addressing urban governance for resilience-building is the particular importance of cultural and natural heritages and their preservation. The Arab region is home to a large number of cultural and natural sites listed on the World Heritage List. Protection of these sites is also important from the perspective of sustainable urban development, which is underlined also in Goal 11 of the SDGs. Many Arab cities are economically dependent on tourism and, therefore, protection of these properties is vital to the functioning of cities. There are 80 cultural and natural properties in total in the region that have been officially included on the World Heritage List (see Annex 7).

Financing for both disaster risk reduction and climate change adaptation remains a major challenge, though more so for DRR. Whatever national financing exists for DRR and CCA is difficult to estimate due to the sectoral nature of allocations aimed at addressing risk reduction (e.g., early warning systems, risk assessment, flood mitigation infrastructure, water resources management, drought mitigation, desertification control, natural resource management, health sector preparedness, etc.). However, a generic impression remains that national financing is limited. The LDCs and the MICs are highly dependent upon international funding in terms of both aid and loans. Comparatively speaking, in terms of global aid, there is significantly more funding available to countries in the region for climate change adaptation than for DRR.

A critical gap is the lack of coordination and cooperation between the CCA and DRR communities. Separate policy, institutions and coordination mechanisms for both subjects adversely affect the ability to address the mutually inclusive challenges posed by climate change and disaster risks. Especially given the fact that many of the natural hazards in the region are induced by

FOOTNOTES

¹⁸ Support for the Arab States region in Adapting to Climate Change (Draft report), UNDP 2016, Istanbul.

climate change, it is highly sensible to integrate DRR capacity development within the climate change adaptation framework.

Robust city governments and multidisciplinary coordination mechanisms at the city level are crucial to promote urban resilience. Legal and institutional capacities of the relevant focal point departments also need to be enhanced in the areas of risk mapping, early warning, risk education and risk reduction. The insurance sector in the Arab States is weak, therefore the possibility to transfer risk remains limited. Land use planning and building codes are the weakest areas of urban development.

Decentralization and the empowerment of urban authorities is the most important requirement in order to enable them to lead urban development. It requires engagement at various levels with numerous stakeholders. The role of national ministries of Interior, Decentralization and Local Affairs is crucial in terms of undertaking necessary legislative and policy measures to empower the city authorities and provide them sufficient finances for DRR and CCA. The sectoral ministries also need to be more cognizant of the expanding development needs of cities due to growing population, climate change and related pressures. The provincial governors, with their role in charge of cities within their jurisdictions, are critical stakeholders. Governors need to be engaged in an awareness and advocacy process to improve their knowledge about challenges to urban resilience, and the actions that can be taken to reduce risks.

The regional, subregional and supraregional intergovernmental bodies concerned with national and urban development have an important role in lobbying and advocacy to promote urban resilience through their networks of ministers: e.g., the League of Arab States (and its numerous ministerial committees), the Emergency Management Centre of the GCC, the Intergovernmental Authority for Development (IGAD), United Cities and Local Governments of Africa (UCLGA), and the African Conference on Decentralization and Local Development (CADDEL). The networks of Arab cities like the Arab Towns Organization (ATO) and its subsidiary organizations provide important vehicles to reach out to a vast number of member cities. The subsidiary organizations of the ATO, which have specific mandates related to cities, include the Arab Urban Development Institute (AUDI), Arab Environment Development, the Development Fund for Arab Cities and the Arab Forum for Information Systems. The ATO has about 500 member cities. The Organization of Islamic Capitals and Cities (OIICC) is another important stakeholder.

In addition, engagement with private sector service providers is critical due to their strong involvement in performing some of the municipal functions in service delivery (e.g., water supply, solid waste management, education, health etc.).

International development assistance organizations and lending agencies will continue to play an important role as advocates, capacity developers and financiers of urban resilience-building. Given the fact that the cost of resilience-building runs into millions of dollars per city, the role of lending institutions becomes crucial, especially since metropolises have the mandate to borrow directly from international sources and national governments cannot afford to allocate the required amounts.

4.2.3 Overview of governance for urban resilience-building in the subregions

4.2.3a The Arab Gulf States

All the GCC member states are monarchies. In the GCC member states, national authorities play a primary role at all levels in a centralized vertical system. Therefore governance for urban disaster risk management is also centralized. In most of the GCC countries, the Civil Defence department, under the Ministry of Interior, is the primary focal point for DRM. The efforts of the civil protection authorities are largely concentrated at the national level and geared to high-level policy-making and planning. The lower levels within administrations (specifically, the municipal level) are largely seen as implementers of the national plans/programmes/policies and have limited authority. In the case of UAE, there is a higher level of decentralization of civil protection and the disaster risk management system, which is also largely explained by the federal configuration of the national administration system.

Both disaster and climate risk issues are addressed by different administrative branches within the national authorities. Each country has a dedicated state authority to address disaster risk, whereby civil protection systems are usually tightly linked with the security establishment. Climate change considerations fall instead under the jurisdiction of environmental authorities.

Urban resilience-building against natural hazards needs to be addressed through the prism of the critical sustainability risks that GCC countries face. Climate risks have become a priority to be addressed by national and municipal authorities, in particular, from the perspective of managing energy and water demand in the built environment.

There is a growing need to explore the multi-hazard risk assessment perspective. Water scarcity and rising temperatures, for example, pose significant risks in urban settings. Bahrain, Kuwait, Qatar and Saudi Arabia are among the world's most water-stressed countries.¹⁹ While many cities in the GCC countries may be classified as cities with extreme drought; some, like the coastal city of Jeddah, also face flood risks. Adequate resilience-building requires a more integrated approach to risk consideration, and more authority and inclusiveness in the areas of risk identification, assessment and response.

The GCC countries are facing existential risks derived from the nexus of energy/oil-sustainable development. With an already high per capita energy consumption in the GCC countries, which is expected to double between 2008 and 2020,²⁰ much of the governments' efforts on resilience-building are geared towards addressing energy efficiency needs and exploring alternative energy sources. Thus, the UAE is already importing natural gas to meet its growing energy needs;²¹ Saudi Arabia, similarly, may need to start importing

FOOTNOTES

¹⁹ <http://www.fao.org/nr/water/aquastat/main/index.stm>.

²⁰ Economist 2010.

²¹ Caroun 2011.

oil within the next 20 years if its consumption continues to grow and energy production remains at current levels.²² Therefore, urban resilience-building is very much linked to their search for solutions for renewable energy.

All the GCC countries show a high commitment to addressing climate change risks, which is further reflected in urban planning and urban resilience-building processes. The ruler of Dubai, Sheikh Mohammed bin Rashid Al Maktoum, for example, was the first to set a policy on green building standards in his Emirate, in 2007.²³ The focus is on improving energy efficiency and water conservation in new building, a Leadership in Energy and Environmental Design (LEED) standard. The Bahraini Ministry of Housing has also launched a Green Building initiative and announced the development of new building code.²⁴ As a result of such policies and initiatives, over 2,000 buildings in the GCC region (with UAE taking the lead) are currently either LEED registered or certified as such from 2015.²⁵ Another example is Masdar City in Abu Dhabi – the world's first eco-city. The non-state actors are largely active in humanitarian and charitable fields.

Bahrain

- The Ministry of Works, Municipalities Affairs and Urban Planning is responsible for management of municipalities.²⁶
- The General Directorate of Civil Defence, the national focal point for disaster management is part of the Ministry of Interior in Bahrain.²⁷
- Bahrain is divided into 24 subdivisions and municipalities.

The General Directorate of Civil Defence is the national focal point for disaster management in Bahrain. A National Civil Defence Council has been set up to coordinate all activities related to resilience-building. Bahrain also has a National Committee for Disaster Management that reports directly to the Council. Bahrain has initiated a National Multi-Agency Risk Assessment process. One of the outputs of this initiative is the hazard profile of the country.²⁸ Local level engagement in resilience-building and disaster risk management is extremely limited.²⁹

The Ministry of Works, Municipalities Affairs and Urban Planning is a very important player due to its role in the realization of the objectives of Bahrain's 2030 Vision. The Vision emphasizes the importance of sustainable economic growth, and therefore, the Ministry is seen as a key partner in the development of policies, application of development plans, and provision of municipal services that are responsive to the local needs, thereby encouraging citizens to become proactive participants in the initiatives intended to promote their local

FOOTNOTES

²² Bloomberg 2012.

²³ Arabian Business 2007.

²⁴ Arab Sustainability Association, "Bahrain implements green building codes," September 15, 2012.

²⁵ <https://www.gbrionline.org/headlines/leed-certified-projects-gulf-cooperation-council-gcc-numbers/>

²⁶ http://websrv.municipality.gov.bh/mun/index_en.html.

²⁷ <http://www.moic.gov.bh/En/MoIC%20Centers/BahrainInvestorsCenter/Licensing%20Authorities/MinistryOfInterior/GeneralDirectorateofCivilDefence/Pages/GeneralDirectorateofCivil%20Defence.aspx>.

²⁸ HFA 2013.

²⁹ Ibid.

communities. Also, the focus of the activities of the Ministry and respective local authorities is largely on providing a safe environment for businesses to flourish.

The largest humanitarian organizations are Bahrain Red Crescent Society³⁰ and the Royal Charitable Organizations (RCO).³¹

No city in Bahrain is engaged in the UNISDR MCR Campaign.

Emirates

- The Emirates is a Constitutional Federation of seven Emirates,³² whereby Abu Dhabi Emirate makes up 87 per cent of the entire country, 70 per cent of which is an open desert.
- The Emirates has six cities.

The NCEMA is the National Focal Point for DRR in UAE. It works under the Supervision of the Supreme Council for National Security. The work of NCEMA is focused on the development, consolidation and maintenance of laws, policies and procedures for emergency and crisis management at the national level.³³ It has the following departments: operations, local centres, planning and preparedness, support services, information and communication technology, media and public information, and safety and prevention.

The NCEMA has a relatively high level of decentralization in line with the general administration system in the country. There are seven NCEMA centres across all Emirates (Abu Dhabi, Dubai, Sharjah, Ajman, Umm Al Quwain, Ras Al Khaimah, and Fujairah), which are in-charge of local coordination. Their work is supervised by the Local Centres Department of the NCEMA. Local centres organize events and take the necessary measures to implement local response plans, improve readiness and preparedness, prepare the local risks register, review the local recovery plans, perform coordination to prepare joint activities in the Emirates, and develop the local resources. The local Centres collect available data on local resources and share it with the Local Centres department at the NCEMA to create a national sustainable database. The Centres coordinate the management of these resources after emergencies, crises and disasters.

The Department of Civil Defence³⁴ under the Ministry of Interior³⁵ is also an important player at the local levels. Acknowledging the boom of housing construction, urbanization, and industrialization in last years, the civil defence keeps the focus on civil and industrial safety and on sustainable development. This work is guided by the principles of Total Quality Management and are geared to obtain Quality Management System certification ISO 9001, Occupational Health and Safety Management System certification OHSAS 18001 and finally the Environment Management System ISO 14001 certification.

FOOTNOTES

³⁰ <http://www.rcsbahrain.org>.

³¹ <http://www.orphans.gov.bh>.

³² <http://government.ae/en/web/guest/home>.

³³ <http://www.ncema.gov.ae/en/about-ncema/ncema-in-focus.aspx>.

³⁴ <http://adcd.gov.ae/en/>.

³⁵ <https://www.moi.gov.ae/en/>.

The Emirates is home to the International Humanitarian City (IHC),³⁶ which is located in Dubai. IHC provides a regional platform for local and international humanitarian organizations, including several UN agencies and the International Federation of Red Cross and Red Crescent Societies. Established by the Government of Dubai in 2007, it is an independent free zone that has become a base for logistics and procurement and partnership and capacity-building through initiatives such as Sphere training.

One city in the UAE is engaged in the UNISDR MCR Campaign: Abu Dhabi.

Box 6
Masdar City:
applying
traditional
knowledge
and modern
technology
to build resilience
to climate change

In 2006 the Government of Abu Dhabi initiated an unprecedented project: Masdar City. It is the world's first full eco-city, with zero carbon emissions and zero waste. Construction is still in progress, but the city is already functioning and hosts the headquarters of the International Renewable Energy Agency (IRENA) and multiple cleantech companies.

The design of Masdar City is empowered by the unique mixture of age-old Middle-Eastern urban planning knowledge and modern technology. The city planners used the ancient trick of building cool streets: short (no longer than 70 m) and narrow streets that usually blocked off at the end by a building. These buildings create enough turbulence so that as the air hits the building it flicks upwards, creating a flushing effect and reducing the heat in the street. As a result, the temperature in the streets of Masdar City is as low as 20°C, whereas just meters away in the desert sand, the temperature is as high as 35°C.

There are no cars in the city, replaced by driverless electric vehicles that ferry residents around the city. There are no light switches or taps either. Instead, there are sensors that helped to cut electricity consumption by 51 per cent and water usage by 55 per cent. The walls of the building are designed to limit heat-radiation and have reduced the demand for air conditioning by 55 per cent.

The entire community is powered by a 22-hectare field, a 100 MW solar field located about 150 km south-west of Masdar, called Shams 1. It is one of the largest concentrating solar power (CSP) plants in the world, and the largest solar plant operating in the Middle East. Concentrated solar power generates electricity from the heat of the sun rather than sunlight, as is the case with solar photovoltaic technology. The heat created at Shams 1 generates electricity that saves 175,000 tons of CO₂ a year, equivalent to planting 1.5 million trees or removing 15,000 cars from Abu Dhabi's roads.

Source: Official webpage of the Abu Dhabi Future Energy Company, Masdar [www.masdar.ae].

FOOTNOTES

³⁶ <https://www.ihc.ae>.

Box 7 UAE National Volunteer Program for Emergencies, Crises and Disasters

Acknowledging the importance of forming a distinguished base of volunteers in the field of emergency, crises and disaster, the NCEMA of UAE has embarked on a National Volunteer Program for Emergencies, Crises and Disasters.

The objectives of the program comprise:

- Attracting individuals in the community who are interested to volunteer and encouraging them to effectively assist in social development.
- Establishing, qualifying and training a team of volunteers that will contribute to the assistance during emergencies, crises and disasters.
- Establishing a database of volunteers to coordinate their work within the efforts of the national response.
- Supporting programs specialized in the management of the National Career Level to guarantee the continuity of work during emergencies, crises and disasters.
- Instilling and promoting the culture of volunteerism within the society.
- Strengthening the sense of belonging, and social cohesion between community members and the State authorities, and collaborating during emergencies, crises and disasters.

Source: <http://www.ncema.gov.ae/en/home.aspx>

Kuwait

- The Directorate General of Civil Defence falls under the jurisdiction of the Ministry of Interior.³⁷
- The activities of municipalities are coordinated through the State Minister for Municipal Affairs.³⁸
- Kuwait is divided into six governorates, with several areas in each. Areas, sometimes called towns, do not exceed 5 km².

The Kuwait Cabinet discussed the possibility of establishing a Civil Defence Authority only in 2001. Within the DRM discourse, the primary focus of the Ministry of Interior is on prevention and response to industrial accidents (fires, explosions, chemical/biological/radiological).

UNDP is supporting the Government of Kuwait to establish the Centre of Excellence for Humanitarian Response and Resilience to institutionalize humanitarian and relief work. The Centre is deemed to support "...the resilience based approach to development, aimed at strengthening communities and systems to withstand shock... with the aim of ultimately limiting damage and reducing costs."³⁹

No city in Kuwait is engaged in the UNISDR MCR Campaign.

FOOTNOTES

³⁷ <https://www.moi.gov.kw/portal/venglish/>.

³⁸ <http://moc.gov.kw>.

³⁹ State of Kuwait and UNDP, Country Programme Action Plan 2015 to 2018, Between the Government of Kuwait and the United Nations Development Programme (UNDP), [<http://www.kw.undp.org/content/dam/kuwait/documents/CPAPandCPA/CPAP%202015-2018.pdf>], p. 13.

Oman

- Municipalities in Oman are under the jurisdiction of the Ministry of Regional Municipality and Water Resources.⁴⁰
- Oman is divided into five regions and four governorates, which are further divided into 61 provinces.
- Oman has 43 cities, towns and municipalities.
- Total population of Oman estimated at 4,944,875.

The Civil Defence department under the Ministry of Interior is the national focal point for DRR. The civil defence system has been to a large extent shaped by the history of frequent tropical storms. After the Cyclone Gonu of 2007, the National Committee for Civil Defence (NCCD) was reformed to take a more proactive role in disaster preparedness. After Cyclone Phet in 2010, the Sultan ordered the NCCD to establish a national-level crisis management experts' panel to actively work on future plans for emergency management.

The National Council for Civil Defence (NCCD) was initially coordinated by the Ministry of Interior since 1999. In 2002, the NCCD became a semi-autonomous entity within the overall structure of the Royal Oman Police. In 2003, specialized regional-level emergency management subcommittees were formed and tasked to carry out emergency preparedness activities in eight regions of Oman. Since 2003, smaller specialized emergency response teams were also formulated under the Royal Oman Police. These include the first national emergency medical service, the national Chemical, Biological, Nuclear and Radiological (CBNR) response team, and other search and rescue teams.

Also, the National Emergency Management Centre in Oman (PACDA) is a part of the national emergency management system in Oman. It is responsible for management and coordination of search and rescue operations and hazardous substance incident response.⁴¹

The NCCD has developed a number of disaster management plans: relief operation plan, emergency medical response and public health plan, search and rescue plan, risk assessment and early warning system, infrastructure recovery plan, CBNR plan, communication and media plan.

Two laws regulate the emergency management system in the Sultanate of Oman. The first is the Civil Defence Law that was instituted by the Royal Decree 76 in 1991. The second is the State of Emergency Law, which was outlined by the Royal Decree 75 in 2008.

The current emergency management system remains largely centralized and resources are concentrated at the national level. The local level response is under-developed, local authorities are largely unprepared to handle emergencies and therefore regional and national support is almost always needed. The local response level is coordinated by the local governor and representative from various governmental organizations such as local

FOOTNOTES

⁴⁰ <http://mrmwr.gov.om/new/en/Page.aspx?id=143&li=7&Type=&Slide=true#>.

⁴¹ <http://www.pacdaoman.gov.om:8080/en/national-committee-en>.

police, local health authorities, and the local municipality. The function of local response is to assess the emergency, address local needs, and when needed, request the regional response. It can be activated by the local governor of the affected area after the approval of the national NCCD representative.

Since its establishment, the Oman Charitable Organization (OCO) runs relief and humanitarian programmes both in Oman and abroad.

No city in Oman is engaged in the UNISDR MCR Campaign.

Qatar

- Municipalities in Qatar are under the jurisdiction of the Ministry of Municipality and Environment.⁴²
- Since 2004, Qatar is divided into eight municipalities,⁴³ which are further subdivided into 87 zones (as of 2004).

The Civil Defence system is responsible for disaster risk management in Qatar at both national and local levels, the latter through its branches. The General Directorate of Civil Defence is in charge of disaster management operations. The activities of the General Directorate of Civil Defence under the Ministry of Interior in Qatar are divided between its four departments (operations, prevention, procurement and administrative affairs) and largely concentrated at the national level. Starting in 2004, the Civil Defence system in Qatar has undergone significant reforms.⁴⁴ The *Qatar National Development Strategy 2011-2016* stipulates to “establish a high-level coordinated approach to national disaster management.”⁴⁵

A new law approved in December 2015 proposed to set up a Supreme Council for Civil Defence. The Council is responsible to draw up a general policy, and declare a state of emergency in case of a disaster. The Council is in charge of preparedness and response activities with the engagement of all ministries.

Building fire is a major urban risk in Qatar, and the number of fires is growing. In 2013 alone there were 1,158 fires, or an average of more than three fires a day, most of which occur either in homes or in vehicles.⁴⁶ An important preventive function of the Civil Defence is to issue licenses to commercial, industrial and general stores to ensure building safety.

The Ministry of Interior (previously the parent ministry of Civil Defence) has set up the Ras Laffan Emergency and Safety College (RLESC) at Doha in partnership with Qatar

FOOTNOTES

⁴² <http://www.mme.gov.qa/cui/index.dox?sitelD=2>.

⁴³ <http://www.mme.gov.qa/cui/view.dox?id=585&sitelD=2>.

⁴⁴ <http://civil-defence-exhibition.com/civil-defence/information-about-civil-defence-qatar>.

⁴⁵ General Secretariat for Development Planning (GSDP), *The Qatar National Development Strategy 2011-2016, Towards Qatar National Vision 2030* (Doha, Qatar: Qatar General Secretariat for Development Planning, 2011), p.19. General Secretariat for Development Planning (GSDP), *The Qatar National Development Strategy 2011-2016, Towards Qatar National Vision 2030* (Doha, Qatar: Qatar General Secretariat for Development Planning, 2011), p.19.

⁴⁶ <http://dohanews.co/new-civil-defense-council-formed-to-manage-qatars-emergency-response/>.

Petroleum. It is an emergency and safety training college, designed to provide advance training to professionals in the oil, gas, petrochemical, civil defence, civil and military aviation industries in the MENA region and Africa.⁴⁷ Such focus is largely explained by the fact that Qatar is the world's biggest natural gas liquefaction site.

Numerous social and developmental organizations address aspects of disaster risk management in Qatar. These include the Qatar Foundation, Qatar Red Crescent Society, Qatar Charity, Shafallah Centre, Sheikh Eid Bin Mohammed Al Thani Charity Foundation, Al Fakhoura Campaign and Reach Out To Asia (ROTA).⁴⁸ These organizations address issues of aid and development response, from education in conflict areas to water and sanitation projects and disaster and emergency response missions.⁴⁹

No city in Qatar is engaged in the UNISDR MCR Campaign.

