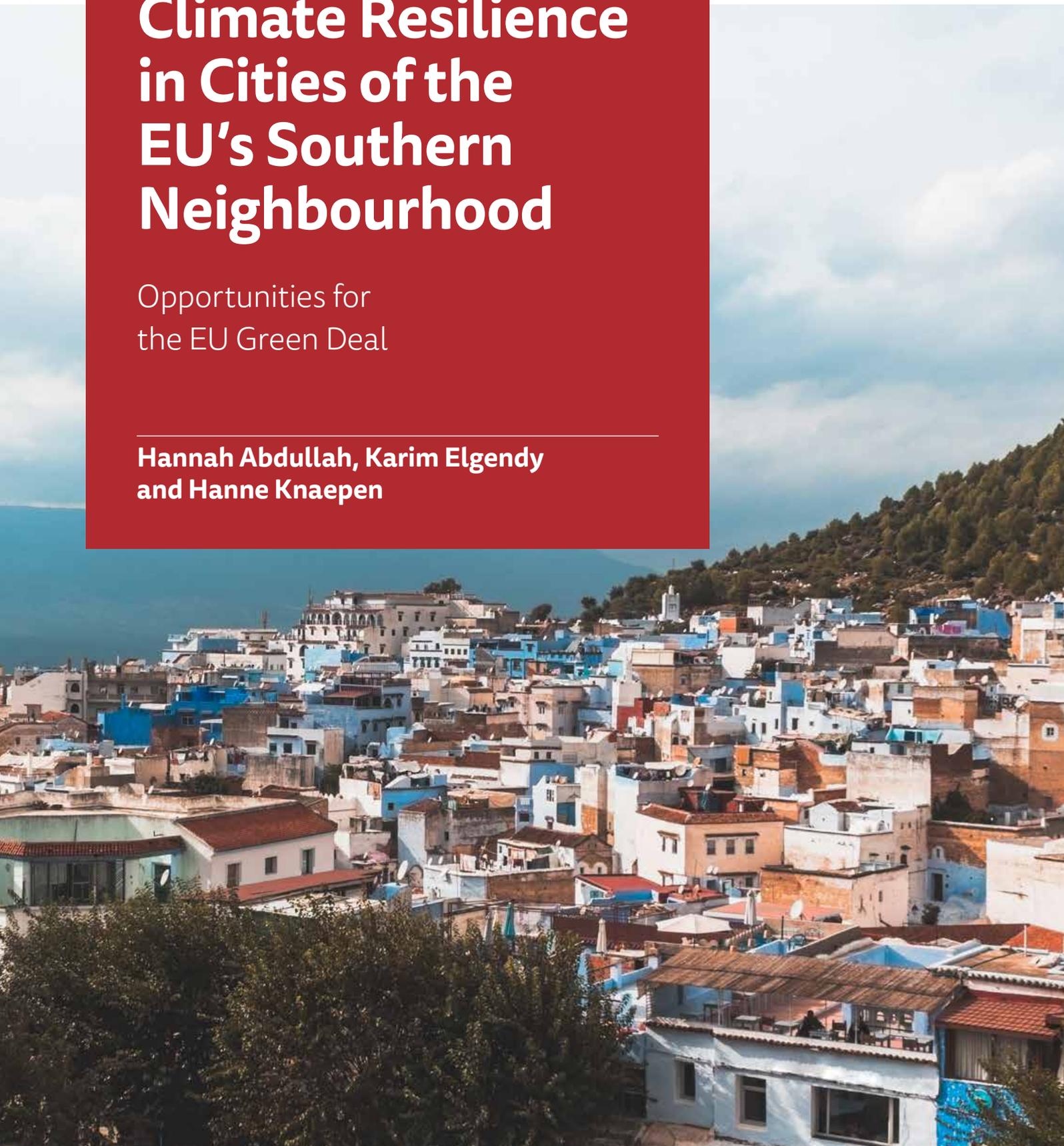


Climate Resilience in Cities