Box 8
Qatar: National Command Centre (NCC) - a unified geospatial response infrastructure

Since 1973 Qatar has been building its operational capacities to respond to emergency situations. In 2006, during the organization of the 15th Asian Games, its Operations Room was shifted from Ministry of Interior to the National Command Centre (NCC). The NCC is fully equipped with necessary up-to-date technical solutions (including the TETRA System).

- NCC manages a coordinated response to both local and national emergencies based on real-time information dissemination about the emergency. It includes the country's Emergency Service Centre, the Ministry of Interior, Internal Security Forces, and the Hamad Medical Corporation, operator of Qatar's national ambulance services.
- NCC uses NJM (Unified Geospatial Infrastructure) – a web-based, bilingual (Arabic and English) geographic security system built on the ArcGIS platform. It includes a number of interactive applications and a unified geodatabase that hosts all geographic and tabular data in a single repository. NJM integrates all NCC functions into a single system and seamlessly interfaces with other systems when needed.
- NCC covers the entire emergency workflow, including receiving calls about emergency incidents, tracking the location of the incident with an automatic call and a location identification system. The application also provides records of nearby incidents, hazardous materials, and critical infrastructure. NJM also provides the location of responding vehicles and their availability status. The application then uses the ArcGIS Network Analyst extension with an integrated automatic vehicle location (AVL) service to determine the nearest available units and match the response needs with predefined unit capabilities and their current location.

Source: Ministry of Interior, Qatar, Central Operations Department [<https://www.moi.gov.qa/site/english/departments/cod/sections/sec1197/1197.html>]. Accessed 20 February 2018.

FOOTNOTES

⁴⁷ Ras Laffan Emergency and Safety College: <http://www.rlsc.qa>.

⁴⁸ The Qatar Foundation: <https://www.qf.org.qa/home>.

⁴⁹ <http://www.unocha.org/romena/about-us/about-ocha-regional/qatar>.

Saudi Arabia

- The Ministry of Interior is the national focal point for emergency and disaster management.⁵⁰ A special focus area is the provision of security during Ramadan and Hajj seasons in Makkah and Medina.
- The Civil Defence (CD) and Fire Services departments and Public Security Directorate (PSD) are placed under the jurisdiction of the Ministry of Interior.
- Saudi Arabia is divided into 13 provinces with a varying number of governorates in each province (118 governorates in total).
- Saudi Arabia has 106 cities and towns.

The Ministry of Municipal and Rural Affairs, jointly with the National HABITAT Consultation Group in the KSA, has articulated the need to “promote disaster-resilient cities through integration of disaster risk management measures into spatial planning” among three priorities for future sustainable development.⁵¹ As of September 2014, the Government is developing a long-term strategy on disaster risk reduction in cooperation with the World Bank/GFDRR to manage and mitigate the impact of disasters.⁵²

The General Directorate of Civil Defence (GDCCD) is chaired by the Minister of Interior. The Civil Defence structure has three layers: Board of the GDCCD, Executive Committee, and volunteers. The Board is responsible for the overall policy development and planning at the national level. The Executive Committee implements decisions of the Board. Its members are appointed by the Board. GDCCD volunteers are the citizens who committed to support the GDCCD task during the times of increased need.⁵³

The Ministry of Interior has set up the Emergency Call and Operation Centre (ECO). The ECO is a network of control rooms across the country tasked with providing multi-agency event reporting and dispatch operations for civil defence or security events. The centre's headquarters is located in Makkah.⁵⁴

Decision-making and resource allocation in the civil protection system is highly centralized. It is response-oriented with a focus on particular security concerns. Also, the system is designed to incorporate the charitable giving concepts of *zakat* (a religious tax) and *sadaqa* (optional charity) under the Saudi National Campaign structure. The humanitarian aid is therefore understood by the community and respected by the government.

Growing attention is paid to urban resilience-building. In 2013, a four-year cooperation agreement was signed between the Government and UN-Habitat for the development of the “Future Saudi Cities Programme.” The four-year Programme will be implemented by UN-Habitat in 17 cities, in collaboration with the Ministry of Municipal and Rural Affairs. One city in Saudi Arabia – Dammam – is engaged in the UNISDR MCR Campaign.

FOOTNOTES

⁵⁰ <http://www.saudinf.com/main/c6p.htm>.

⁵¹ UN-Habitat 2016b, p. 47.

⁵² *Ibid.*

⁵³ <http://www.998.gov.sa/Ar/eServices/Pages/default.aspx>.

⁵⁴ Yao et al. 2013.

Box 9**Jeddah: flood risk and urban planning in an ancient city**

Known as the “Bride of the Red Sea,” Jeddah is considered the economic and tourism capital of the country. It is the second largest city after Riyadh, with a population of around 3.8 million. The origins of the city date back around 3,000 years, when the fishing tribe of Quda’ah came to Jeddah and settled there. The founding of the city may be dated to A.D. 647 when the third Muslim Caliph Othman Bin Affan ordered the city to be transformed into a port to welcome pilgrims (Hajjis) coming by sea for the Holy Pilgrimage to Makkah.* Today too, Jeddah continues in its role as the gateway to the holy cities of Makkah and Madinah.

On 25 November 2015, the worst flood of the past 27 years hit the coastal city of Jeddah and the surrounding areas of Makkah Province in Saudi Arabia. Heavy rains also lashed western, northern and central parts of Saudi Arabia, including the cities of Makkah, Medina, Hail and Arar. More than 90 millimetres of rain fell in just four hours in Jeddah, which is nearly twice the annual average and the heaviest rainfall in Saudi Arabia in decades. It resulted in over 100 lives lost and billions of riyals in damage caused to homes, cars and public infrastructure.

The Governorate of Makkah has confirmed that the flooding of streets and tunnels was the direct result of “a lack of adequate rainwater drainage systems at these sites.”** Benefiting from the experience gained from the floods that hit the city in 2009 and 2011, Jeddah Municipality has prepared an integrated plan to deal with heavy rains or flooding in the city in 2014. As part of its efforts to deal with the hazards of heavy rains and floods, the municipality will liaise with the Presidency of Meteorology and Environment (PME), the Civil Defence, traffic police, the Ministry of Water and Electricity, the National Water Company and the Ministry of Transport.

The risk of flooding is constant and growing in Jeddah, as it is a coastal city with a rapidly increasing population. The main focus for the municipality is how to deal with the housing needs of the middle and low-income families (set to grow by around 2.25 million people between now and 2029) among Jeddah’s 3.8 million population.***

* <http://www.uksacb.org/uk-en1313/page/main-cities>

** Arab News, 20 November, 2015 <http://www.arabnews.com/saudi-arabia/news/838371>

*** Construction Week, February, 2014 <http://www.constructionweekonline.com/article-26590-city-report-jeddah/>

Box 10**Saudi Arabia: smart cities and youth urban innovation**

A new initiative has been recently launched by the Arab Urban Development Institute (AUDI) on Youth Urban Innovation to utilize youth ICT skills in the implementation of the KSA 2030 vision and engage youth in transforming cities into SMART CITIES. The programme emphasizes the importance of balancing “*soft infrastructure*” of local social network, youth civic empowerment, cultural aspects of urban planning and “*hard infrastructure*” of a smart built environment, while realizing the KSA 2030 vision.

The programme's official launch took place in May 2016, adopting the Saudi transformative 2030 Vision for Sustainable Development and paving the road for achieving the United Nations 17 Sustainable Development Goals (SDGs) over the next 15 years. The programme was launched in Riyadh city in collaboration with the Higher Development Authority of Riyadh, and will be implemented in 17 Saudi Cities in collaboration with the Ministry of Municipalities and Rural Affairs. The Saudi Arabia model will be analysed for knowledge dissemination and replication in the Arab region.

The aim of this seven-month programme is to develop smart and responsive contemporary technology-based services and resilient urban planning development schemes. The program is designed to inspire and support municipal officials as they develop the Saudi Smart City policies and implementation framework for their cities, while engaging youth in leading Smart City development in Saudi Arabia.

The programme is expected inter alia to develop a Youth Urban Visualization learning toolkit to empower youth civic engagement, as a sustainable approach for community participation in the space mapping, design and development of Smart Cities.

The Arab Urban Development Institute (AUDI) is a non-profit and non-governmental organization, working as the Arab Towns Organization (ATO) scientific body in 500 cities and local municipalities across 22 Arab countries. Established in Riyadh 1998, its five main programmes are: City Development Strategy, Capacity Building, Child and Youth, Urban Observatories, and Urban Poverty.

Nuha Eltinay

4.2.3b The Maghreb

The Maghreb features very diverse characteristics, a few of which can have significant impact on urban resilience-building: Morocco as a kingdom with many achievements in disaster and climate risk management including at the local level, Algeria with an advanced civil protection and disaster risk management system (particularly risk transfer and DRR integration into sectoral planning), and Tunisia demonstrating an increasing interest in urban resilience. Libya, on the other hand, is a failed state with conflict ongoing since 2011, while Mauritania is one of the poorest countries in the world, and suffering from challenges of food security due to climate change.

Yet there are similarities among these countries, especially in terms of risk exposure of urban areas to seismic, coastal and climate hazards. At least three countries (Algeria, Morocco and Tunisia) have established good practices in disaster risk management. Also, with the exception of Mauritania, the Maghreb countries are middle and high income. Urbanization is comparatively high in the region. Decentralization and democratization is stronger in Tunisia and Morocco. The local authorities, however, struggle to obtain and effectively exercise power over planning, financing, and implementing resilience-building initiatives. A lack of financial resources, lack of human capital, and lack of enabling legal framework, all contribute to this situation.

Algeria

- Algeria is divided into 48 provinces,⁵⁵ 553 districts and 1,541 municipalities.⁵⁶ It has 38 cities with more than 100,000 inhabitants, and 134 towns (Brinkhoff 2017).
- Civil Protection Directorate is part of the Ministry of Interior and Local Governments

The civil protection system in Algeria is one of the most advanced in the subregion.⁵⁷ It has a long-standing history of disaster reduction in the country, triggered as often is the case, by disasters. After the El Asnam earthquake in 1980, the Government of Algeria issued the construction code in 1983. It implemented the first disaster reduction and management plan already in 1985.

The Boumerdès earthquake of 2003 heightened the importance of preparedness. The Law on Prevention of Major Risks and Disaster Management and new building regulations were adopted in 2004. DRR has become an important consideration for sectoral planning, whereby the National Scheme for Land Use planning was the first to integrate DRR. With UNDP support, DRR was also integrated into the National Planning Scheme 2030.

After the North Algerian earthquake, a disaster insurance scheme was introduced in 2003. The insurance scheme is mandatory for all property owners and covers physical damage to property (e.g., apartments, houses, villas, industrial and commercial buildings and their contents) affected by one of the following hazard events: earthquakes, floods and mudslides, violent storms and winds, landslides, or other similar disasters.

In 2006, the Government of Algeria adopted Law No 06-06 about city orientation. The law provides a common ground for shaping urban coherence scheme. Under this law a study will be carried out and solutions defined to address the existing and emerging problems in the urban context (including, but not limited to, the balance of development and economy, improving the living environment of citizens, etc.). The cities of Algiers, Oran, Constantine and Annaba will be the first cities to be tackled. In total it is envisaged to include 33 major cities, 39 cities with population over 10,000, 158 small towns, and 361 urban clusters.

Under this law, a National Observatory for the Cities was also established, followed in early 2007 by an executive decree establishing the organization and functioning of the Observatory. The Observatory is in charge of monitoring the implementation of the urban policy and proposes measures for its realization and the involvement of the citizens. The new Observatory is also responsible for developing indicators, statistics and information about the cities as well as new management models able to assist government and local authorities in improving the life of citizens and consolidating the role of the city in sustainable development.

FOOTNOTES

⁵⁵ The regional structure (region) as a local authority granted legal status does not exist. However, the regional constituency covering a space comprising several *wilayas* is tangible to the extent that several State services as well as their public and private businesses have been established regionally.

⁵⁶ <http://www.interieur.gov.dz/Dynamics/frmlItem.aspx?html=3&s=25>.

⁵⁷ UNISDR-ROAS 2013.

The resilience agenda in Algeria has been taken to a higher level by the appointment and institutionalization of the Délégation Nationale aux Risques Majeurs in September 2012. Also, the response capacities of the civil protection authorities are strong. During the Nepal earthquake of 2015, Algeria was the only African and Arab country actively present in the field.⁵⁸

“The strong centralization of powers and prerogatives, exacerbated by endemic bureaucracy, has largely reduced the role of community structures, supposed to be the counterpart of citizens to the extent that, in theory, they embody and express the will of the people.”⁵⁹ The decentralization law of 2004 requires municipalities to have specific disaster management responsibilities. However, resources and capacities at the municipality level remain limited. As such, additional support is required to empower municipalities to undertake effective DRM actions, through the provision of adequate budgets and capacities.

Non-governmental organizations are also active in resilience-building in Algeria. In September 2013, with the support of UN regional offices, the UN Country Team in Algeria started developing contingency plans to improve emergency preparedness. This included an earthquake simulation exercise.⁶⁰

A major component of the Civil Protection’s mandate is to train and sensitize schools, municipalities and *wilayas* (provinces) on preparedness and prevention measures. The Civil Protection Directorate organizes regular public-awareness tours to reach remote sites and inform the general population about disaster risk preparedness and prevention measures.

Algeria is also part of the Euromed programme for the Prevention, Preparedness and Response to Natural and Man-made Disasters (PPRD). PPRD is an EU-funded programme aiming at raising the national resilience of each southern Mediterranean partner country (countries targeted by the European Neighbourhood Policy – ENP) affected by a natural or human-caused disaster, mainly through risk reduction (prevention, mitigation, public awareness) and preparedness (capacity building, contingency planning), including better cooperation at the international level.⁶¹

None of the Algerian cities is engaged in the UNISDR MCR Campaign.

Box 11
Algeria:
insurance against
natural hazards

The unplanned urbanization and failure to comply with the seismic building codes has increased vulnerability to natural hazards. To address the growing financial risk from natural hazards, legislation on hazard risk insurance was enacted in August 2003 after the 2003 Boumerdès earthquake .

FOOTNOTES

⁵⁸ <http://www.aps.dz/en/algeria/7772-nepal-earthquake-algeria-hailed-for-its-“commitment,”-civil-protection’s-professionalism”>.

⁵⁹ United Cities and Local Governments (UCLG), Country Profile – Algeria.

⁶⁰ <http://www.unocha.org/romena/about-us/about-ocha-regional/algeria>.

⁶¹ PPRD South program II: <http://www.euromedpprdsouth2.eu>.

It is a mixed insurance system, based on mandatory insurance, combining the principle of citizen mutuality, a fundamental principle of insurance, and that of national solidarity with State intervention as a financial guarantor. The compulsory insurance scheme is designed to limit the financial threat to the national budget, ensure risk-sharing by all owners, promote seismic building code practices, and build up long-term reserves to compensate future disasters losses.

The insurance scheme is mandatory for all property owners and covers physical damage to property (e.g., apartments, houses, villas, industrial and commercial buildings and their contents) affected by: earthquakes, floods and mudslides, violent storms and winds, or other similar disasters.

The cost of the insurance (the premium) is based on three parameters: the value of the property insured, the risk zone where the building is located, and compliance with the mandatory building standards. For example, an apartment type F3 (three bedroom apartment) with an area of 70 m² in Algiers (the capital), can be insured for up to 1,800 DZD (18 USD). The minimum income in Algeria is 20,000 DZD (200 USD). A significant fraction of the risk is transferred to international reinsurance companies until sufficient financial funds have been accumulated under the insurance scheme.

To enforce the insurance scheme, two types of sanctions are currently applied:

- Owners are required to take insurance and if they fail to do so, they will not be eligible for government compensation in the form of housing credits or reconstruction in the event of damage caused by a natural hazard.
- To sell, purchase or lease any type of housing or property, owners must present their insurance policy documents to real estate registration offices and the tax authorities at the time of making their tax declaration. The law also provides sanctions for non-compliance with this obligation: refusal of compensation and fines equal to the amount of the premium increased by 20 per cent.

The insurance scheme is designed as a multi-hazard insurer. Private and public insurance companies undertake policy distribution and marketing, and conduct loss assessments. Currently, five insurance companies are offering policies for this insurance scheme. However, it should be noted that the uptake rate is low (5.2 per cent for residential property and 7.6 per cent for industrial facilities in 2012), due to insufficient public awareness of the benefits of insurance, the habitual role of the government in compensating for disaster losses, and the difficult economic conditions experienced in recent years.

Sources

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des catastrophes naturelles et à l'indemnisation des victimes et textes d'application.

B. Conseil national des assurances (CNA), Bulletin des assurances No. 26 (Alger, Algérie : CNA, 2014). [<http://www.cna.dz/Documentation/Travaux-du-CNA/Publications-du-CNA/Bulletin-des-assurances-n-26>]. Accessed 22 February 2018.

C. AssurAl, Le portail de l'Assurance en Algérie, L'assurance contre les effets des catastrophes naturelles [<http://www.cna.dz/En-savoir-plus/Assurances-obligatoires/L-assurance-contre-les-effets-des-catastrophes-naturelles>]. Accessed 22 February 2018.

Box 12**Algeria: flood forecasting and early warning system (UPI) for cities along the Mekerra Wadi**

A flood forecasting and early warning system (F-EWS) has been developed and implemented in Sidi Bel Abbas *wilaya* (province), through the EU-funded “Support program for the water resources sector in Algeria” aimed at flood risk prevention. The F-EWS is expected to be replicated in other provinces of Algeria.

The Oued Mekerra basin forms “a major part of the *wilaya* of Sidi Bel Abbas” and was chosen as a pilot area for implementing the methodology and procedures to set up and manage the forecasting and flood risk early warning system.

The UPI main tasks: The UPI (Unité de Prévision des Inondations, or Flood Forecasting Unit) is a scientific unit, not an operational one. Its work is based on real-time monitoring – necessary for flood forecasting – which consists of collecting data several times a day on the water level or flow data at key points along the monitored *wadis* (valleys). These key points were chosen for Wadi Mekerra in those areas where floods have occurred in the past. The prediction of rainstorms is the responsibility of the National Meteorological Organization (ONM). This body is responsible for transmitting Special Meteorological Bulletins (BMS) to the early warning system (UPI) and to the National Hydraulic Resource Agency (ANRH). The National Meteorological Organization regularly distributes these Bulletins. ANRH undertakes the hydrometric observation of *wadis* and is also responsible for the management of hydrometric and rainfall stations. Data transmitted by these stations are received by the UPI and by ANRH. The data transmission is routinely carried out by telephone landline or by using an ordinary GSM chip (every 30 minutes). Rainfall stations in the Oued Mekerra basin have been replaced by automatic units to provide this data (Figure 1). This procedure ensures that rainfall observation takes place in real time in the basin that is being monitored.

Flood forecasting

UPI compiles an empirical prediction based on its observations of the amount of water that has fallen in the catchment areas, as well as water levels in the wadi itself. These observations are mainly made upstream of the basin using the measurement data collected by the network of “automated data collection and flood warning systems.” This system provides sufficient time to analyse the data.

The data is then fed into several complex models that can predict water levels. There is a hydrological model which transforms rainfall into flow. Another model is a hydraulic simulation model which provides a “model of the distribution of flood water.” The triggering of the alarm related to the flood risk is based on a disaster risk plan that was previously established using the hydraulic model.

The UPI is responsible for the dissemination of information. This is carried out for different levels of risk and by hydraulic subdivision. Alerts have to be forwarded to the leaders of the *Dairas* as well as to the local civil protection service.

The flood early warning system serves numerous Algerian cities. A list of the cities with flood risks is provided in Table 14: *Projected threshold flood flows for some cities along the Mekerra Wadi*.

Sources

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- B. Abbas Merabet, Étude de la protection de la ville de Sidi Bel Abbès contre les inondations, Mémoire de magister, spécialité: Hydraulique, Université de Sidi Bel Abbès, 2008.
- C. Direction de l'hydraulique de la Wilaya de Sidi Bel Abbès, 2010, Système de prévision des inondations (U.P.I.).

Table 14
Projected threshold flood flows for some cities along the Mekerra Wadi

City	Threshold Orange m ³ /s	Threshold Red m ³ /s	Description
Redjem Demouche	200		Water to the limit of the bridge (40 cm below)
Ras El Ma	150	175	Risk of flooding city and harbour
El Hacaiba	350		Water to the limit of the bridge (60 cm below)
Moulay Slissen	150	175	Tadjmout: Risk of flooding city and bridge
Moulay Slissen	550	575	Mekerra: Risk of flooding bridge
Sidi Ali Benyoub	750	775	Risk of flooding bridge
Mellinet	675	725	Risk of flooding bridge
Tabia	1500		Water to the limit of the bridge (30 cm below)
Boukhanefis	100	150	Bridges
Sidi Lahcene	100	150	Bridges and impact in the city

Box 13
Algeria: development of response and recovery capacities at the wilayas (provinces)

Algeria has built a solid disaster response system across the country. The Civil Protection General Directorate is the primary actor responsible for coordinating implementation of comprehensive preparedness, response and recovery measures at the national and local levels. Every six months *wilayas* participate in simulation exercises as part of the national preparedness. Each *wilaya* is responsible for drafting a disaster management plan that is tested and updated through simulations according to the 04/20 Law on Prevention and Disaster Management.

Decisions about the recovery process are taken by the central government and they are implemented through the line ministries at the *wilayas* and municipalities. The example of the 2003 Boumerdès earthquake illustrates the regular process for the reconstruction and recovery after disasters in Algeria:

Assistance Packages offered to Individuals for Reconstruction: Government allocated a 100 billion Algerian Dinars (1.4 billion USD) for the reconstruction of 22,000 housing

units, 160 schools and 6 sanitary establishments and for the repair of damaged constructions in Algiers and Boumerdès *wilayas*.

Urban reconstruction measures: Government has decided to incorporate appropriate preventive measures into policies and programmes of urban zones. Thus, technical quality control has been made compulsory for public and private buildings alike since 2004. Also, a new law related to the procedures of elaboration and approbation of the land use, urban planning and construction has been adopted by the government.

Relief Issues:

- Homeless families were sheltered by the government (civil protection, Red Crescent) and international organizations, in tents built in camp sites.
- Each camp site was provided by a police bureau, a civil protection centre, a temporary hospital, a bureau of Algerian Red Crescent, an annex of local administration and a mosque.
- In the first four weeks after the disaster, cooked food was distributed three times a day.
- Camp administrators organized special tents for children to play, do manual work such as crafts, watch TV, and play games under the supervision of psychologists and social workers.
- High school students who had to pass the baccalaureate exam in September were provided with special sites in the affected zone or outside the zone assisted with professors to help them review their courses.
- Some nights, musical evenings were organized in the camps.
- The main problems reported in the camps were hygiene and collective toilets. The families had to stand in a queue to use the toilets.
- The government started building individual prefabricated houses “chalets” in about 150 sites where the victims were removed from the camp sites to these new sites.
- These “chalets” are equipped with water, electrical power, sewage and water systems and individual toilets.
- The president has promised that all the victims will be sheltered before the winter season.

Psychological and medical rehabilitation:

- All the sites of temporary sheltering (more than 150 campsites) were provided consultations, examinations, and a care programme, as well as the programmes of public health (vaccination, prevention against water-borne diseases, epidemiologic monitoring).
- The Ministry of Health, in order to avoid the occurrence of epidemics, employed 27 teams of epidemiologists and technicians for cleaning whose mission was the strict control of drinking water and hygiene in the camps.

Source: [Rapport officiel national sur la gestion de la catastrophe du séisme de Boumerdès du 21 mai 2003 \(Algérie, 2003\)](#).

Libya

- Libya is divided into 22 districts.
- Libya has 97 cities, towns and municipalities.

After NATO-backed rebels toppled the former ruler Gaddafi, Libya plunged into chaotic unrest. Diverse warring factions are fighting to seize the power in the country. The conflict is largely between two groups: the Tobruk government of the General National Congress (GNC) and the Islamic government of the General National Congress (GNC) also called the National Salvation Government. The situation is complicated with the presence of so-called ISIS in Libya that has established its largest power centre outside of the caliphate's borders, with one city under its brutal brand of Islamic law and thousands of fighters across the country.⁶²

In 2016, the UN-backed Government of National Accord (GNA) was formed. The rival Tripoli-based National Salvation government rejected the GNA transition. It is assumed that the GNA is eventually empowered to restore security and launch a comprehensive program to rebuild the economic and social infrastructures. However, it is uncertain whether the new unity government will be able to bring together the warring factions and re-establish stability in Libya.⁶³

In this context, the primary concern is to stabilize the situation in the country and provide safety and security to the population. UNDP and the Libyan Government of National Accord initiated the Stabilization Facility to rehabilitate critical infrastructure destroyed by conflict and restore basic service provision.

The facility can finance rehabilitation and repairs of key public infrastructure including clinics, hospitals, police stations, water and waste water treatment facilities, power grids and stations, etc. The facility can also support businesses that were destroyed by the conflict or degraded, and are vital to communities as a whole, such as bakeries in places where they were destroyed and people are forced to bring bread from elsewhere.⁶⁴

It remains important that humanitarian and development partners take due account of existing and emerging disaster and climate risks while designing and implementing necessary interventions.

FOOTNOTES

⁶² <http://europe.newsweek.com/watch-rise-isis-libya-445291?rm=eu>.

⁶³ <http://www.cfr.org/global/global-conflict-tracker/p32137#!/conflict/civil-war-in-libya>.

⁶⁴ <http://www.ly.undp.org/content/libya/en/home/presscenter/articles/2016/04/13/undp-libya-launches-the-stabilization-facility-plan-for-libya-during-the-senior-officials-meeting-in-tunis/>.

Mauritania

- The national system of regional governors and prefects is modelled on the French system of local administration. Mauritania is divided into 15 regions, which are further divided into 44 departments. It has 43 cities, towns and municipalities.
- The Ministry of Interior and Decentralization⁶⁵ oversees the system of local administration.
- The Directorate of Civil Protection operates under the jurisdiction of the Ministry of Interior and Decentralization.
- Mauritania is one of the poorest countries in the world: it ranks 141 out of 185 countries based on GDP per capita (WB).⁶⁶

Mauritania is taking its first steps towards building resilience in the country. The disaster and climate risk management is inevitably seen through the prism of the food and nutrition security. Thus, in its Poverty Reduction Strategy Paper, “the integration of risk and natural disaster management into sectoral policies” is highlighted with regard to climate change monitoring.⁶⁷

The Civil Protection system needs support in capacity development in order to further the resilience-building agenda. Thus, with the support of the Prince’s Government of Monaco the first three fire-fighting stations have been set up in the capital Nouakchott.⁶⁸ Also, a radio communications network was established to support local firemen in dealing with emergency situations. Some ambulances and protective clothing were also provided.

In January 2015, with the support of NATO and the Canadian Department of Foreign Affairs, the first Mauritanian Centre for crisis monitoring, alerts and management was set up.⁶⁹ One of the objectives of this particular partnership is to give more power to the regional directorates for civil protection, each with an operational coordination centre (Centre de Coordination Opérationnelle – CCO). As part of West Africa, Mauritania is engaged in and benefiting from the Regional Committee for Disaster Management in West Africa (GECEAO) since 2009.⁷⁰

The administrative system of Mauritania is highly centralized across all sectors including civil protection. The capacities of the local authorities for resilience-building are extremely limited in the capital city and largely non-existent outside it. The primary focus is very much on response.

None of the Mauritanian cities is engaged in the UNISDR MCR Campaign.

FOOTNOTES

⁶⁵ <http://www.interieur.gov.mr>.

⁶⁶ http://data.worldbank.org/indicator/NY.GDP.PCAP.CD?order=wbapi_data_value_2013+wbapi_data_value&sort=asc.

⁶⁷ IMF 2013, p. 71.

⁶⁸ <http://en.gouv.mc/Policy-Practice/Monaco-Worldwide/Public-Aid-for-Development-and-International-Cooperation/News/Civil-Security-in-Mauritania-A-Field-Mission-for-Two-Monegasque-Firemen>.

⁶⁹ http://www.nato.int/cps/en/natohq/news_117409.htm.

⁷⁰ http://abdoukarimsow.org/geceao_VF/.

Morocco

- Directorate of Surveillance and Prevention of Risk falls under the jurisdiction of the Department of Environment of the Ministry of Energy, Water, Mines and Environment.
- Morocco is divided into multiple levels of local government, all directly under the Ministry of the Interior: 16 regions, 38 provinces and 1,544 municipalities.⁷¹

Morocco has taken steps to establish a strong foundation for risk-informed resilience-building, which is further based on two priority risks and their implications: seismic risk and climate risk with the focus on the nexus of water, food and agriculture. Understandably, the resilience-building priorities and tasks are largely divided between various ministries, including the Ministry of Interior, the Ministry of Water and Environment, the Ministry of Health, the Ministry of Energy and Mines, and the Ministry of Education.

Thus, the Department of Water has developed the Plan National contre les Inondations (PNI, or the National Plan against Floods/NPF). The plan identified 390 priority areas for which prevention measures are to be realized before 2020. Under this plan, Morocco has developed a forecasting and flood warning system. The country intends to develop a geographic information system (GIS) with data on natural and technological hazards across the country, called GIS risk assessment.

Risks and vulnerabilities in the agricultural sector is a priority for the country too. The National Irrigation Water Saving Programme (or Programme National d'Economie d'Eau en Irrigation/PNEEI), formulated in 2009, is considered the primary tool in implementing the Plan Maroc Vert (PMV)⁷² as a response to the challenges of climate change and food security.

With the support of international partners (WB, GFDD and SDC), Morocco has made a shift from managing risk in "silos" to integrated risk management.⁷³ In April 2016, USD 200 million in funding was approved by the WB for the Integrated Disaster Risk Management and Resilience Program in Morocco for institutional reforms with disaster risk-reduction investments and the introduction of a catastrophe risk insurance program.⁷⁴

Morocco has engaged in a series of reforms on decentralization since 1999. The primary focus is to ensure that the mission of local authorities is less about maintaining public order, but rather encouraging development and local initiatives and ensuring human rights (among others through the Local Initiatives for Human Development). There are 1,544 municipalities in Morocco, each of which elects municipal councils and mayors by general

FOOTNOTES

⁷¹ Arab Political Systems: Baseline Information and Reforms – Morocco, Carnegie Endowment: www.carnegieendowment.org/arabpoliticalsystems.

⁷² <http://www.finances.gov.ma/fr/Pages/Stratégies/Stratégie-de-développement-agricole--le-Plan-Maroc-Vert.aspx?m=Investisseur&m2=Investissement>.

⁷³ World Bank 2013.

⁷⁴ <http://www.worldbank.org/projects/P144539?lang=en>.

election. As part of its decentralization policy, Morocco's government has sought in recent years to increase the councils' autonomy. But the councils remain weak because the central government continues to control their finances and resources.

Two Moroccan cities are engaged in the UNISDR MCR Campaign: Agadir and Tata.

Box 14

Morocco: eradicating urban slums to reduce vulnerability

Like most developing countries, the government of Morocco is faced with the day-to-day demand on housing and better conditions of living. There are about 1,000 slum districts in Morocco. In total, about 212,000 families live in urban slums across 70 cities of Morocco, and about 80,000 families live in informal agglomerations.

In the year 2000, the government launched a strategy to reduce the vulnerability of informal construction, slums and ancient housing sites.

In order to implement the strategy, under the UN-Habitat program "Cities without slums" (2004-2005) nearly USD 450 million were invested and an allocation of about USD 140 million was dedicated to social housing from the State Solidarity Fund of Housing. In parallel, another programme was launched for urban rehabilitation of illegal districts, with funding from the State Housing Solidarity Fund (USD 20 million) and the government (USD 25 million).

There is also fair attention paid to creating incentives for rural development. In order to reduce the rural exodus to large cities, the government strategy is to encourage development in rural areas and remote villages.

Another important consideration is urban planning for suburban areas located in the close vicinity of large cities. The government has initiated a new programme to set up viable new urban agglomerations around the large cities. This programme was conducted in partnership with local authorities and the private sector. Public land grants were established in order to promote social housing units and for the prevention of illicit human establishments. To this end, a micro-zoning planning of Al Hoceima (Morocco) was initiated as a pilot project for countrywide replication.

The legal framework was revised and improvements were made to the main urban planning regulations to integrate the risk of natural hazards. Also, technical controls for constructions in hazard-prone zones were adopted which allow the imposition of fines and in certain case, demolition of unsanctioned constructions in hazard-prone zones.

In 2004, a financial incentive mechanism was introduced: all the taxes received from the sales of cement in the entire Kingdom during one year were used to establish two guaranty funds. Thus, USD 100 million were allocated to support low-income households and families with irregular income, and two major public banks were reorganized to support the social housing program in the Kingdom.

Source: A. Guedira and M. El Malti. "Evaluating and reducing the vulnerability of slums, traditional housing, and migrant populations – Experience from Morocco", Kingdom of Morocco/Ministry of Housing and Urban Planning. World Conference on Disaster Reduction, 18-22 January 2005, Kobe, Hyogo, Japan.

Tunisia

- Tunisia is divided into 24 governorates, 264 districts (municipalities).
- Tunisia has 264 cities, towns and municipalities.
- The National Office of Civil Protection (NOCP) operates under the jurisdiction of the Ministry of Interior.⁷⁵

The roots of Tunisian civil protection can be traced back to November 1894, when the Aid Association for Volunteer Firemen was founded in Tunis. Since then, it has grown, and in 1993 it became the National Office of Civil Protection (NOCP). It is established within the Ministry of Interior with the goal to organize civil protection on a national and regional scale. This involves responding to all types of accidents, calamities or disasters that threaten people, property or the environment. The NOCP also engages in prevention activities, including contributing to both the national plan and regional plans. In 2015, the NOCP established the National School of Civil Protection in Jebel Jelloud, Tunis in 2015. It is also involved in raising citizen awareness on prevention, as well as teaching people about civil protection and providing instruction in first aid.⁷⁶ Various international partners (EU, France, etc.) effectively support the activities of the NOCP and invest in its capacity development.

In addition, Tunisia established its DesInventar database on disaster loss and damage in 2012-2013. Tunisia is a part of the World Initiative on Safer Schools launched in Istanbul in 2014.⁷⁷ In 2012 Tunisia announced that it will establish a National DRR Platform, however during the third UN World Conference on DRR, no National Platform was reported.

Local-level resilience-building in Tunisia is highly restricted by a number of factors, including limited financial resources and limited human capacities.

Municipal institutions in Tunisia are relatively long-standing. The first modern municipality dates back to 1858. Article 7 of Tunisia's Constitution recognizes the legal status of municipalities allowing them to be seen as legally independent from the State, with their own capital, land and budget, financed by specific revenue. However, municipalities have low level of autonomous financial resources and limited control over municipal budget.⁷⁸ Moreover, municipalities appear detached from many services. Thus, services such as education, water distribution, drainage, transport, etc. are outsourced to other public organizations leaving the responsibilities of municipalities largely residual and inconsistent.⁷⁹ Also, municipalities have significant lack in human resources and technical capacities to address resilience issues at the local level. This situation limits the power of the municipalities to exercise the responsibilities for sustainable urban planning and urban resilience.

FOOTNOTES

⁷⁵ <http://www.ministeres.tn>.

⁷⁶ <http://www.icdo.org/en/media/press-media/civil-protection-republic-tunisia/>.

⁷⁷ <https://www.unisdr.org/archive/42152>.

⁷⁸ UCLG County Profile: Tunisian Republic.

⁷⁹ *Ibid.*

Despite the challenges, many Tunisian municipalities are putting forth efforts to champion urban resilience. Thus, in 2013 the municipality of Ain Draham, with active support of UNDP, became the first city in Tunisia to join the Making Cities Resilient campaign. It was followed by 12 other municipalities.

4.2.3c The Mashreq

The Mashreq is the most dynamic subregion when it comes to the legal and institutional framework for disaster risk management, the progress made on DRR, and the level of capacities of state and non-state actors.

All six countries of the subregion, including Syria before the 2011 uprising, have undertaken initiatives to improve national disaster risk management systems through institutional reform, strategy development, risk assessment, urban disaster resilience, disaster preparedness, disaster risk education and emergency response. Iraq has set up a national disaster management committee and is currently expanding the work to other levels and sectors. Of urgent concern and focus is the risk from the Mosul dam. Jordan has achieved significant progress on urban disaster resilience in numerous cities, but especially in Aqaba and Petra. Amman is a grant recipient of the 100 Resilient Cities programme of the Rockefeller Foundation. Egypt has achieved progress on national institutional and strategy development, governorate-level emergency preparedness, disaster response drills and city-level risk management. Lebanon is in the lead when it comes to promoting urban resilience. It has invested significant efforts in reform of the national system and improvement of emergency preparedness through emergency centres and drills. Palestine has initiated work on national strategy development, national risk assessment, and urban resilience. All the Mashreq countries have developed disaster damage and loss databases, namely the DesInventar.

This subregion is also, however, the most unstable of the MENA region. Syria is undergoing a full scale war with deep engagement of regional and international powers. Egypt and Iraq are trying to balance development with ongoing armed conflict. Palestine is fragmented and lacks full freedom for actions on resilience-building. Lebanon has a fragile peace and a weak political system. Jordan is the only “island of stability” in the subregion.

In terms of urban resilience, the municipal authorities in Jordan, Lebanon and Palestine enjoy relatively higher autonomy - in Palestine and Lebanon due to the weak state and in Jordan for economic reasons. In Iraq, certain governorates and regions also enjoy high autonomy vis-à-vis the national government. In Egypt, trends of centralization of authority have become stronger since the arrival of the current government. Another equally important challenge that the municipalities in the Mashreq face is the lack of financial resources, with few exceptions, including Aqaba, Petra and Beirut.

Egypt

- Law 43/1979 defines the legal basis for the local Egyptian administrative system that is divided into five territorial units: 27 governorates, 25 cities and 217 towns and urban subdivisions. The Ministry of Local Development⁸⁰ oversees the local administration system.
- Egypt is a unitary country with one of the longest traditions of centralization.

Disaster risk management has made some progress at the national level in Egypt. Thus, the National Strategy for Crisis/Disaster Management and Disaster Risk Reduction and the National Strategy for Adaptation to Climate Change were adopted in 2010 and 2011, respectively. Other laws and decrees that provide the legal framework for DRM/DRR in Egypt include Law No. 179/1956 on civil defence, Presidential Decree No. 300 on establishing the Search and Rescue Centre at the Ministry of Defence (the Centre of "Search and Rescue" was established at the Ministry of Defence in Cairo), and the Prime Minister's Decree No. 1537/2009 of constituting the National Committee for Crisis/ Disaster Management and Disaster Risk Reduction.

The same decree established the institutional framework of crisis/disaster management and DRR in Egypt that comprises six main elements:⁸¹ the Higher Ministerial Committee for Crisis/Disaster Management and DRR; the National Committee for Crisis/Disaster Management and DRR; the Advisory Committee for Crisis/Disaster Management and DRR; the Crisis/Disaster Management and DRR Sector at the Information and Decision Support Center (IDSC); and Crisis/Disaster Management Departments at different ministries, governorates, bodies, civil society organizations and in the private sector.

Also, in partnership with UNICEF, IDSC developed the Egypt National Communication Strategy for Raising Societal Awareness in the Area of Risk Reduction and Crisis Management in 2010.⁸²

Even though each governorate has a designated "crisis/disaster management department," the central authorities maintain a high level of control, particularly with regard to financial issues. For instance, the free transfer of movable and immovable assets or rental fees carried out by the governorate popular council for amounts of over 50,000 Egyptian pounds (about 5,000 Euros) must be approved by the Council of Ministers.⁸³

Minor progress on community participation and delegation to the local level has been noticed so far. Egypt is considered one of the most centralized countries in the world, ranking 114 out of 158 countries on decentralization and the closeness of government to the people, a so-called "decentralization index,"⁸⁴ and this is despite years of the USAID-funded Egyptian Decentralization Initiative 2008-2012.

FOOTNOTES

⁸⁰ <http://www.mold.gov.eg/arabic/default.htm>.

⁸¹ The National Strategy for Crisis and Disaster Risk Reduction 2010. [http://www.preventionweb.net/files/13353_nationlstrategyforcrisisdisasterman.pdf]. Accessed 26 February 2018.

⁸² <http://www.preventionweb.net/english/professional/policies/v.php?id=21623>.

⁸³ United Cities and Local Government: Country Profile: Egypt.

⁸⁴ <http://www.economics-ejournal.org/economics/journalarticles/2014-3>.

Four cities in Egypt are committed to the UNISDR MCR campaign: Alexandria, Cairo, Ismailia and Sharm el-Sheikh.

Box 15
Egypt: linking national and local levels with legal and institutional frameworks

The institutional arrangements for resilience-building in Egypt are confined to the National Committee for Crisis/Disaster Management and Disaster Risk Reduction (Prime Minister's decree No. 1537/2009), while specific thematic tasks are allocated to all ministries. The NCCMDRR was established in April 2006. It serves as the National Platform. The Committee also includes the IDSC and a scientific advisory committee comprising a panel of experts and professional scientists.

The institutional framework of crisis/disaster management and DRR in Egypt has six main elements. Crisis management entities were established in all 28 governorates (the local level), as well as at various ministries, agencies and institutions.

In 2010, Egypt adopted the National Strategy for Crisis/Disaster Management and Disaster Risk Reduction.* The strategy allocates tasks and responsibilities to national authorities as well as to governorates and "concerned authorities" (which leaves room for the municipal authorities). However, the lack of financial and human capacities means that these tasks go largely unattended. Importantly, the National Strategy emphasizes the significance of raising awareness on disaster risk reduction and disaster management issues. This is further emphasized in order to promote a Safety First culture in the National Strategy for Adaptation to Climate Change and Disaster Risk Reduction.

The system of crisis and disaster management and disaster risk reduction in Egypt has been designed around the 'incident' and not the risk. Although many efforts were invested to shift the focus of the system from response to prevention and preparedness issues, and risk considerations have been integrated in the legal and institutional frameworks, the application of disaster risk governance interventions is still lagging.

A further concern is the capacity of local authorities to reduce disaster risks. For municipalities this usually takes the form of responsibilities for controlling construction through the development of land-use regulations, environmental protection measures and building codes. Since 1956, Egypt has continually developed and updated its building codes. In 2001, the Egyptian Code for the Calculation of Loads and Forces on Structural and Masonry Works was completely revised and now follows the Eurocode 8 standards. The main challenge, however, remains the enforcement of these building codes in cities, by the municipal authorities as well as by the organizations that are called on to provide quality control and supervision of construction, such as the Housing and Building National Research Centre of Egypt.

* http://www.preventionweb.net/files/13353_nationlstrategyforcrisisdisasterman.pdf

Sources

A National Strategy for Crisis/Disaster Management and Disaster Risk Reduction, 2010, Egypt, IDSC;
 B HFA Progress Report, 2014, Egypt, IDSC

Iraq

- Iraq has a federal parliamentary system of government. Iraq is composed of 19 governorates, which are subdivided into 111 districts. Iraq has 46 cities.
- The Ministry of Municipality and Public Works supervises the local administration in Iraq.
- The Ministry of Interior is responsible for dealing with large scale emergency situations.
- The National Committee for Disaster Risk Reduction is under the chairmanship of the Minister for Science and Technology. It has responsibility for policy, coordination, capacity development and information management with regards to DRR.

In 2007, the Government of Iraq established a National Disaster Risk Reduction (DRR) Committee, chaired by the Minister of Science and Technology (MoST) with membership from ten ministries and departments. The committee has drafted a new disaster risk management policy and proposed the establishment of a National Disaster Risk Management Centre (NDRMC). However, modern Iraq has inherited weak policies and institutions to deal with disaster risks.⁸⁵ It has a predominantly response-focused system.

The Province Law enacted in 2008 granted significant autonomy to governorates to undertake specific measures in case of any disaster. Article 31 prescribes the establishment of Emergency Response Cell in each Governorate. Currently nine out of 19 governorates have operational Emergency Response Cells. In case local capacities are not sufficient to respond to a disaster, the Governor may request the support of the federal Ministry of Interior. However, local capacities and financial resources are extremely limited to address existing and emerging disaster risks at the municipal level.

No Iraqi city is engaged in the UNISDR MCR campaign.

Box 16 Iraq: legislation to support disaster resilience

The administrative framework for governorates, districts and local government is organised according to the Province Law 2008. The law empowers governors of respective provinces to undertake specific measures in case of disaster, including the establishment of Governorate Emergency Cells (GECs) to address humanitarian emergencies in accordance with a 'Master Plan' for response functions.

There are also several specific laws that were enacted before 2003 and remain in force today. These include the Emergency Use Law 1961; the Civil Defence Law 1978 and the Social Care Law 1980. The Emergency Use Law 1961 was enacted to respond to disasters, calamities and accidents. The Civil Defence Law, introduced in 1978, established the Civil Defence in Iraq. Other laws that have a bearing on DRR include the Cities Land Use Law 1965, the Public Health Law 1981, Rangelands and their Protection Law 1965, Maintenance of Networks of Irrigation and Drainage Law 1995, Regulation of Landfills Law 1986 (updated in 2009 as Law No 29), Protection from Ionic Radiation Law 1980, and the Preservation of Water Resources Law 2001.

Source: UNDP 2014b.

FOOTNOTES

⁸⁵ http://www.iq.undp.org/content/iraq/en/home/operations/projects/environment_and_energy/DRR.html.

Jordan

- Jordan is divided into Northern, Central, and Southern regions each of which is further subdivided into governorates (12 in total).
- Jordan has 40 cities and towns.

Jordan has one of the longest-standing and advanced civil protection systems in the region having established its first Disaster Risk Reduction (DRR) Program in 1991. The primary focus remains largely on civil defence from the response, reconstruction and recovery perspective. However, there is a growing recognition of the importance of DRR, especially at the city levels.

The General Directorate of Civil Defence (GDCCD) was established in 1959, under the umbrella of the Ministry of the Interior. It provides daily operational duties in the form of ambulance services, firefighting and rescue operations. Over the last few years, the engagement of Jordan in the fight against terrorism has placed additional responsibilities on the civil defence services.

The GDCCD has around 172 centres across the kingdom's governorates.⁸⁶ On 23 February 1991, a Disaster Department was established within the GDCCD to serve as focal point for various cooperative programmes related to disaster risk reduction with other state and non-state organizations.

The Higher Council of Civil Defence (HCCD)⁸⁷ in Jordan is authorized by law to undertake appropriate procedures to deal with disasters. The Minister of the Interior is its President, and the Director General of Civil Defence is Vice President, with membership drawn from deputies of all ministries and institutions.

In 2006, Jordan embarked on establishing the National Centre for Security and Crisis Management (NCSCM).⁸⁸ The vision of the centre is to build national resilience through coherent cross-sector emergency preparedness capabilities in all sectors of society, both public and private, and at the national level (strategic, operational and tactical).⁸⁹ Acknowledging the importance of climate risk considerations, the NCSCM hosts the permanent office for the National Meteorology Department.

There is a network of voluntary civil defence teams in the country, as stipulated by the main law governing disaster management system, the Civil Defence Law No. (18) 1999.⁹⁰ Also, the Prince Hussein Bin Abdullah II Academy for Civil Protection⁹¹ is considered one of the best civil defence academies in the Middle East and North Africa.

FOOTNOTES

⁸⁶ Civil Protection in Jordan: Building the Future. [<http://www.icdo.org/en/media/press-media/civil-protection-jordan-building-future/>]. Accessed 26 February 2018.

⁸⁷ <http://www.cdd.gov.jo>.

⁸⁸ <http://ncscm.jo>.

⁸⁹ <http://www.preventionweb.net/english/professional/policies/v.php?id=7351>.

⁹⁰ UNDP and General Directorate of Civil Defence, *Analytical Study on Legislations effective in the Hashemite Kingdom of Jordan related to Disaster and Disaster Management*. [http://www.preventionweb.net/files/31204_legislativerevision28englishedition.pdf]. Accessed 26 February 2018.

⁹¹ <http://www.pha.edu.jo/Default.aspx?tabid=486&language=en-US>.

There is growing attention paid to resilience-building at the municipal level in Jordan. The most prominent example is Aqaba, which hosted the first Arab Regional Conference on Disaster Risk Reduction in 2013 with the support of UNDP. It started working on disaster risk reduction in 2009. Since then, it has become an example for local-level risk reduction and was recognized as a UNISDR MCR role model in 2013. Following the example of Aqaba, the tourist city of Petra has also replicated disaster risk management endeavours, with support from UNDP.

Also following the path of Aqaba, five other municipalities became engaged in the UNISDR MCR campaign, including Salt, Jerash, Ma'an, Zarqa and Irbid. Each of these cities has set up a disaster risk management unit to oversee activities in close cooperation with the Higher Council of Civil Defence.

Box 17
Jordan:
protecting critical
infrastructure –
getting Amman
airport ready for
disasters (GARD)

The Getting Airports Ready for Disaster (GARD) program was implemented at Amman Queen Alia Airport from September 2014 with the aim of improving the efficiency of the airport at times of abnormal stress, for example during a disaster. In partnership with Deutsche Post DHL Group (DHL), an in-depth analysis of the airport's areas of weakness was conducted in order to ascertain its capacity for response during times of high activity. The Airport Assessment Reports and Action Plan were prepared and handed over to the GARD Jordan Owner (the Civil Aviation Regulatory Commission) and UNDP. The airport was found to be in a good position to respond, with a variety of organisational and logistical improvements needed to further enhance its response capability. Since then, numerous simulations on disaster preparedness have been conducted at the airport involving all agencies concerned with the management of the airport.

Source: [Progress Report on GARD Programme, \(Jordan: UNDP, 2015\)](#).

Box 18
Jordan:
enhancing
resilience in
the touristic
city of Petra

In 2013, UNDP, in partnership with the Petra Development and Tourism Regional Authority (PDTRA), commissioned an Integrated Risk Assessment study for Petra. The study looked at the three main risk factors in Petra-Wadi Musa region, namely, earthquakes, landslides and flash floods. The study analysed those risks in an integrated manner and produced numerous maps that quantified the potential loss in property and lives with different disaster scenarios, and in case of combined disasters as well. The integrated Risk Assessment was the first of its kind in the country, and is expected to inform the decision-making in PDTRA.

Based on the outcomes of the risk assessment, competency training was carried out for the DRM District Committee and DRM Directorate in PDTRA.

The PDTRA City Profile was also developed. While the integrated risk assessment of the Petra region addressed the physical aspects of vulnerability, the PDTRA City Profile aimed at defining the current situation of PDTR DRM, and produced a comprehensive summary of the essential data and statistics of the city. It also provided analysis of the

disaster management structures of the city within the national institutional framework, with a special focus on land use planning and management practices. The study also defined the specific areas pertaining to how the city manages public safety issues resulting from natural or human-caused hazards. Another important outcome of this was to investigate for the Disaster Risk Management Vision and to understand what city decision-makers and/or other sectors want to put into place with respect to DRM.

To further insure proper institutionalization of disaster risk consideration in local planning, the PDTRA management has set up a DRR Unit and earmarked annual funding for DRR.

Sources

A UNDP Jordan, 2015, Amman

B Hussain Al-Hasnat, DRR Focal Point, Petra Development and Tourism Authority (PDTRA)

Box 19

**Jordan: making
Aqaba the Arab
role model city
for disaster
resilience**

The city of Aqaba, with technical assistance from UNDP since 2009, has implemented a variety of initiatives with regards to earthquake risk reduction, including risk assessment, public awareness, urban search and rescue capacity, community volunteer teams, training of officials, establishment of a disaster risk reduction unit and a multi-stakeholder coordination committee. Based upon the risk assessment report, the city government also relocated one flash-flood-prone community to a safer area. Aqaba is using the results of the seismic risk assessment for safer land use planning through the Aqaba Development Company. Given the strong leadership that Aqaba has shown in setting up DRR systems, in 2013 it was declared the Arab Role Model City on DRR.

One of the initiatives that the Aqaba Special Economic Zone Authority (ASEZA) has pioneered with support of UNDP is the Aqaba Neighbourhood Disaster Volunteers (ANDV). The reasoning behind this initiative is very simple – DRR is more effective when communities are engaged in the process. Neighbourhood volunteer teams were selected and trained, and they have been provided with the necessary equipment to facilitate rescue and aid missions during and/or after a disaster.

Source: UNDP Jordan, 2015, Amman

Lebanon

- Lebanon is divided into 8 governorates that are further divided into 26 districts, and further subdivided into 51 municipal unions and 1,108 municipalities.⁹²
- The Ministry of Interior and Municipality⁹³ oversees the local administration system.

Lebanon is the only country in the region where 57 cities committed to the UNISDR MCR campaign. This highlights the importance of the DRM agenda at the city level. Lebanon is making progress at both the national and municipal level in addressing the DRR agenda. In 2009, UNDP and the Government of Lebanon initiated the *Strengthening Disaster Risk Management Capacities in Lebanon* project. Among the main achievements⁹⁴ of the project was the establishment of a fully operational Disaster Risk Reduction Management Unit at the Office of the Prime Minister, and the development of the National Response Plan and the Draft Disaster Law. Building city and community resilience is a key priority in Lebanon.⁹⁵ The project further supported local level DRR efforts to develop city response plans for the districts of Byblos and Metn, and the municipalities of Byblos and Beirut.

Donors are trying to actively support DRM efforts in Lebanon. In 2014, the JTI Foundation began supporting the DRM Unit of the Government of Lebanon with (a) the development of disaster preparedness plans for the key ministries and agencies and (b) strengthening the resilience of five pilot municipalities against disasters.⁹⁶ In 2011, UNDP Lebanon, SDC and UNISDR ROAS developed the *Lebanon disaster guide* to help general public prepare for disasters, such as earthquakes, tsunamis, landslides, storms, floods and fires.⁹⁷ Another interesting initiative with respect to seismic risks management has been initiated by the National Council for Scientific Research (CNRS, for its initials in French). The aim of this initiative is to develop a risk map for Beirut to develop scenarios and corresponding response plans, as well as to increase awareness of the local public. The new project is implemented in partnership with the municipality of Beirut and the Île-de-France region.

Box 20 Byblos: working with international partners for disaster resilience

Byblos is one of the oldest inhabited cities in the world, largely exposed to natural hazards, such as landslides, storms and earthquakes. Acknowledging the importance of resilience-building, the municipality of Byblos, in close cooperation with the Lebanese Government, embarked upon improving disaster risk reduction in the area.

The municipality of Byblos was among the first municipalities to engage in the “Making Cities Resilient Campaign” in 2010. Since the campaign was launched, the UNDP DRM

FOOTNOTES

⁹² The Lebanese Center for Policy Studies, *About Administrative Decentralisation in Lebanon*, 2015. [<http://www.lcps-lebanon.org/publication.php?id=279&category=500&title=8>]. Accessed 26 February 2018.

⁹³ <http://www.moim.gov.lb>.

⁹⁴ UNDP 2014a.

⁹⁵ The Lebanese Center for Policy Studies, *op. cit.*

⁹⁶ <http://jtifoundation.org/projects/strenghtening-governmental-disaster-risk-management-capaciti/>.

⁹⁷ <https://www.unisdr.org/we/inform/publications/27111>.

Unit has been supporting the local authorities in adopting the principles of the campaign, conducting Local Governance Self-Assessment Tool (LGSAT), drawing up action plans, establishing partnerships and implementing the action plan. With the support of UNDP, the municipal authorities drafted a City Risk Assessment Report in 2013 and an Action Plan for 2015. Through funding obtained from 100 Resilient Cities and direct technical assistance provided by UNDP, the municipality of Byblos completed its first ever Byblos Resilience Strategy Report in 2016. The strategy sets out the resilience vision and goals for the city, the challenges and strategic principles for resilience-building, as well as the steps to be taken towards achieving this vision.

Effective response and resilient recovery are among the priorities included in the Byblos Resilience Strategy. A decade's worth of efforts aimed at preparing and responding more effectively to disasters were highlighted when the seasonal storm Zina struck Lebanon in January 2015. Zina brought heavy snow and rain, as well as high winds and severe cold. In the days after the storm, the Byblos municipality mobilized a team to assess the damage to Byblos-sur-Mer, and evaluate preparedness in the event that another storm should strike. The assessment was carried out partly to determine reconstruction and recovery needs, as well as to underscore the importance of greater preparedness for similar risks. Following Zina, the municipality also deployed a crisis disaster unit for the first time to support the local population. The unit forms part of the Response Plan of the Caza (district) of Byblos, in line with the Lebanese National Response Plan for Disasters. It has been developed through the partnership between the municipality and UNDP.

Karine Zoghby and Nathalie Zaarour
Source: www.medicities.org

However, the capacities to address DRR issues remain largely limited: the system remains predominantly response-oriented and lacks adequate financial means and technical capacities to build resilience at the national and local levels.

Article 1 of Legislative Decree No. 118 of 30 June 1977 states that the municipality is a local government. It enjoys financial autonomy and power of self-management.⁹⁸ The law stipulates that any work having a public character or utility within the area of the municipality falls under the jurisdiction of the Municipal Council. However, municipalities remain constrained administratively and fiscally: most of the municipalities, of which 70 per cent are small, do not have the administrative capacity to provide many of the designated services.

Almost 400 municipalities do not have one single employee and another 400 have very weak municipal administration.⁹⁹

FOOTNOTES

⁹⁸ Centre de ressources sur le développement local au Liban. [<http://www.localiban.org/rubrique1023.html>].

⁹⁹ The Lebanese Center for Policy Studies, *Decentralization in Lebanon*, March 2012. [<http://www.lcps-lebanon.org/featuredArticle.php?id=6>]. Accessed 20 November 2016.

Box 21
Saida:
integrating
resilience into
city development
strategy

The municipality of Saida (or Sidon) was among the first to join the MCR campaign in 2010 and become a signatory to the 2013 Aqaba Declaration. The municipality was actively engaged in a vulnerability assessment in preparation for national simulation exercises that were organized in Saida in 2015. It also took part in an international city-to-city exchange programme with Dutch cities in 2015. In 2013 the municipality developed the Saida Urban Sustainable Development Strategy with the support of Medcities. Furthermore, with technical support from UNDP, the municipality of Saida drafted its City Resilience Action Plan for 2015.

The city of Saida is the third city of Lebanon with a population of approximately 225,000, and has one of the oldest and most important harbours in the Levant, as well as a unique ancient inner city which is considered a living urban heritage site. The population of the city, their properties, and the critical infrastructure, including cultural heritage sites inside the old city, are increasingly at risk due to natural hazards. The city faces growing multidimensional urban problems, putting the operation of the municipality in a constant state of crisis management.

Acknowledging the importance of resilience-building, part of which is having an effective disaster response, UNDP has supported the municipality in the procurement of multipurpose small-scale equipment suitable for specific operations in the context of Saida's old city architecture. Old cities require more careful consideration of the special equipment to be used during delicate disaster response and risk mitigation activities. This equipment is to be used in the old city for preparedness against flooding along the river banks (e.g., keeping the Awwali and Sayniq riverbanks clean) and to respond to natural hazards or human-caused disasters (e.g., lifting debris from old houses, etc.).

Karine Zoghby and Nathalie Zaarour
 Source: www.medcities.org

Palestine

- The High Council for Civil Defence is under the jurisdiction of the Ministry of Interior.
- Palestine has 36 cities and towns.

Palestine has a non-member observer state status at the UN. Administratively Palestine is divided into three areas (A, B, and C), whereby area A is controlled by the Palestine National Authority, Area B by the joint Israeli-Palestinian security control, and Area C is fully under the Israeli control. Areas A and B are further subdivided into 165 separate units of land that have no territorial contiguity and restrictions on access. The latter explains high level of autonomy of the local municipal authorities in Palestine.

After the winter storm Alexa in December 2014,¹⁰⁰ the need to prioritize the adoption of a DRM strategy for Palestine become more vivid. The current Civil Defence Law No. 3

FOOTNOTES

¹⁰⁰ <http://www.dailymail.co.uk/news/article-2523259/Historic-snow-fall-turns-Holy-Land-scenes-Christmas-cards.html>.

adopted in 1998 is the main law addressing disasters in Palestine. Based on this law, the High Council of Civil Defence (HCCD) is the highest body for disaster risk management. It was established in 1998. The members of the Council include all ministries and national bodies. The Ministry of Interior serves as chair of the HCCD.¹⁰¹

The National Agency for Disaster Risk Mitigation (NADRM) was founded in 2004 with the mission to form a national framework that gathers all NGOs working in disaster management and emergency support. Due to the restrictions put on the Palestinian Authority's institutions, the role of Palestinian NGOs has become increasingly important in providing assistance and services before, during and after disasters.

At the local level, the Governorate Emergency Committees (GEC) are the primary mechanisms for response; they are composed mainly of security entities. The GECs are chaired by the Governor, who reports in turn to the President, with a delegated decision-making authority.

The system of disaster management is very much response-oriented. It provides some mechanisms for response in case of small-scale disasters and not the large-scale ones. The system lacks technical capacities and adequate resources at local and national levels. The situation is further constrained by the complications related to the fragmented land and the relationship with Israel.

In case of Palestine it is also important to mention the strong role of the international donor community: the UN Working Group on DRR was established in 2012 under the Humanitarian Country Team (HTC). Organizations such as UNDP, UNISDR, UNICEF, WFP, FAO, UNRWA, UNOPS and many others actively support national and local authorities in building disaster and emergency response capacities as well as building long-term resilience in Palestine.

Nine cities in Palestine have already committed to the UNISDR MCR campaign: Al-Khalil/Hebron, Bethlehem Municipality, Gaza, Jabalia Al Nazlah, Ariha Municipality, Nablus, Qalailia Municipality, and Ramallah.

Box 22
Ramallah:
building social
and disaster
resilience under
occupation

The municipality has played an important role in building the capacity of Ramallah city to face the challenges of rapid population increase and the resulting pressure on limited resources and space. Ramallah municipality is a member of the emergency council of Ramallah district and coordinates efforts in the event of threats such as natural hazards (e.g., severe weather conditions) or human-caused disasters (e.g., Israeli incursions).

Ramallah municipality has implemented several projects aimed at enhancing the security and safety of its citizens toward building a smart city. Many of the initiatives focus directly on reducing vulnerability as well as building trust and social capital in Ramallah city. Examples include interventions that are designed to provide access to

FOOTNOTES

¹⁰¹ UNDAC 2014.

Internet and rapid information about the latest news on the weather, security, traffic congestions, available services, etc. The municipality has also built many cultural centres that have contributed to strengthening local identity, social belonging, and a sense of pride and commitment among citizens.

The municipality is further actively engaged in disaster risk reduction efforts. It is currently in the final stages of implementing a large-scale environmental project to create a sanitary landfill to dump huge amounts of solid waste and reduce public exposure to toxic hazards. Acknowledging the importance of resilience-building in Ramallah city, the municipality recently joined the 100 Resilient Cities initiative, which has enabled Ramallah city to hire a Chief Resilience Officer and to develop its Resilience Strategy. As part of this international network, Ramallah is engaged in sharing experiences and expertise with other cities in the network. More than 100 private sector companies offer support to member cities of the network in the development and implementation of city resilience strategies worldwide.

Ramallah municipality is aiming to embed resilience into its managerial and technical capacities, including budget allocation and policy provision for city stakeholders. The resilience team at the municipality has set up its organizational structure such that the political leadership at both municipal and national levels are directly involved in facilitating resilience strategy development and implementation efforts. The municipality's resilience program is dedicated to raising awareness of the importance of the initiative among major city stakeholders. Most importantly, the program involves marginalized groups in strategy formulation and implementation in order to improve their level of social protection, food security and social cohesion, as well as improve leadership and decision-making capacities among key players in the city.

Finally, Ramallah city is well positioned to integrate disaster risk reduction into its Resilience Strategy given that it is also a member of the national DRM committee and keen to capitalize on both initiatives.

Mohammed Shaheen and Husam Tubail

Box 23
Nablus:
a multi-
stakeholder
approach to
resilience-
building

Situated around 60 kilometres north of Jerusalem and with a population of more than 150,000, Nablus has experienced more than 20 major earthquakes in the last 1,000 years, with the last devastating quake occurring in 1927.

In February 2013, the city mayor confirmed his commitment to take the necessary steps to join the Making Cities Resilient campaign. An advisory board comprising various city stakeholders and professionals was formed to steer and advocate the incorporation of DRR into the city's strategies and policies. There are 20 experts on the board, with members from Al-Najah University, as well as private and public sector institutions.

Since 2014 the city has implemented various DRR-oriented activities, including the following:

- In coordination with the Engineers Association – Jerusalem Centre (EAJC), the Nablus Municipality and other relevant institutions, a plan was prepared to set up a mechanism to ensure inspection of building construction by engineers.
- A set of rules and regulations was developed for excavation work in projects, especially where the land has a large incline or weak structure with the potential for landslides or failure of the land structure itself and the surroundings. This included the preparation of a safety plan, excavation plan, securing the surrounding areas, carrying out the necessary tests, as well as insurance policies, etc.
- Studies were conducted to identify areas with the potential for landslides and seismic amplification for the purpose of land use policy. Unfortunately, the Municipality does not yet have detailed maps.
- The Municipality completed the construction of a Wastewater Treatment Plant in 2014 with funding from the German Development Bank KfW. This plant is now operational and handles the waste from the western part of the city, representing around 70 per cent of the total waste flow. The Municipality is currently working on a plan to cover the east of Nablus. This plan is in the early design stage.
- In order to reduce population density and thus the exposure factor, the Municipal Council has approved a plan to expand the city by about 50 per cent. The plans have been submitted to the Ministry of Local Government for approval.

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Syrian Arab Republic

- The Ministry of Local Affairs was responsible for local authorities.
- The Civil Defence Department under the Ministry of Interior was responsible for disaster management.
- Syria *de jure* has 64 cities and towns.

Syria *de jure* is divided into 14 governorates, which are further subdivided into 61 districts. Syria has been in a devastating, multi-sided war for the last seven years, whereby large parts of the country have been under the control of the rebels and ISIS.

The primary focus in the Syrian conflict has been to cease fire and stabilize the situation. There are over 13.5 million people in need¹⁰² of urgent humanitarian aid, provision of which is a life-saving activity given the protracted and severe nature of the conflict. Emergency response has been provided to cultural heritage that are damaged or under a significant risk of being destroyed by ISIS.^{103, 104}

FOOTNOTES

¹⁰² UNOCHA 2015a.

¹⁰³ Prince Claus Fund [<http://www.princeclausfund.org/en/programmes/cultural-emergency-response>].

¹⁰⁴ International Centre for the Study of the Preservation and Restoration of Cultural Property [<https://www.iccrom.org/news/first-aid-cultural-heritage-times-crisis>].

Not being able to end the violence in Syria is a collective failure of the risk governance efforts of national authorities and the international community at all levels that is resulting in human, cultural, environmental and generational disasters of today and tomorrow.

4.2.3d Southern Tier Countries

Resilience-building in the STC can be characterized by a complex interplay of a high degree of vulnerability, considerable exposure to hazards, and a significant of coping capacities. The region remains predominantly rural, agrarian and pastoral with the exception of Djibouti.

Recurrent and prolonged drought and floods on one side, and civil war on the other, define the context of this subregion. As a result, many challenges need to be addressed including: rural-urban immigration in search of employment opportunities; social disruption because of displacement; violent conflicts over the resource base; and health burdens such as malnutrition and epidemics like malaria and cholera. The situation is further complicated due to the lack of institutional capacity, financial resources, technical expertise, and centralized legal and administrative frameworks, and the power of tribes and clans. Resilience-building is primarily exercised in response to an immediate risk of a humanitarian crisis with some effort towards reducing vulnerability. In this context, disaster risk governance remains an endeavour that requires plentiful efforts to build resilient societies.

DRM in all countries of this subregion remains at a rudimentary level. Understandably, the capacities of the local authorities at city level are hardly evident. Scarcity of resources, untrained laborers, weak institutional frameworks and a lack of accountability and participation characterize the urban authorities in the STC subregion. Some efforts, however, have been made in Djibouti, Sudan and Somalia with support from UNDP and the World Bank. Primary priorities for the countries are house construction, urban improvements, provision of basic services, resettlement of returnees and refugees, economic recovery and job creation, neighbourhood protection, and grassroots reconciliation. Water resourcesmanagement is the topmost priority for the subregion, remaining a “strategic currency” for all countries in the STC. Effective water management would make critical contributions to reducing risks in the region.

While the pressure to address the immediate needs of the population is high, the changing climate and growing urbanization are posing new risks, calling for joint efforts on the part of the international community to address them.

Comoros

- Comoros is the third-smallest African state with a total territory of 2,034 km² and total population of 798,000. It has the worst income inequality and is ranked in the lowest quantile of the Human Development Index.
- The country consists of three major islands – Grande Comore (with the capital Moroni), Mohéli and Anjouan –and numerous smaller islands. The presidency rotates among the three islands.
- The legal system is based on French and Sharia (Islamic) Law.
- Comoros has 48 cities, towns and municipalities.

DRM efforts in Comoros consist of rebuilding after extreme events (flood, storm, cyclone or volcanic eruption) rather than prevention or even response. Comoros has just started to establish institutional entities with the explicit mandate to manage disaster risks.

In 2010, the National Platform for DRR (PNRRC for its initials in French) was set up. Then in 2012 The Directorate General of Civil Protection (DGSC for its initials in French) was established by Decree No. 12-054/PR and mandated to protect population, property and the environment. It also coordinates the development of the national DRM strategy and its implementation. The DGSC is also charged with the coordination of the National Platform.

However, the DGSC lacks the expertise and resources for effective disaster risk management. Financial resources are extremely limited at both the Union and island levels. Public investment needs are generally covered by international partners, including multilateral (EU, UNDP, WB) and bilateral (China, France, Japan, Qatar, Kuwait, Dubai, Saudi Arabia, Oman, etc.).

The local level is governed by the island governments that enjoy a high level of fiscal and political autonomy – even though the Union Government takes precedence over island law, the island governments may establish their own “basic law” or constitution. Island government is also responsible for the provision of basic services.

DiMSUR was launched in 2014 by the Union of Comoros, Madagascar, Malawi and Mozambique, which show similar vulnerabilities to disasters. UN-Habitat and DiMSUR have recently developed the City Resilience Action Planning (CityRAP) Tool with the objective of enabling local governments of small to intermediate sized cities to understand risks and plan practical actions to progressively build urban resilience.¹⁰⁵

No city is engaged in the UNISDR MCR campaign.

FOOTNOTES

¹⁰⁵ UNISDR 2015.

Somalia

- Somalia is divided into 18 administration regions, which in turn are subdivided into 90 districts.
- Somalia has 135 cities, towns and municipalities.

Somalia has only recently been lifted out of the category of “failed state” to a “fragile state” status.¹⁰⁶ Disaster management in Somalia should be seen through the prism of complex political, security and development processes taking place in the country. Somalia topped the Failed States Index (FSI) between 2008 and 2013. Somalia remains a country in conflict over scarce resources and power, state fragility, environmental degradation, organized armed groups and proliferation of small arms and light weapons. The parties to the conflict including clans, Al Shabab militia, the international community, Somalia National Forces, African Union Mission to Somalia (AMISOM), The federal government of Somalia, Puntland and Somaliland governments, and a high density of local and international agencies. Prolonged droughts and regular floods resulted in famine, which in turn triggered a large number of refugees and IDPs in and from Somalia.¹⁰⁷

There are 4.5 million people in need of life-saving humanitarian aid in Somalia. Therefore, disaster management in Somalia is inevitably linked to humanitarian aid.¹⁰⁸ This is also the focus of donor community: FAO-managed Food Security and Nutrition Analysis Unit (FSNAU), Somalia Water and Land Information Management (SWALIM), USAID-created Famine Early Warning Network (FEWSNET). On 16 September 2013, the Federal Government of Somalia (FGS) and its international partners launched the New Deal Compact for Somalia, which provided a comprehensive vision towards peace and stability by clearly identifying the most vital political, security, social and economic priorities in the country.

Somalia comprises the semi-autonomous and self-proclaimed southern Puntland State of Somalia, Somaliland, and South Central (Galmudug). The state is governed by one President and the provisional constitution developed with UNDP support and adopted in 2012.

The National Disaster Council (NDC), under the Office of the President, provides overall leadership; however, the focal agency for coordination of emergency response is the National Environmental Research and Disaster Preparedness Agency (NERAD). Capacities of disaster management authorities in Somalia are at a rudimentary stage to adequately respond to emergencies and manage disaster risk.

In South Central: The Somalia Disaster Management Agency (DMA) was set up under the Ministry of Interior and Federalism in 2013. It is mandated to formulate and enforce national disaster policies and regulations at regional and federal levels. Financial capacities are

FOOTNOTES

¹⁰⁶ <http://www.theguardian.com/world/2015/dec/23/somalia-no-longer-a-failed-state-just-a-fragile-one-says-un>.

¹⁰⁷ Humanitarian crisis analysis: Somalia (including Kenya), SIDA

[<http://www.sida.se/globalassets/sida/sve/sa-arbetar-vi/humanitart-bistand/somalia-including-kenya--humanitarian-crises-analysis-2015.pdf>].

¹⁰⁸ UNOCHA 2015b.

very low, dependent on donors for any programme.¹⁰⁹ Likewise, human resources are still at the very early stage and logistical capacities are minimal.

In Somaliland: The National Environment Research and Disaster Preparedness and Management Authority (NERAD) was created in 2003 and put in place in 2006. The agency is under the direct supervision of the President of Somaliland and has a fully developed legal framework defining its mandate, functions and accountability.¹¹⁰ Low capacities and a lack of financial resources remain persistent.

In Puntland: Puntland operates with a high degree of decentralization. With the support of UNOCHA and Diakonia Sweden, the Government of Puntland developed in 2011 the Puntland Disaster Management Framework¹¹¹ to guide DRM efforts of the Puntland Humanitarian Affairs and Disaster Management Agency (HADMA). It has an extremely limited annual budget and some expertise in humanitarian actions, but lacks capacities, logistical and financial means for effective DRR and DRM.

Box 24
Mogadishu:
resilience in the
face of chronic
crises and
disasters

Somalia displays exceptional resilience in the face of civil war, armed conflict, terror attacks, climate hazards and economic adversity. Mogadishu, the capital of Somalia, provides the most extreme example of resolve to carry on with daily life amidst material deprivation, disasters, poor basic services and extreme physical insecurity. The capital city has a port and an airport, and it lies on a stretch of coveted East African coastline – dotted with palm trees and bordered by crystal waters.

However, over the last few decades, natural and human-caused disasters, poor public service and scarce government resources displaced many in Mogadishu and created a gap in basic service delivery. The flash flood risks within Mogadishu are high and environmental vulnerability is intensified with recurrent droughts and flooding due to changing climatic conditions, combined with growing pressure on land and coastal resources.

The weakness of the Federal Government of Somali (FGS) makes it unable to prepare for, prevent and respond to disasters which lead to new displacements on a recurring basis. The majority of the displaced move to cities, mainly Mogadishu; making it the second fastest growing city in the world in terms of population, and increasing the strain on urban services.

In this context of often ineffectual administration in Mogadishu, international aid organizations and the local private sector are playing an important role in providing

FOOTNOTES

¹⁰⁹ *A fresh analysis of the humanitarian system in Somaliland, Puntland and South Central*, Oxfam Research Report, 2015 [https://www.oxfam.org/sites/www.oxfam.org/files/file_attachments/rr-humanitarian-system-somaliland-puntland-south-central-somalia-010515-en.pdf].

¹¹⁰ *Ibid.*

¹¹¹ HADMA 2011.

basic services, jobs and livelihoods, infrastructure and institutions. The private sector has a lot of flexibility (space to operate) in Somalia as result of the absence of restrictive government policies, state provision, regulation and control. The role of courts have been replaced in commercial matters by traditional elder-driven dispute resolution mechanisms, which is a relatively quick procedure and is free. For example, basic services like water, electricity and transport are delivered to existing and new IDPs settlements within and at the outskirts of Mogadishu by local private utility companies. Private companies like Hormud, the biggest telecommunication company in Somalia, play an important role as part of its corporate social responsibility in supporting the municipality firefighting emergency unit together with other private companies. Turkish International Cooperation and Development Agency (TIKA), in partnership with the Mogadishu Municipality, has rehabilitated main roads and supports waste management and it has built IDPs settlements in Mogadishu.

Moreover, the local residents also join hands with the municipality and the private sector in dealing with disasters when they occur. For example, the Shamo area of Wadajir district, was flood prone, and the drainage system and road were destroyed during one of the floods. The community, including residents, business people and the municipality, came together to rehabilitate the drainage system and to reduce the impact of the flooding.

There is also a growing commitment on the part of the FGS to take a lead role in providing and coordinating disaster response and assistance to affected people. The Somali Disaster Management Agency (SoDMA) was established in 2014. The FGS has also established a ministerial-level Emergency Response Committee tasked with disaster response and coordination responsibilities. The SoDMA is under the Ministry of Interior and federalism. It is mandated to formulate and enforce national disaster policies and regulations at regional and federal levels, as well as collaborate closely with various government ministries, NGOs, and UN agencies to jointly coordinate efforts in disaster management and emergency operations in the country. SoDMA has developed a strategic plan to coordinate and establish a common disaster management approach, but more structural investments are needed to implement this strategy.

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Djibouti

- Djibouti is divided into six administrative regions, including Djibouti city itself. The regions are further divided into 11 districts.
- Djibouti has 11 cities, towns and municipalities.

Djibouti is highly vulnerable to prolonged droughts and flooding. The last major drought claimed 4 per cent of GDP annually between 2008 and 2011 and impacted more than 50 per cent of the country's 860,000 residents. With over 60 per cent of the population dependent on agriculture-based livelihoods, and an influx of long-term refugees from southern Somalia and new refugees from Yemen, the primary humanitarian challenge remains in providing life-saving assistance in food security, as defined in the 2016 Humanitarian Response Plan (HRP). This situation inevitably affects urban settlements and the capacity of local authorities to address urban resilience-building challenges.

Acknowledging, however, that disasters are the main source of poverty in the country, the Government of Djibouti has developed the National Strategy on DRM and Disaster Risk Management Action Plan in 2006.

The Executive Secretariat for Risk and Disaster Management (SEGRC for its initials in French) serves as the national focal point. Permanent regional offices of DRM have been established under the Ministry of Interior and Decentralization. Due to the lack of local sources of revenue, the country is dependent on external funding.¹¹² Djibouti has recently implemented projects on disaster risk management with support of international donors (e.g., the World Bank/GFDRR and UNDP). Djibouti is the first among African countries to establish a vulnerability and risk assessment and communication platform for early warning of disasters. One of the main purposes of the system is to inform infrastructure investment and integration of the risk assessment in the urban development efforts for the capital, Djibouti city.

In November 2012 Djibouti city became the first city in the country to join the UNISDR MCR campaign.

Sudan

- Sudan is the third largest Arab country by area after Algeria and Saudi Arabia. It is divided into 18 states and 133 districts. Sudan has 29 cities.
- The Sudanese legal system is based on Islamic Law.
- After a prolonged civil war that resulted in the independence of South Sudan in 2011, Sudan continues to face immense security challenge.

Flood and drought are the main natural hazards threatening the development of Sudan. More than 65 per cent out of over 40 million population of Sudan resides in rural areas that are highly prone to drought. Floods caused by the Nile and rain storms regularly

FOOTNOTES

¹¹² UNISDR 2014.

cause massive losses. In this context, flood and drought risk early warning, and adequate preparedness, response and mitigation remain the primary concern of DRM institutions.

The Council for Disaster Management under the Ministry of Interior is responsible for disaster management in Sudan. It includes three high-level bodies: the High Council for Civil Defence, the Humanitarian Aid Commission, and the Higher Council for Environment and Natural Resources. The primary responsibility for disaster management and civil protection lies with the National Council for Civil Defence (NCCD) that is headed by the Minister of Interior Affairs. The structure of Civil Defence is replicated at all levels, including the municipal level. The Civil Defence mainly deals with flood response, including early warning, awareness, relocation of affected villages and contingency plans.

The UNDP National Disaster Risk Management Programme supported the NCCD to prepare a National Disaster Risk Management profile and the National Disaster Management Strategy in 2016. Also, UNDP supported Khartoum State to develop the Khartoum State Strategy for Disaster Risk Reduction (KSSDRR) 2016-2030.

The Emergency Operation Centres (EOCs) are established at the national and local levels to respond to critical situations. Many of the efforts are geared towards capacity development concerning the use of space-based information in natural resource management, environmental monitoring and DRR, particularly through the support of UN-SPIDER. The University of Khartoum hosts two institutes – the Desertification and Drought Studies department and the Remote-sensing Research Centre – which play a crucial role in promoting disaster risk reduction and an early warning system both for floods and droughts.

Other major international development actors are present in Sudan focusing on eco-system based DRR (UNEP), dam rehabilitation and de-silting (Practical Action), water resource management (WB), and more.

A significant lack of technical capacities and extremely limited resources, as well as the overlap in mandates and lack of cooperation, remain significant problems in the DRM field. In addition, the country lacks a culture of preparedness and risk reduction. DRR efforts at the municipal level are hardly evident.

Box 25
Khartoum:
building
resilience of
a capital city
through Aqaba
Declaration

Khartoum is the capital of Sudan, as well as the capital of Khartoum State. The State has a population of 8 million people and an area of 22,000 km². The major disasters that affect Khartoum are the seasonal flooding from Nile River and flash flooding due to heavy rainfall in summer and autumn seasons.

In 2014, UNDP initiated the Arab Cities Resilience Project in Khartoum city. As a result of the project, the Khartoum municipality has made significant progress in achieving the objectives of the Aqaba Declaration on DRR. It has especially achieved progress in following areas:

- *Set up a dedicated local unit for planning and management of DRR strategies.* Specifically, in October 2015 a dedicated unit with 12 employees was established under the High Council for Environment, Urban and Rural Promotion. To date, it has already implemented a number of capacity development activities in the area of a geographic information system (GIS), strategic planning, and e-waste management.
- *Allocate between 1 and 5 per cent of city's annual budget for DRR works to be spent on integrating risk reduction measures.* Specifically, the Khartoum State allocated 8 per cent of its annual budget (which is about USD 36 million) to disaster risk reduction in 2013-2014. These funds covered activities such as development of a rain water drainage canal and water pump-stations for drainage in flood areas; river embankment; water harvesting structures, and others.
- *Prepare the city's DRR strategy through consultations with stakeholders to define realistic schemes for risk reduction and link it to national strategy for DRR.* Specifically, in partnership with the National Ribat University and in consultation with all relevant stakeholders, the Unit has developed the Khartoum Disaster Risk Management Strategy 2016-2030. The Strategy has been approved by the Governor of Khartoum and the Minister for Environment.
- *Develop education and training programs on DRR in schools and universities and integration of DRR in educational curricula.* Specifically, the National Ribat University, the University of Africa and the Ahfad Women University already offer masters, diploma and certificate programmes on disaster risk management. The Khartoum State DRR Unit is currently developing a curriculum for integration of DRR concept into the school syllabus.
- *Set up community volunteer groups and train them to support search and rescue, fire-fighting and medical aid.* Specifically, in a training course organized in partnership with the Red Crescent Society of Sudan at least 140 community volunteers have been trained as first responders. Together with the Arab Organization for Agricultural Development (AOAD) the DRR Unit of Khartoum State is planning to conduct a city risk assessment and establish a 'green belt' to address desertification challenges.

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Source: Final Progress Report of the Arab Cities Resilience Programme, Amman: UNDP (2016).

Box 26
Khartoum:
urban risks from
solid waste and
e-waste

The municipalities in Sudan face major issues with regards to solid waste (SW) management in urban areas and its cascading effects on health and environment.

Increased rural to urban migration due to drought and desertification, along with population growth, has caused a sharp population rise in major cities in Sudan. The quantity of solid waste is increasing rapidly, contributing to health-related hazards. Studies indicate the value of the per person generation rate of solid waste to be 0.6 kg/day. Translating this number into total amount of SW for Khartoum through the prism of the total population in 2015 (5.1 million) and the projected population in 2030 (8.2 million)

means 3.6 million kg SW a day in 2015 and 4.9 million kg SW a day in 2030 respectively. The local authorities lack the necessary capacity to handle the immense problems of SW management. Study shows that the poor municipal SW management in Khartoum is posing high risks to human health and the environment.

The e-waste in Sudan generated per person per year equals to 1.2kg.* This is the result of large amount of electronic waste disposals in Sudan. In the report on waste crime from 2015,** UNEP indicates that 90 per cent of the world's electronic waste, worth nearly USD 19 billion, is illegally traded or dumped each year largely in Africa and Asia. Khartoum gets its share of the illegal e-waste.

This situation illustrates interconnectedness of various emerging risks from natural and human-caused hazards. The solutions therefore will also require a more integrated perspective acknowledging the "supply chain" of various risks: through natural hazards or human activities.

* Abubaker B. M. A, Mohammed Alhadi, Aisha Magzoub, Alnail Mohmmmed, Gamareldawla Hussein, Nabil M. Elamin, Bashir H. Osman, Mukhtar Adam, *Investigating the Solid Waste Management Problems in Urban Area, Sudan*, International Journal of Engineering Research & Technology, June 2014.

** http://www.step-initiative.org/Overview_Sudan.html.

Yemen

- Since 2014, Yemen's administrative division includes six regions creating a federalist model of governance.
- Yemen has 39 cities.

Yemen today is in civil war. It is not a single conflict, but a mosaic of multifaceted regional, local and international power struggles, emanating from both recent and long-past events.¹¹³ Currently, North Yemen is under the control of the Houthis – a Zaidi Shia-led rebel group. South Yemen is split between a portion controlled by Al Qaida in the Arabian Peninsula (AQAP) and Hadi remnants.

Yemen remains extremely vulnerable to climate risks including droughts, storms and floods. It faces severe challenges in terms of food security. Sustainable and fair management of natural resources is one of the critical elements of the reconciliation process. Here is where disaster risk governance can offer entry points for the creation of the conditions necessary for resilience. Before the war, the High Council for Civil Defence had the overall responsibility for DRM, while the civil defence department was concerned with disaster preparedness. Yemen's Red Crescent Society was also an important player. Many Yemeni cities are at high risk to climate-induced water scarcity, flash flood and cyclones, including Sanaa.

FOOTNOTES

¹¹³ <http://www.ecfr.eu/mena/yemen>.

Box 27
Aden:
managing debris
to reduce post
disaster risks

In June 2016, UNDP and the Government of Japan launched the support to the local authorities to remove debris and rubble from Aden, which was considered the most devastated city as a result of the ongoing military conflict in the country. There is a huge amount of solid waste and debris, estimated at over 350,000 tons, which has accumulated from the complete destruction of about 163 public and private buildings and partial destruction of about 327 buildings. The cash-for-work modality has been used, guaranteeing emergency employment for the local population.*

Source: <http://reliefweb.int/report/yemen/undp-and-government-japan-support-removal-debris-and-rubble-aden>

4.2.4 Urban governance and resilience: concluding remarks

Throughout the whole region, urban management and service delivery are relatively centralized and led by national public agencies. At the local level, the limited authority and capacities (human, financial and administrative) of the municipal authorities have created a huge gap in the provision of public services. Here private sector and civil society organizations often fill the critical service gaps and, in some cases, are the most efficient service providers for the urban poor.

The partial autonomy of the municipal authorities also limits the scope for local risk governance. Public participation and bottom-up approaches to decision-making continue to be weak throughout the region. This situation largely explains the challenge of urban governance for resilience-building against natural hazards in Arab cities. It must be acknowledged that there are differences between countries and cities in how urban governance for resilience-building is shaped and exercised. This depends largely on the exposure to disasters, the degree of priority given to disaster risk by various stakeholders, the engagement of civil society, the role of the donor community, local leadership, and engagement of the private sector and academia among others.

In general, many of the processes, strategies and programmes (including budgeting) for resilience-building against natural hazards are happening at regional and national levels. The UNDP-implemented Arab Cities Resilience Programme 2014-2019 is one of the few interventions focused on resilience-building at the city level. It is also important to acknowledge the existing city networks that have a strong potential to become a vehicle for promoting urban resilience in the region. They include, for instance, the Arab Towns Organization (ATO)¹¹⁴ and its subsidiaries: the Arab Urban Development Institute, the Development Fund for Arab Cities, the Arab Forum for Information Systems, Arab Foundation for Heritage, and Arab Award Foundation. Another example is the Organization of Islamic Capitals and Cities (OICC).¹¹⁵

FOOTNOTES

¹¹⁴ Arab Town Organization [http://www.araburban.com/index.php?page_id=187].

¹¹⁵ <http://www.oicc.org>.

Throughout the region some progress has been made in improving legal and institutional frameworks for risk governance. Internationally-accepted protocols and targets have started to be integrated *de jure* into national legal and institutional frameworks. Some progress has been made to achieve a cultural shift from the predominant response approach to prevention and preparedness throughout the region. Most of the countries have joined international reference frameworks, such as HFA in 2005, and subsequently, the Sendai Framework for DRR in 2015, MDGs in 2000 and subsequently SDGs in 2015, and many more.

All countries in the region are members of the International Civil Defence Organization (ICDO).¹¹⁶ The capacities of the national Civil Defence organizations are being upgraded by the Euromed PPRD project. The Euromed programme for the Prevention, Preparedness and Response to Natural and Man-made Disasters (PPRD) is an EU funded programme aiming at raising the national resilience of each southern Mediterranean partner country (countries targeted by the European Neighbourhood Policy - ENP).¹¹⁷ There is also growing engagement of civil society actors in various phases of the disaster risk management cycle, further combined with a growing awareness among the general public of disaster and climate risk issues. Multiple EU-funded initiatives are being implemented in the Mediterranean region by civil society organizations.¹¹⁸

However, there are still significant gaps to be addressed in order to bring about resilience-building at urban level. These challenges impact more strongly the secondary cities that are growing at a rapid pace. The hosting of Syrian refugees in Lebanese and Jordanian cities has exacerbated the exposure and vulnerability of both the refugees and the host populations to disaster risks. The millions of internally displaced Syrians have also become highly vulnerable to the impact of droughts and other disasters.

The primary challenges in relation to urban governance for resilience-building against natural hazards in the region are highlighted below:

- **Policy and institutional fragmentation of civil protection, disaster risk management, and climate risk management in the region:** the three interrelated subjects are largely addressed separately in terms of planning and implementation of resilience-building interventions. There is a need to overcome such fragmentation by embracing a more holistic and synergized approach to risk management, acknowledging the cascading effect of risk that goes beyond narrowly defined institutional borders. An important entry point could be to organize national risk assessments and use the results for multidisciplinary interventions including city risk profiling. This is tightly linked with the following point.
- **Lack of risk-centred development programming:** not only local authorities but also development partners need to explicitly factor risk in development planning and implementation. It is not about mainstreaming risk consideration, instead, this requires

FOOTNOTES

¹¹⁶ <http://www.icdo.org/en/about-icdo/members/member-states>.

¹¹⁷ <https://eeas.europa.eu/topics/european-neighbourhood-policy-enp>.

¹¹⁸ http://www.enpi-info.eu/list_projects_med.php?

building development programming around the risk(s) it aims to address, tackling causes and consequences of risks. The pathway to resilience is to improve the risk governance regime of existing and emerging risks. Taking this path requires new thinking, methodologies and tools from all development partners.

- **Urban planning is reactive, insufficiently embracing the medium and long-term horizon.** This can be explained primarily by the lack of local expertise and availability of tools and mechanisms to take a longer perspective towards understanding risk and its impact on various sectors and industries at city level. This also requires a certain level of adaptive regulatory planning, which is not addressed in these cities either.
- **Understanding the risk “footprint” and rising awareness of risk justice:** increasing awareness about risk management requires recognizing those contributing to the risk and those most likely to bear impact of the risk. Importantly, understanding the time horizon attached to risk defines its urgency and should guide risk prioritization efforts. This is also tightly linked with loss and damage discourse and the importance of disaggregated data on disaster consequences.
- **Little attention to risk perception contributes to risk governance deficit in cities.** Risk perception largely explains the public response to hazards, and provides entry points for building successful resilience strategies. As defined by IRGC, risk perception is equally essential to effective risk governance as scientific knowledge about risk.¹¹⁹ It is important to note the criticality of indigenous knowledge in risk management as demonstrated in the case study on Masdar City (UAE).
- **Urban planning is a “product” not a “process.”** Often urban planning is not much of a process of consultation geared towards better understanding of risk and developing risk-informed service provision. This requires that urban planning should be a well-balanced process of deliberation including all relevant stakeholders, together with adequate due diligence processes. Rather, urban planning is more often a “product,” largely an internal product of a municipality that reflects the political priorities and immediate tasks that are feasible within the expected budget. As a result, many municipal governments do not have adequate provision to be able to deal with increased climate hazards (such as flood management, for instance), or to invest in those priorities, which do not provide immediate political dividends.
- **The pattern of engagement by international partners could further disable and disempower local authorities.** International donor organizations tend to bypass local authorities – they work either directly with civil society or through the national authorities. This is explained by the constraints they face at the city level, yet, through such a strategy, they further reinforce this vicious cycle. To overcome this challenge, the UNDP Regional Office for Arab States has embarked on resilience-building activities through local partners. Thus, it works with the Arab Towns Organization (ATO), its subsidiary bodies, including the AUDI and other similar entities to address urban risk issues. Working through these umbrella organizations allows outreach to a large number of cities to encourage the systematic adoption of a resilience-building agenda by Arab cities. The Kuwait-based ATO has 402 member cities and ongoing programmes in 35 cities.

FOOTNOTES

¹¹⁹ IRGC 2009.

05

Outlook and Way Forward

Building resilience against disaster risks in Arab cities is of utmost importance. The question remains how to select the optimum pathway towards building capacities among multiple stakeholders and thus adequately execute resilience-building interventions. The cases provided in this report illustrate how different cities are addressing this question. Practice shows that this work is very much evolving, along with our improving awareness of what is important and what is feasible.

Across the Arab region, there are multiple initiatives aimed at building resilience in the urban context. They vary in size, thematic focus, implementation modality, level of engagement with different state and non-state stakeholders, duration, etc. In all interventions, the most important prerequisite is the commitment by local actors to resilience-building, as well as the support they receive from the national governments and international development partners. This commitment comes with enhanced awareness of the importance and benefits of resilience-building. Therefore, it is strongly recommended that further investment is made in awareness-raising among all stakeholders and in developing their capacities in the performance domains referred to the analytical framework outlined in this report (Table 12).

The report has identified several contextual aspects of resilience-building in Arab cities.

1. The region is exposed to significant hydrometeorological hazards, whereby the nexus of water-energy-food security is of prime importance for the region. Some cities in the region are facing up to 5°C temperature increases, which is far above average projections. Since water stress is a particular challenge throughout the region, governance and capacities for urban resilience are often seen through the lens of sustainable development and climate change adaptation, which provide a strong entry point for increased synergy across thematic sectors. These links need to be further strengthened through programmatic activities on the part of all donors.
2. The seismic risk is also highly articulated in some cities in the region. Ensuring adoption and, more importantly, enforcement of the building codes remains a high priority task, as well as developing appropriate risk transfer mechanisms. The insurance industry in the Arab States remains underdeveloped due to the weak culture of buying insurance policies. Therefore the option of risk transfer is not available to most of the vulnerable segments of society.
3. Many cities in the region are subject to both hydrometeorological and geophysical hazards. The complex nature of the evolving risk landscape is most articulated in coastal areas, which are particularly susceptible to both flood, seismic and climate risks.
4. The region is home to a growing number of large agglomerations with populations of more than one million people. The total number of such agglomerations is expected to increase to 18 by 2030, accounting for 24 per cent of the total population of the region (128 million people). Therefore, building resilience in cities with high concentrations of people, assets and infrastructure is a task of mounting complexity and absolute importance.

5. The growing population of young people in the region need to become more engaged in resilience-building activities. New ways have to be found to engage young people in resilience-building in their home cities.
6. Large numbers of people reside in slums and informal settlements in many Arab cities. More attention should be given to resilience-building activities for and among the poor. Some countries have provided better quality of housing to the slum dwellers, however vast numbers of people still continue to stay in the informal settlements. Safer construction, better access to emergency responders, risk awareness and community preparedness remain key issues to be addressed in the informal settlements.
7. Reducing vulnerabilities is one of the most important strategies for addressing resilience. It is most important therefore to identify the risk landscape of each target city and coordinate donor efforts to the extent feasible, and address these priority risks either by reducing vulnerabilities or by mitigating the hazard itself.
8. It is of particular relevance for the Arab region to explore the nexus of disaster, climate, food-security and conflict, and the role of cities as stabilizing factor in potential conflict.
9. The region is home to many world cultural heritage sites and critical infrastructures. Building resilience to natural hazards requires particular efforts in this context.

The analytical framework on urban governance for building resilience to natural hazards as proposed in this report, suggests the performance areas where resilience at urban level can and should be built and measured. From the governance perspective, there are several important learning points that could be mentioned:

1. The lack of risk governance regime in the region and the cities is immense. Effective resilience-building depends on how enabling the environment is.
2. The largely hierarchical public administration system in the region leaves little room for municipal level autonomy in the political, institutional and fiscal domains. This impedes effective risk identification and assessment, and the deployment of adequate risk response strategies in the urban environment.
3. A lack of adequate levels of fiscal autonomy and fiscal capacity is another major impediment to resilience-building.
4. The role of the international donor community could be instrumental if it can harmonize its activities and align them more closely to the local risk landscape.
5. Resilience-building activities are emerging and being formulated in various Arab cities. It could potentially be beneficial for local authorities to have a forum where they can engage,

FOOTNOTES

¹ UNDP 2013.

exchange ideas, and learn from each other on the topic of urban resilience-building in the Arab region. Therefore, following the example of UNDP, closer partnerships with grass-roots initiatives (such as the AUDI, for instance) should be promoted to create synergy. The role of regional city networks in resilience-building is crucial. There are emerging initiatives at a very grassroots level that catalyse resilience-building initiatives, create fora for city-to-city learning, and stimulate participation and engagement of various stakeholders.

6. It is also important to pick up the momentum of the MCR campaign and focus commitments to the Aqaba Declaration, as well as explore further steps towards building urban resilience to natural hazards. A system of monitoring that addresses “risks to operations” – with the focus on how to improve performance by maximizing opportunities and avoiding threats¹ – could benefit this process.
7. The most important prerequisite is the need to cultivate a culture of resilience throughout all areas of the urban fabric. Priority steps for resilience-building at urban level include the need to:
 - (a) develop the capacities of local actors to enable them understand risk, risk management, and resilience;
 - (b) develop methodologies and carry out integrated risk assessments in cities (including both hazard-based and event-based assessments);
 - (c) strengthen risk governance throughout legal, institutional and fiscal dimensions based on the principle of “risk footprint” (i.e., acknowledging creation of a decision-making space for those contributing to and potentially impacted by the risk).

The foregoing requires comprehensive strategies for resilience-building and the engagement of all stakeholders, with a primary focus on the evolving risk landscape of Arab cities. Resilience-building is very much context-specific work, of which the variability at city level cannot be covered by one report. It is important, however, to keep reviewing the progress on resilience-building in Arab cities.

All partners are invited to share their knowledge and expertise on building resilience of Arab Cities and learn from the others at the web portal set up by UNDP: <http://arabcitiesresilience.org/index.php/en/>.

It is recommended that future editions of this report address urban resilience performance in the domains conceptualized under the Analytical Framework: urban governance for building resilience against natural hazards. In the meantime, the establishment of an Arab Cities Resilience Network could also be beneficial to further explore urban resilience against natural hazards, exchange ideas and experiment, as well as learn from one another’s practices.

It is important to acknowledge that building urban resilience to natural hazards is a continuous process that requires human and financial investments to accommodate the constantly changing hazard and vulnerability profiles of Arab cities. This is a lifelong journey and many Arab cities have already embarked on it!

Annex 01

The Aqaba declaration on disaster risk reduction in cities

Aqaba, Jordan
21 March 2013

We, Mayors and Local Government representatives together with National Government Officials,

Having participated in The First Arab Conference for Disaster Risk Reduction, 19-21 March in Aqaba, Jordan, and

Welcoming the support by the United Nations Office for Disaster Risk Reduction (UNISDR), the United Nations Development Programme (UNDP), the League of Arab States, the Swiss Agency for Development Cooperation (SDC), and the hospitality of the Hashemite Kingdom of Jordan and Aqaba Special Economic Zone Authority (ASEZA), which facilitated the mobilization of Arab mayors, local and national authorities.

We emphasize the importance of reducing disaster risk in Arab cities and declare from Aqaba the following:

Recognizing that:

- Over 56 per cent of the Arab population at present lives in urban areas (large cities and small towns), while in some countries the percentage of people living in urban areas is as high as 87 per cent of the total population;¹
- The urban population is growing at an accelerated speed of the overall growth in population, while the overall population growth rate is also among the highest in the world;
- Arab urban areas are a major source of economic and human development for the opportunities they provide in the form of employment, education, health, communications facilities, trade and tourism;
- A well-conserved environment, supported by viable traditional knowledge and skills, considerably reduces underlying disaster risk factors, strengthens the resilience of communities and saves lives, assets and livelihoods;
- Many Arab cities and towns are located in high risk areas, including coasts and highly seismic zones as well as volcanic areas making them exposed to disaster risks from earthquakes, flooding, flash flooding and storms leading to losses in lives, assets and livelihoods;
- Disaster risk is driven by climate change due to increased frequency and severity of hydrometeorological incidents including what the Arab region faces from climate change negative impacts manifested in droughts, desertification, flash flooding, and storms leading also to food insecurity. Arab cities and villages are expected to be increasingly exposed to coastal erosion, sea level rise, storms and flash flooding among other climate-related risks.
- Sustainable development principles must be closely linked to urban development planning across all sectors (e.g., infrastructure, environment, energy, socioeconomic development) to increase resilience to disaster through protection and conservation of natural resources (water, land, green belts, watersheds, swamps) with gender sensitive approach and prioritization of most vulnerable population.
- Strong disaster risk management policies and functional implementing institutions are a must to undertake disaster risk reduction measures.
- Sufficient investments in disaster risk reduction activities are necessary to minimize losses, damages and risks and sustain livelihoods;
- Civil society plays a valuable role in strengthening capacities and enhancing community awareness, hence it is important to engage civil society organizations in planning, implementing, monitoring and assessing disaster risk reduction programmes and actions.

Recalling:

- The World Disaster Reduction Campaign 2010-2015 Making Cities Resilient: “My city is getting ready!”, which is aimed at achieving resilient, sustainable urban communities based on the principles of the Hyogo Framework for Action;
- The Mayors’ Statement on Resilient Cities at the Third Session of the Global Platform for Disaster Risk Reduction, which calls on UNISDR to work with city networks, UN entities and civil society organizations to sustain local preparations for disaster risk reduction and local resilience-building;

Until the end of 2017, we resolve to:

- I. Set up a dedicated local unit for planning and management of disaster risk reduction strategies, including mitigation, preparedness, response and recovery actions at municipality level;
- II. Recommend issuance of legislations and ensure enforcement of laws and regulations with respect to: (a) responsibilities of stakeholders for disaster risk reduction, (b) identification of zones for land-use planning to reduce hazard exposure of city infrastructure, (c) enforcing penalties for non-compliance and providing incentives for compliance to safety standards;
- III. Allocate between 1 and 5 per cent of city’s annual budget for disaster risk reduction works to be spent on integrating risk reduction measures in all development sectors, strengthening institutional capacities, enhancing resilience of infrastructure and improving community preparedness;²
- IV. Prepare at least one risk assessment report of the city (including public buildings, schools, health facilities, historic old towns, and cultural heritage areas) to guide urban development plans and decisions, and ensure that this information and the plans for city’s resilience are readily available to the public;
- V. Prepare City’s Disaster Risk Reduction strategy through consultations with stakeholders to define realistic schemes for risk reduction and link it to national strategy for disaster risk reduction;
- VI. Implement at least one public awareness campaign to increase the understanding of local communities in cities, towns and rural areas about disaster risks and actions they can take to minimize the risks;
- VII. Recommend development of education and training programmes on disaster risk reduction in schools and universities and integration of disaster risk reduction in educational curricula;
- VIII. Build or restore at least two infrastructure facilities to reduce disaster risks; a dike, a dam, or a flood drainage system, where needed;
- IX. Ensure the implementation of disaster mitigation measures in at least two government offices, two schools and two hospitals or health facilities in the city;³

FOOTNOTES

² According to local conditions, such works may include construction and repair of dikes, flood drainage system, maintenance of green belts/forests, public awareness, early warning, training, purchasing rescue and warning equipment, setting-up rescue teams, storage of relief materials, provision of microcredits after disasters for recovery of livelihoods etc.

- X. Set up a system to monitor the enforcement of building regulations and land use planning;
- XI. Set up a municipal early warning committee to prepare and disseminate disaster warning to high risk communities in urban and rural areas;⁴
- XII. Implement at least two schemes to protect natural resources and mitigate disaster risks – e.g., natural drainage channels (canals, rivers), swamps/marshlands, mangroves, forests/green belts, watersheds – where needed;
- XIII. Pay special attention to historical sites and world cultural heritage in the Arab region and allocate resources to protect and maintain these sites to reduce disaster risk;
- XIV. Strengthen joint cooperation among Arab cities and towns to transfer knowledge and expertise across municipalities and local governments;
- XV. Announce the twenty-first of March every year the Arab Day for Disaster Risk Reduction.

Observations

- We are committed to this Declaration up to the end of 2017. A review will be conducted in 2015 to ensure consistency with the global disaster risk reduction framework to be adopted in 2015 (post-Hyogo Framework for Action).
- We acknowledge that Arab countries are at different levels of development with regards to their disaster risk reduction systems and therefore different cities in the Arab states have differential capacities and resources to implement this Declaration. While all share equal commitments to this declaration, there will be differentiated levels of progress among Arab Cities in undertaking targets outlined in the Aqaba Declaration for Disaster Risk Reduction in Cities.

FOOTNOTES

³ This may include: purchase insurance for critical buildings and infrastructure (city government offices, bridges, hospitals, schools, airports, train/bus-stations, ports) so as to transfer disaster risks from the public exchequer to the insurance sector, and partner with the insurance sector to promote risk insurance for private sector industry and housing.

⁴ This may include: set up a multidisciplinary committee to receive disaster warning information from national and international sources and to disseminate it among general public using variety of channels; e.g. media, mosques, churches, community organizations, educational institutions.

Annex 02

SDG: Targets for Goal 11: Make cities inclusive, safe, resilient and sustainable

Target 11.1	By 2030, ensure access for all to adequate, safe and affordable housing and basic services and upgrade slums.
Target 11.2	By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons.
Target 11.3	By 2030, enhance inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and management in all countries.
Target 11.4	Strengthen efforts to protect and safeguard the world's cultural and natural heritage.
Target 11.5	By 2030, significantly reduce the number of deaths and the number of people affected and substantially decrease the direct economic losses relative to global gross domestic product caused by disasters, including water-related disasters, with a focus on protecting the poor and people in vulnerable situations.
Target 11.6	By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management.
Target 11.7	By 2030, provide universal access to safe, inclusive and accessible, green and public spaces, in particular for women and children, older persons and persons with disabilities.
Target 11.a	Support positive economic, social and environmental links between urban, peri-urban and rural areas by strengthening national and regional development planning.
Target 11.b	By 2020, substantially increase the number of cities and human settlements adopting and implementing integrated policies and plans towards inclusion, resource efficiency, mitigation and adaptation to climate change, resilience to disasters, and develop and implement, in line with the Sendai Framework for Disaster Risk Reduction 2015-2030, holistic disaster risk management at all levels.
Target 11.c	Support least developed countries, including through financial and technical assistance, in building sustainable and resilient buildings utilizing local materials.

Annex 03

Useful resources from the region

- The Arab Urban Development Institute:
http://www.araburban.com/index.php?page_id=187
- Development Fund for Arab Cities:
http://araburban.com/index.php?module=sitemap&page=content_en&id=223
- Arab Forum for Information Systems:
<http://www.itcat.org>
- Arab Foundation for Heritage and Historical Cities:
http://araburban.com/index.php?module=sitemap&page=content_en&id=223#
- The Arab Award Foundation:
<http://arabthought.org/en#.VzfaYWNW1Ec>
- The Organization of Islamic Capitals and Cities (OICC):
<http://www.oicc.org/>
- Arab Town Organization:
http://www.araburban.com/index.php?page_id=187
- The Arab Forum for Environment and Development:
<http://www.afedonline.org/en/>
- Arab Regional Centre for World Heritage (ARC-WH) under the auspices of UNESCO
<http://arcwh.org>

Annex 04

Migration, urbanization, and socioeconomic analysis

1. Migration profile of Arab region

The following indicators are considered in the analysis of the demographic situation:

- **Net migration rate:** The number of immigrants minus the number of emigrants over a period, divided by the person-years lived by the population of the receiving country over that period. It is expressed as average annual net number of migrants per 1,000 people.
- **Net number of migrants:** The net number of migrants, that is, the number of immigrants minus the number of emigrants. It is expressed as thousands.

Table 1.9
Net migration rate
(per thousand)

Region	Country	2000-2005	2005-2010	2010-2015	2015-2020	2020-2025	2025-2030
GCC	Emirates	62.7	109.1	9.3	5.8	5.4	4.7
GCC	Qatar	51.8	131.4	36.3	8.5	5.9	3.0
GCC	Bahrain	34.8	59.5	4.5	4.6	2.4	1.6
GCC	Kuwait	13.3	39.2	29.8	4.9	3.1	2.9
GCC	Saudi Arabia	8.2	6.2	5.7	2.1	1.1	1.1
GCC	Oman	3.4	13.6	65.2	-0.9	-2.0	-1.9
Maghreb	Mauritania	2.0	-1.2	-1.0	-0.9	-0.8	-0.7
Maghreb	Libya	-0.4	-2.7	-16.0	-0.3	0.6	0.6
Maghreb	Algeria	-1.3	-2.1	-0.8	-0.2	-0.2	-0.2
Maghreb	Tunisia	-2.8	-0.6	-0.6	-0.3	-0.3	-0.3
Maghreb	Morocco	-4.7	-3.7	-1.9	-1.8	-1.6	-1.5
Mashreq	Lebanon	30.5	8.8	49.1	-9.5	-27.3	-12.5
Mashreq	Egypt	-0.2	-0.7	-0.5	-0.4	-0.4	-0.4
Mashreq	Iraq	-2.1	-3.2	3.3	0.1	-0.5	-0.3
Mashreq	Jordan	-3.7	15.2	6.5	-6.6	-9.4	-3.9
Mashreq	Syria	-4.4	3.8	-41.1	9.5	23.9	8.9
Mashreq	Palestine	-11.2	-4.7	-2.0	-1.3	-0.9	-0.8
STC	Yemen	-1.0	0.0	-0.4	-1.4	-1.3	-0.6
STC	Sudan	-2.9	-2.9	-4.2	-0.5	-0.2	-0.2
STC	Comoros	-3.4	-3.0	-2.7	-2.4	-2.1	-1.9
STC	Djibouti	-4.8	-5.0	-3.7	-2.4	-1.8	-1.8
STC	Somalia	-5.0	-7.8	-7.9	-3.4	-2.2	-1.9

Table 1.10
Number of migrants
(thousands)

Region	Country	2000-2005	2005-2010	2010-2015	2015-2020	2020-2025	2025-2030	2030-2035
GCC	Emirates	1 180	3 493	405	275	275	250	250
GCC	Saudi Arabia	945	815	850	350	200	200	200
GCC	Kuwait	139	522	518	100	70	70	50
GCC	Qatar	185	855	364	100	75	40	30
GCC	Bahrain	134	317	30	33	18	13	13
GCC	Oman	40	186	1 211	- 20	- 50	- 50	- 50
Maghreb	Libya	- 12	- 82	502	- 10	20	20	20
Maghreb	Mauritania	30	- 20	- 20	- 20	- 20	- 20	- 20
Maghreb	Tunisia	- 139	- 33	- 33	- 20	- 20	- 20	- 20
Maghreb	Algeria	- 205	- 357	- 143	- 50	- 50	- 50	- 50
Maghreb	Morocco	- 695	- 578	- 311	- 311	- 300	- 300	- 300
Mashreq	Syria	- 380	370	4 030	941	2 780	1 201	- 33
Mashreq	Palestine	- 190	- 90	- 44	- 33	- 25	- 25	- 25
Mashreq	Iraq	- 266	- 457	549	20	- 104	- 85	- 30
Mashreq	Jordan	- 94	450	230	- 258	394	- 172	- 20
Mashreq	Egypt	- 68	- 279	- 216	- 216	- 216	- 216	- 216
Mashreq	Lebanon	550	183	1 250	- 279	770	- 335	- 20
STC	Djibouti	- 18	- 20	- 16	- 11	- 9	- 9	- 9
STC	Comoros	- 10	- 10	- 10	- 10	- 10	- 10	- 10
STC	Sudan	- 430	- 500	800	- 100	- 45	- 45	- 45
STC	Yemen	- 100	0	- 50	- 200	200	- 100	- 100
STC	Somalia	- 200	- 350	- 400	- 200	- 150	- 150	- 150

3. Urban profile of Arab region

The following indicators are considered in the analysis of the urbanization situation:

- **Percentage of population at mid-year residing in urban areas by major area, region and country**
- **Urban population at mid-year by major area, region and country (thousands)**
- **Average annual rate of change of the urban population by major area, region and country (per cent)**
- **Average annual rate of change of the percentage urban by major area, region and country (per cent)**
- **Population of urban agglomerations with one million inhabitants or more in 2014, by country (thousands)**
- **Urban population, number of cities and percentage of urban population by size class of urban settlement, by country**

Table 3.1
Percentage of
population at mid-
year residing in
urban areas

Region	Country	2005	2010	2015	2020	2025	2030
GCC	Qatar	97.4	98.7	99.2	99.5	99.7	99.7
GCC	Kuwait	98.2	98.3	98.3	98.4	98.5	98.6
GCC	Bahrain	88.4	88.5	88.8	89.1	89.5	90.0
GCC	Emirates	82.3	84.1	85.5	86.8	87.7	88.5
GCC	Saudi Arabia	81.0	82.1	83.1	84.1	85.0	85.9
GCC	Oman	72.4	75.2	77.6	79.7	81.4	82.8
Maghreb	Libya	76.9	77.6	78.6	79.6	80.7	81.8
Maghreb	Algeria	63.8	67.5	70.7	73.4	75.6	77.4
Maghreb	Tunisia	65.1	65.9	66.8	67.9	69.2	70.6
Maghreb	Morocco	55.1	57.7	60.2	62.6	64.9	67.0
Maghreb	Mauritania	53.1	56.7	59.9	62.6	65.0	66.9
Mashreq	Lebanon	86.6	87.2	87.8	88.4	89.0	89.6
Mashreq	Jordan	81.2	82.5	83.7	84.8	85.7	86.6
Mashreq	Palestine	73.1	74.1	75.3	76.4	77.6	78.8
Mashreq	Iraq	68.8	69.0	69.5	70.2	71.2	72.4
Mashreq	Syria	53.8	55.7	57.7	59.7	61.8	63.8
Mashreq	Egypt	43.0	43.0	43.1	43.8	45.0	46.7
STC	Djibouti	76.8	77.0	77.3	77.8	78.5	79.2
STC	Somalia	35.2	37.3	39.6	42.0	44.6	47.3
STC	Yemen	28.9	31.7	34.6	37.5	40.4	43.2
STC	Sudan	32.8	33.1	33.8	35.0	36.7	38.8
STC	Comoros	27.9	27.9	28.3	29.0	30.1	31.5

Table 3.2
Urban population
(in thousands)

Region	Country	2005	2010	2015	2020	2025	2030
GCC	Saudi Arabia	19 994	22 375	24 854	27 202	29 086	30 603
GCC	Emirates	3 413	7 096	8 192	9 198	10 072	10 915
GCC	Kuwait	2 255	2 940	3 524	3 951	4 366	4 764
GCC	Oman	1 826	2 107	3 228	3 599	3 885	4 076
GCC	Qatar	800	1 726	2 333	2 531	2 653	2 753
GCC	Bahrain	778	1 108	1 207	1 319	1 406	1 478
Maghreb	Algeria	21 677	25 027	28 739	32 176	35 145	37 569
Maghreb	Morocco	16 607	18 253	20 439	22 497	24 473	26 258
Maghreb	Tunisia	6 543	7 010	7 510	8 005	8 464	8 869
Maghreb	Libya	4 302	4 690	4 962	5 387	5 769	6 103
Maghreb	Mauritania	1 671	2 046	2 442	2 866	3 311	3 774
Mashreq	Egypt	30 884	33 588	36 538	39 869	43 610	47 864
Mashreq	Iraq	18 826	21 374	24 847	28 564	32 654	36 880
Mashreq	Syria	9 771	11 989	12 837	15 364	17 213	19 109
Mashreq	Jordan	4 253	5 323	6 435	6 855	7 495	8 103
Mashreq	Palestine	2 601	2 975	3 423	3 927	4 476	5 050
Mashreq	Lebanon	3 452	3 785	4 437	4 312	4 489	4 634
STC	Sudan	10 347	11 794	13 391	15 575	18 220	21 393
STC	Yemen	5 828	7 223	8 837	10 663	12 639	14 684
STC	Somalia	2 977	3 590	4 399	5 386	6 576	7 977
STC	Djibouti	596	642	696	751	803	852
STC	Comoros	167	191	218	249	287	333

Table 3.3
Average annual
rate of change
of the urban
population
(per cent)

Region	Country	2000-2005	2005-2010	2010-2015	2015-2020	2020-2025	2025-2030
GCC	Kuwait	3.74	5.31	3.63	2.29	1.99	1.75
GCC	Emirates	6.81	14.64	2.87	2.32	1.82	1.61
GCC	Saudi Arabia	4.35	2.25	2.10	1.81	1.34	1.02
GCC	Bahrain	5.50	7.08	1.71	1.77	1.28	1.00
GCC	Oman	3.03	2.86	8.54	2.17	1.53	0.96
GCC	Qatar	6.72	15.38	6.02	1.63	0.95	0.74
Maghreb	Mauritania	4.52	4.04	3.54	3.20	2.88	2.62
Maghreb	Morocco	1.62	1.89	2.26	1.92	1.68	1.41
Maghreb	Algeria	2.63	2.87	2.77	2.26	1.77	1.33
Maghreb	Libya	1.70	1.73	1.13	1.64	1.37	1.13
Maghreb	Tunisia	1.54	1.38	1.38	1.28	1.12	0.94
Mashreq	Iraq	2.88	2.54	3.01	2.79	2.68	2.43
Mashreq	Palestine	2.40	2.69	2.81	2.75	2.61	2.41
Mashreq	Syria	2.78	4.09	1.37	3.59	2.27	2.09
Mashreq	Egypt	1.74	1.68	1.68	1.75	1.79	1.86
Mashreq	Jordan	2.23	4.49	3.79	1.26	1.79	1.56
Mashreq	Lebanon	4.31	1.84	3.18	-0.57	0.81	0.64
STC	Somalia	3.85	3.75	4.06	4.05	3.99	3.86
STC	Sudan	2.77	2.62	2.54	3.02	3.14	3.21
STC	Yemen	4.72	4.29	4.03	3.76	3.40	3.00
STC	Comoros	2.42	2.60	2.67	2.71	2.81	2.98
STC	Djibouti	1.49	1.49	1.60	1.52	1.35	1.18

Table 3.4
Average annual
rate of change
of the percentage
urban (%)

Region	Country	2000-2005	2005-2010	2010-2015	2015-2020	2020-2025	2025-2030
GCC	Oman	0.23	0.75	0.65	0.53	0.43	0.34
GCC	Saudi Arabia	0.28	0.27	0.25	0.23	0.22	0.20
GCC	Emirates	0.50	0.43	0.35	0.28	0.23	0.18
GCC	Bahrain	0.01	0.03	0.05	0.08	0.10	0.11
GCC	Kuwait	0.02	0.02	0.02	0.02	0.02	0.02
GCC	Qatar	0.23	0.25	0.12	0.06	0.03	0.01
Maghreb	Morocco	0.66	0.91	0.85	0.78	0.71	0.64
Maghreb	Mauritania	1.52	1.30	1.09	0.90	0.73	0.59
Maghreb	Algeria	1.26	1.13	0.93	0.75	0.59	0.46
Maghreb	Tunisia	0.52	0.26	0.27	0.32	0.37	0.40
Maghreb	Libya	0.14	0.19	0.23	0.27	0.28	0.27
Mashreq	Egypt	0.11	-0.00	0.05	0.30	0.53	0.75
Mashreq	Syria	0.69	0.69	0.70	0.70	0.68	0.66
Mashreq	Iraq	0.08	0.08	0.13	0.20	0.28	0.34
Mashreq	Palestine	0.30	0.29	0.30	0.30	0.31	0.30
Mashreq	Jordan	0.34	0.32	0.29	0.26	0.23	0.20
Mashreq	Lebanon	0.14	0.14	0.14	0.14	0.14	0.13
STC	Yemen	1.94	1.84	1.73	1.61	1.48	1.34
STC	Somalia	1.12	1.16	1.19	1.21	1.20	1.15
STC	Sudan	0.16	0.19	0.43	0.69	0.94	1.15
STC	Comoros	-0.15	0.03	0.27	0.50	0.72	0.93
STC	Djibouti	0.06	0.06	0.09	0.13	0.16	0.19

Table 3.5
Slum population as a
percentage of urban
population for select
Arab States
(1990-2014)

Region	Country	1990	1995	2000	2005	2007	2009	2014
GCC	Bahrain	-	-	-	-	-	-	-
GCC	Kuwait	-	-	-	-	-	-	-
GCC	Oman	-	-	-	-	-	-	-
GCC	Qatar	-	-	-	-	-	-	-
GCC	Saudi Arabia	-	-	-	18.0	-	-	-
GCC	Emirates	-	-	-	-	-	-	-
Mashreq	Iraq	16.9	16.9	16.9	52.8	52.8	52.8	47.2
Mashreq	Syria	-	-	-	10.5	22.5	-	19.3
Mashreq	Jordan	-	-	-	15.8	17.7	19.6	12.9
Mashreq	Egypt	50.2	39.2	28.1	17.1	14.4	13.1	10.6
Mashreq	Lebanon	-	-	-	53.1	-	-	-
Mashreq	Palestine	-	-	-	-	-	-	-
Maghreb	Mauritania	-	-	-	-	-	-	79.9
Maghreb	Morocco	37.4	35.2	24.2	13.1	13.1	13.1	13.1
Maghreb	Tunisia	-	-	-	-	-	-	8.0
Maghreb	Algeria	-	-	-	-	-	-	-
Maghreb	Libya	-	-	-	-	-	-	-
STC	Sudan	-	-	-	-	-	-	91.6
STC	Comoros	65.4	65.4	68.9	68.9	68.9	68.9	69.6
STC	Somalia	-	-	-	73.5	73.6	73.6	73.6
STC	Yemen	-	-	-	67.2	76.8	-	60.8
STC	Djibouti	-	-	-	-	-	-	-

Source: United Nations Statistics Division 2015 (data for all available Arab states)

Table 3.6
Urban population,
number of cities
and percentage
of urban population
by size class of
urban settlement

		2015	2030	2015	2030
Maghreb	Algeria	1	2	2 594	4 531
Maghreb	Morocco	4	5	7 787	11 457
Maghreb	Libya	1	1	1 126	1 333
Maghreb	Tunisia	1	1	1 993	2 347
Maghreb	Mauritania	0	1	0	1 432
Maghreb Total		7	10	13 501	21 101
Mashreq	Egypt	2	2	23 549	30 815
Mashreq	Lebanon	1	1	2 226	2 437
Mashreq	Syrian	4	7	9 005	16 422
Mashreq	Palestine	0	0	0	0
Mashreq	Jordan	1	1	1 155	1 355
Mashreq	Iraq	5	7	11 526	19 592
Mashreq Total		13	18	47 462	70 621
GCC	Bahrain	0	0	0	3 915
GCC	Kuwait	0	1	1	2 779
GCC	Oman	0	1	0	1 124
GCC	Qatar	0	0	0	0
GCC	Saudi Arabia	5	5	14 561	17 965
GCC	Emirates	3	3	4 839	6 969
GCC Total		9	10	22 178	29 972
STC	Comoros	0	0	0	0
STC	Djibouti	0	0	0	0
STC	Somalia	1	2	2 138	5 464
STC	Sudan	1	2	5 129	9 437
STC	Yemen	1	3	2 962	7 641
STC Total		3	7	10 229	22 542
Grand Total		32	45	93 370	144 236

4. Governance Indicators⁵

Voice and accountability – reflects perceptions of the extent to which a country’s citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media.

Political stability and absence of violence/terrorism – measures perceptions of the likelihood of political instability and/or politically-motivated violence, including terrorism.

Government effectiveness – reflects perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government’s commitment to such policies.

Rule of law – reflects perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence.

Control of corruption – reflects perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as “capture” of the state by elites and private interests.

Table 4.1
Control of corruption

Region	Country/Territory	2006	2007	2008	2009	2010	2011	2012	2013	2014
GCC	Emirates	0.95	1.08	1.13	0.95	0.93	1.07	1.18	1.29	1.23
GCC	Qatar	1.09	0.81	1.11	1.72	1.57	1.08	1.19	1.24	1.09
GCC	Bahrain	0.24	0.25	0.25	0.24	0.25	0.24	0.39	0.45	0.30
GCC	Oman	0.19	0.27	0.45	0.29	0.28	0.00	0.08	0.08	0.25
GCC	Saudi Arabia	-0.25	-0.18	-0.03	-0.01	0.06	-0.37	-0.06	-0.01	0.10
GCC	Kuwait	0.54	0.49	0.54	0.42	0.40	0.13	-0.16	-0.15	-0.26
Maghreb	Tunisia	-0.07	-0.11	-0.18	-0.11	-0.15	-0.17	-0.15	-0.14	-0.09
Maghreb	Morocco	-0.40	-0.32	-0.38	-0.31	-0.18	-0.40	-0.44	-0.36	-0.26
Maghreb	Algeria	-0.49	-0.52	-0.56	-0.55	-0.49	-0.50	-0.48	-0.47	-0.61
Maghreb	Mauritania	-0.68	-0.50	-0.72	-0.56	-0.67	-0.56	-0.73	-0.80	-0.92
Maghreb	Libya	-1.03	-0.96	-0.86	-1.17	-1.26	-1.29	-1.40	-1.52	-1.61
STC	Djibouti	-0.62	-0.47	-0.19	-0.29	-0.32	-0.30	-0.38	-0.44	-0.49
STC	Comoros	-0.64	-0.65	-0.76	-0.78	-0.75	-0.71	-0.73	-0.73	-0.53
STC	Sudan	-1.17	-1.34	-1.48	-1.21	-1.26	-1.23	-1.51	-1.49	-1.45
STC	Yemen	-0.69	-0.69	-0.69	-1.02	-1.16	-1.19	-1.23	-1.20	-1.55
STC	Somalia	-1.84	-1.90	-1.92	-1.72	-1.74	-1.70	-1.59	-1.58	-1.69
Mashreq	Jordan	0.30	0.31	0.41	0.22	0.06	0.10	0.07	0.09	0.15
Mashreq	Palestine	-1.10	-0.81	-1.15	-0.36	-0.34	-0.80	-0.61	-0.53	-0.57
Mashreq	Egypt	-0.66	-0.67	-0.71	-0.42	-0.55	-0.66	-0.59	-0.60	-0.59
Mashreq	Lebanon	-0.94	-0.89	-0.84	-0.83	-0.86	-0.89	-0.87	-0.93	-1.06
Mashreq	Iraq	-1.56	-1.58	-1.57	-1.39	-1.31	-1.21	-1.24	-1.25	-1.34
Mashreq	Syria	-0.99	-1.01	-1.08	-1.07	-1.08	-1.05	-1.17	-1.24	-1.55

FOOTNOTES

⁵ <http://info.worldbank.org/governance/wgi/index.aspx#home>.

Table 4.2
Government effectiveness

Region	Country/Territory	2006	2007	2008	2009	2010	2011	2012	2013	2014
GCC	Emirates	0.92	0.92	0.88	1.02	0.91	1.06	1.14	1.17	1.48
GCC	Qatar	0.55	0.44	0.61	1.00	0.89	0.78	0.95	1.07	0.99
GCC	Bahrain	0.40	0.42	0.41	0.50	0.48	0.55	0.54	0.58	0.59
GCC	Oman	0.27	0.35	0.44	0.41	0.42	0.27	0.26	0.21	0.29
GCC	Saudi Arabia	-0.23	-0.11	-0.07	-0.06	0.03	-0.32	0.03	0.06	0.23
GCC	Kuwait	0.24	0.11	0.01	0.21	0.18	0.02	-0.08	-0.07	-0.15
Maghreb	Tunisia	0.58	0.47	0.31	0.40	0.24	0.03	-0.05	-0.07	-0.13
Maghreb	Morocco	-0.14	-0.16	-0.17	-0.13	-0.09	-0.15	-0.07	-0.04	-0.14
Maghreb	Algeria	-0.52	-0.60	-0.61	-0.58	-0.48	-0.57	-0.55	-0.56	-0.51
Maghreb	Mauritania	-0.77	-0.86	-0.95	-0.88	-0.96	-0.93	-0.92	-0.98	-1.05
Maghreb	Libya	-1.11	-1.20	-1.16	-1.08	-1.10	-1.35	-1.49	-1.48	-1.64
STC	Djibouti	-0.90	-0.86	-0.88	-0.91	-0.99	-0.96	-1.10	-1.03	-0.97
STC	Yemen	-0.92	-0.86	-0.87	-1.08	-1.02	-1.13	-1.28	-1.20	-1.41
STC	Sudan	-1.14	-1.08	-1.27	-1.27	-1.37	-1.39	-1.46	-1.51	-1.61
STC	Comoros	-1.68	-1.75	-1.77	-1.77	-1.74	-1.75	-1.55	-1.57	-1.67
STC	Somalia	-2.31	-2.34	-2.45	-2.26	-2.24	-2.16	-2.23	-2.27	-2.48
Mashreq	Jordan	0.18	0.22	0.22	0.28	0.13	0.10	-0.04	-0.11	0.13
Mashreq	Lebanon	-0.32	-0.34	-0.41	-0.49	-0.28	-0.26	-0.34	-0.39	-0.38
Mashreq	Palestine	-1.11	-1.22	-1.32	-0.71	-0.42	-0.63	-0.75	-0.77	-0.53
Mashreq	Egypt	-0.48	-0.38	-0.35	-0.27	-0.38	-0.57	-0.80	-0.87	-0.82
Mashreq	Iraq	-1.77	-1.59	-1.26	-1.20	-1.22	-1.15	-1.11	-1.08	-1.13
Mashreq	Syria	-0.93	-0.76	-0.62	-0.59	-0.60	-0.50	-1.22	-1.34	-1.44

Table 4.3
Political stability and absence of violence/terrorism

Region	Country/Territory	2006	2007	2008	2009	2010	2011	2012	2013	2014
GCC	Qatar	0.91	0.94	1.10	1.21	1.12	1.17	1.21	1.19	1.00
GCC	Emirates	0.91	0.97	0.70	0.91	0.79	0.91	0.87	0.89	0.81
GCC	Oman	0.82	0.91	0.92	0.80	0.59	0.42	0.45	0.45	0.66
GCC	Kuwait	0.36	0.56	0.46	0.34	0.44	0.29	0.18	0.14	0.14
GCC	Saudi Arabia	-0.54	-0.50	-0.37	-0.51	-0.22	-0.46	-0.45	-0.41	-0.24
GCC	Bahrain	-0.39	-0.24	-0.24	-0.16	-0.51	-0.96	-1.14	-1.35	-0.94
Maghreb	Morocco	-0.47	-0.51	-0.60	-0.41	-0.38	-0.39	-0.46	-0.48	-0.39
Maghreb	Mauritania	0.22	0.27	-0.65	-0.88	-1.08	-1.17	-1.13	-1.00	-0.58
Maghreb	Tunisia	0.24	0.19	0.12	0.06	-0.04	-0.37	-0.74	-0.93	-0.93
Maghreb	Algeria	-1.12	-1.13	-1.09	-1.22	-1.26	-1.36	-1.32	-1.18	-1.17
Maghreb	Libya	0.35	0.73	0.81	0.81	-0.03	-1.29	-1.54	-1.81	-2.32
STC	Comoros	-0.31	-1.06	-1.08	-0.75	-0.50	-0.48	-0.38	-0.19	-0.19
STC	Djibouti	-0.22	-0.06	0.30	0.50	0.26	0.18	0.17	-0.12	-0.72
STC	Sudan	-2.12	-2.35	-2.47	-2.65	-2.66	-2.53	-2.27	-2.20	-2.36
STC	Somalia	-2.78	-3.24	-3.31	-3.32	-3.11	-3.07	-2.85	-2.74	-2.49
STC	Yemen	-1.35	-1.56	-1.99	-2.32	-2.42	-2.42	-2.41	-2.35	-2.53
Mashreq	Jordan	-0.77	-0.31	-0.36	-0.36	-0.31	-0.52	-0.52	-0.62	-0.56
Mashreq	Egypt	-0.87	-0.59	-0.52	-0.62	-0.91	-1.45	-1.46	-1.65	-1.58
Mashreq	Lebanon	-1.85	-2.13	-1.90	-1.58	-1.63	-1.56	-1.66	-1.69	-1.72
Mashreq	Palestine	-1.70	-1.95	-1.97	-2.03	-1.94	-1.93	-1.94	-1.76	-1.99
Mashreq	Iraq	-2.83	-2.79	-2.48	-2.19	-2.26	-1.84	-1.93	-2.02	-2.47
Mashreq	Syria	-0.28	-0.30	-0.30	-0.49	-0.81	-2.01	-2.69	-2.68	-2.76

Table 4.4
Rule of law

Region	Country/Territory	2006	2007	2008	2009	2010	2011	2012	2013	2014
GCC	Qatar	0.72	0.63	0.79	1.01	0.95	0.84	1.03	1.04	0.99
GCC	Emirates	0.37	0.36	0.49	0.46	0.37	0.53	0.56	0.64	0.71
GCC	Oman	0.37	0.51	0.71	0.66	0.64	0.54	0.58	0.56	0.58
GCC	Bahrain	0.42	0.57	0.57	0.55	0.48	0.39	0.28	0.35	0.45
GCC	Saudi Arabia	0.11	0.19	0.19	0.16	0.26	0.14	0.24	0.26	0.27
GCC	Kuwait	0.58	0.65	0.62	0.61	0.60	0.55	0.38	0.39	0.05
Maghreb	Morocco	-0.25	-0.26	-0.29	-0.19	-0.16	-0.22	-0.21	-0.26	-0.06
Maghreb	Tunisia	0.20	0.17	0.14	0.20	0.12	-0.14	-0.16	-0.21	-0.12
Maghreb	Algeria	-0.64	-0.71	-0.71	-0.76	-0.75	-0.77	-0.75	-0.66	-0.73
Maghreb	Mauritania	-0.72	-0.64	-1.12	-0.79	-0.87	-0.88	-0.90	-0.97	-0.82
Maghreb	Libya	-0.99	-0.81	-0.70	-0.85	-0.94	-1.18	-1.15	-1.36	-1.52
STC	Djibouti	-0.82	-0.70	-0.59	-0.65	-0.71	-0.79	-0.78	-0.76	-0.85
STC	Comoros	-0.98	-1.03	-1.07	-1.15	-1.06	-1.00	-1.03	-0.99	-0.94
STC	Sudan	-1.31	-1.39	-1.41	-1.23	-1.30	-1.22	-1.21	-1.25	-1.15
STC	Yemen	-1.02	-0.96	-0.98	-1.09	-1.07	-1.27	-1.27	-1.16	-1.17
STC	Somalia	-2.55	-2.62	-2.67	-2.50	-2.45	-2.36	-2.45	-2.44	-2.39
Mashreq	Jordan	0.38	0.45	0.46	0.28	0.20	0.26	0.37	0.39	0.48
Mashreq	Palestine	-0.50	-0.77	-0.81	-0.35	-0.21	-0.44	-0.46	-0.44	-0.44
Mashreq	Egypt	-0.20	-0.18	-0.09	-0.06	-0.12	-0.40	-0.46	-0.60	-0.60
Mashreq	Lebanon	-0.63	-0.71	-0.68	-0.69	-0.69	-0.66	-0.75	-0.78	-0.76
Mashreq	Syria	-0.86	-0.69	-0.60	-0.49	-0.50	-0.69	-1.10	-1.48	-1.34
Mashreq	Iraq	-1.79	-1.92	-1.84	-1.77	-1.62	-1.51	-1.50	-1.47	-1.36

Table 4.5
Voice and accountability

Region	Country/Territory	2006	2007	2008	2009	2010	2011	2012	2013	2014
GCC	Kuwait	-0.55	-0.52	-0.52	-0.46	-0.51	-0.54	-0.63	-0.65	-0.65
GCC	Qatar	-0.66	-0.91	-0.88	-0.89	-0.89	-0.96	-0.80	-0.86	-0.98
GCC	Oman	-1.12	-1.01	-1.02	-1.03	-1.00	-1.02	-0.98	-1.00	-1.05
GCC	Emirates	-1.00	-0.91	-0.92	-0.84	-0.91	-0.91	-1.01	-1.03	-1.06
GCC	Bahrain	-0.91	-0.86	-0.87	-0.80	-0.97	-1.22	-1.32	-1.32	-1.32
GCC	Saudi Arabia	-1.70	-1.62	-1.65	-1.78	-1.74	-1.86	-1.81	-1.82	-1.78
Maghreb	Tunisia	-1.23	-1.32	-1.29	-1.31	-1.37	-1.39	-1.22	-1.12	0.03
Maghreb	Morocco	-0.73	-0.73	-0.79	-0.78	-0.73	-0.74	-0.63	-0.73	-0.70
Maghreb	Mauritania	-0.90	-0.72	-0.99	-0.97	-0.95	-0.97	-0.96	-0.96	-0.91
Maghreb	Algeria	-0.92	-1.00	-0.99	-1.06	-1.03	-1.00	-0.90	-0.89	-0.93
Maghreb	Libya	-1.94	-1.90	-1.88	-1.86	-1.89	-1.56	-0.94	-1.00	-1.15
STC	Comoros	-0.30	-0.48	-0.36	-0.38	-0.47	-0.43	-0.52	-0.52	-0.33
STC	Yemen	-1.19	-1.11	-1.23	-1.28	-1.34	-1.41	-1.39	-1.35	-1.34
STC	Djibouti	-1.10	-1.18	-1.18	-1.18	-1.25	-1.40	-1.42	-1.44	-1.41
STC	Sudan	-1.71	-1.62	-1.62	-1.66	-1.72	-1.77	-1.77	-1.78	-1.73
STC	Somalia	-1.83	-1.93	-1.93	-2.09	-2.07	-2.07	-2.23	-2.19	-2.13
Mashreq	Lebanon	-0.41	-0.50	-0.46	-0.38	-0.35	-0.42	-0.42	-0.44	-0.42
Mashreq	Jordan	-0.69	-0.65	-0.72	-0.78	-0.80	-0.80	-0.74	-0.82	-0.77
Mashreq	Palestine	-0.54	-0.76	-0.78	-0.93	-0.76	-0.96	-0.88	-0.87	-0.85
Mashreq	Egypt	-1.16	-1.12	-1.18	-1.12	-1.15	-1.13	-0.77	-1.04	-1.19
Mashreq	Iraq	-1.40	-1.23	-1.20	-1.10	-1.06	-1.14	-1.12	-1.10	-1.21
Mashreq	Syria	-1.70	-1.72	-1.67	-1.64	-1.64	-1.75	-1.80	-1.77	-1.80

Annex 05

Arab cities registered in UNISDR MCR campaign by 31 December 2015

Lebanon

Aabbassiyet Tyre, Aalma ech-Chaab, Aaqabet Rachaya, Aaqoura, Aarab Salim, Aarbet Qozhaiya, Aarjis, Aarsal, Aassoun , Aaynata Baalbek, Aaytit, Achach, Afka, Ain Aakrine, Ain Arab, Ain Baal , Ain El Safsaf-Mar Mikhael Bnabil, Aain el-Ghouaybe, Ain Et Tineh, Ain Kfar Zabad, Ain Qana, Ain Qani, Ain Saade, Ain Zebde, Aintoura, Aintourine, Al Atchaneh, Al Baddawi, Al Bourghliyah, Al Dinnieh Union of Municipalities, Al Fidar, Al Ghabehe, Al Halousieh, Al Hmairy, Al Jebbine, Al Kneuseh, Al Majdal, Al Mourouj, Al Ouyoun, Al-Tawfiqiyah, Al-Aairoun, Anfeh, Antelias-Naccache, Ardeh, Arzoun, Assia, Baabda, Baabdat, Baadarane, Baalbek Beeka, Bafliye, Bakaa, Bakhaaoun, Barich, Baskinta, Batoulay, Bazouriye, Bebnine, Bechmezzine, Bechouat, Bedias, Behouaita, Beirut, Beit Meri, Beit Shaar-Mazraat el Hadira, Beit Chabab - Chaouiyeh el Qnaytra, Bejje, Bichtlida, Bikfaya-el Mhaydse, Biyad, Blat Jbeil-Wichita-Qartaboun, Borj Ech-Chemali, Borj Hammoud, Borj Rahhal, Bouarej, Boustane, Bqarsouna, Broumana, Bsalim-Mezher-Majzoub, Bteghrin, Btermaz, Bterram, Byaqout, Byblos, Bziza, Chaaitiye, Chaat, Chehabiye, Chehour, Chihine, Chilfa, Choueifat, Dahr el Souan, Daraiya Zgharta, Dbayeh-Zouk el Kharab-Aoukar-Haret Ee Ballaneh, Debaal Tyre, Dedde, Deir Ames, Deir El Qamar, Deir Nbouh, Deir Qanoun el Aain, Deir Qanoun en-Nahr, Der Kaifa, Derdghaiya, Dhairah, Dik el Mehdi, Douris, El Dekwaneh Mar Roukoz, El Douar, El Khenshara-El Jouar, El Mtein-Mshikha, El Qaaqour, El Shwair-Ain El Sendiyene, El-Bire, El-Rafide, En Naqoura, Eymar, Fanar, Fatre, Federation of Municipalities of the Higher Chouf, Fiaa, Flawi, Ghabat-Rweiss, Ghabet Bologna-Wata El Marouj, Ghalboun, Hadath Baalbek, Halbata, Hanaouay, Haouch el Rafqa, Haret Jandal, Harf el Sayad, Heloueh, Henniye, Houmine el Faouqa, Hsoun, Iaal, Iqlim el Touffah Union of municipalities, Jabbouleh, Jal el Dib-Bkennaya, Jannata, Jarjou'a, Jbaa Ech-Chouf, Jbaa, Jbal el Botm, Jdaidet El Fekehe, Jdeideh-el Baouchriye-el Sid, Jdita, Jebaa, Jebjennine, Jej Faouzi Achkouti, Jouaiya, Kafarzina, Karoun, Kennabet Broumana, Kfar Aabida, Kfar Bnine, Kfar Dines, Kfar Hazir, Kfar Michki, Kfar Saroun, Kfar Zabad, Kfaraaqab, Kfarfila, Kfarhata Zgharta, Kfartay, Kherbet Kanafar, Khereibit ech-Chouf, Khirbet Rouha, Kolaylat al Harfouche, Koussaya, Laqlouk, Lefed, Maaraboun, Maarake, Maaroub, Mahrouneh, Majdaloun, Majdel Tarchich, Majdel, Majdelzoun, Majedil, Makse, Mansoura, Mansouri Tyre, Mansouriyeh-Mkalles-Dishouniyeh, Mar Moussa el Douar, Mar Moussa el Douar, Mar Shaaya-el Mazkeh, Marjaba, Mayfouq-Qottara, Mazraaet Meshref, Mazraaet Yashouh, Mdoukha, Merouahine, Mina, Moukhtara, Mrah es-Srayj, Mrah es-Sfireh, Mristi, Naba al Qaddam, Nabay, Nahle, Nakhle - Hara al Khassa, Niha, Niha el Chouf, Nimrine-Bakoura, Qabb Elias, Qald as-Sabe', Qana, Qarsaita, Qlaile Tyre, Qobayyet, Qornet Shahwan-Ain Aar-Beit el Kiko and El Hbous, Rabieh, Rach'ine, Ram-Jabbaniyya, Ras Kifa, Recheknanay, Rmadiye, Rmassa, Roumieh, Roumine, Sadiqine, Saghbine, Saida, Sakiet El Mesk-Bhersaf, Sarba, Selaa, Serrain el Tahta, Shamah, Sin el Fil, Srifia, Talia, Tarane, Tartij, Tayr Debba, Tayr Falsay, Tayr Harfa, Temnine el Faouqa, Temnine el Tahta, Terboul, Toura, Tripoli, Tyre Union of municipalities, Tyre,

Wadi Faara, Yahchouch, Yanouh Jbeil-Hdeine, Yanouh Sour (Tyre), Yarine, Youmine, Zalka-Amarat Chalhou, Zaroun, Zebqine, Zekrit, Zgharta-Ehden.

Jordan

Amman, Aqaba, Salt, Irbid, Jarash, Madaba, Petra, Salt, Zarka.

Iraq

Maysan.

Palestine

Al-Khalil/Hebron, Bethlehem, Gaza, Jabalia al-Nazlah, Ariha, Nablus, Qalqilia, Ramallah.

Syria

Aleppo and Homs.

Egypt

Alexandria, Cairo, Ismailia, Sharm al-Sheikh.

Tunisia

Ain Draham, Bizerte, Boussalem, Foussana, Hydra, Jidiliène, Menzel Jemil, Mournag, Sbiba, Tadamen M'niha, Thala, Tunis.

Morocco

Agadir and Tata.

UAE

Abu Dhabi and Dubai.

KSA

Dammam.

Yemen

Aden and al Mukalla.

Annex 06

Cultural and natural properties listed in the World Heritage List

Algeria:

- six cultural properties: Al Qal'a of Beni Hammad, Djemala, Kasbah of Algiers, M'Zab Valley, Timgad, Tipasa
- one mixed cultural and natural property: Tassili n'Ajjer

Bahrain:

- two cultural properties: Pearling, Testimony of an Island Economy and Qal'at al-Bahrain – Ancient Harbout and Capital of Dilmun

Egypt:

- six cultural properties: Abu Mena, Ancient Thebes with its Necropolis, Historic Cairo, Memphis and its Necropolis – the Pyramid Fields from Giza to Dahshur, Nubian Monuments from Abu Simbel to Philae, and Saint Catherine Area
- one natural Property: Wadi Al-Hitan

Iraq:

- four cultural properties: Ashur (Qal'at Sherqat), Erbil Citadel, Hatra, Samarra Archaeological City

Jordan:

- four cultural properties: Baptism site Bethany Beyond the Jordan (Al-Maghtas), Petra, Quseir Amra, and Um er-Rasas (Kastrom Mefa'a)
- one mixed property: Wadi Rum Protected Area

Libya:

- five cultural properties: Archaeological Site of Cyrene, Archaeological Site of Leptis Magna, Archaeological Site of Sabratha, Old Town of Ghadamès, and Rock- Art Sites of Tadrant Acacus

Lebanon:

- five cultural properties: Anjar, Baalbek, Byblos, Wadi Qadisha (the Holy Valley) and the Forest of the Cedars of God (horsh Arz el-Rab), Tyre

Mauritania:

- one cultural property: Ancient Ksour of Ouadane, Chinguetti, Tichitt and Oualata
- one natural property: Banc d'Arguin National Park

Morocco:

- nine cultural properties: Archaeological Site of Volubilis, Historic City of Meknes, Ksar of Ait-Ben-Haddou, Medina of Essaouira (formerly Mogador), Medina of Fez, Medina of Marrakesh, Medina of Tétouan (formerly known as Titawin), Portuguese City of Mazagan (El Jadida) and Rabat, Modern Capital and Historic City: a Shared Heritage

Oman:

- four cultural properties: Aflaj Irrigation Systems of Oman, Archaeological Sites of Bat, Al-Khutm and Al-Ayn, Bahla Fort, Land of Frankincense

Palestine:

- two cultural properties: Birthplace of Jesus: Church of the Nativity and the Pilgrimage Route, Bethlehem and Palestine: Land of Olives and Vines – Cultural Landscape of Southern Jerusalem, Battir

Qatar:

- one cultural property: Al Zubarah Archaeological Site

Saudi Arabia:

- four cultural properties: Al-Hijr Archaeological Site, Al-Turaif District in ad-Diriyah, Historic Jeddah, the Gate of Makkadh, and Rock Art in the Hail Region of Saudi Arabia

Sudan:

- two cultural properties: Archaeological Sites of the Island of Meroe and Gebel Barkal, and the Sites of the Napatan Region

Syria:

- six cultural properties: Ancient City of Aleppo, Ancient City of Bosra, Ancient City of Damascus, Ancient Villages of Northern Syria, Crac des Chevaliers and Qal'at Salah Ed-Din, and Site of Palmyra

Tunisia:

- seven cultural properties: Amphitheatre of El Jem, Archaeological Site of Carthage, Dougga/Thugga, Kairouan, Medina of Sousse, Medina of Tunis, Public Town of Kerkuane and its Necropolis
- one natural property: Ichkeul National Park

United Arab Emirates:

- one cultural property: Cultural Sites of Al Ain (Hafit, Hili, Bidaa Bint Saud and Oases Areas)

Yemen:

- three cultural properties: Historic Town of Zabid, Old City of Sanaa, and Old Walled City of Shibam
- one natural property: Socotra Archipelago

NB. Most of the cultural heritages of Syria and Yemen have been brutally destroyed during the current wars, along with other culturally valuable sites in Iraq and Libya.

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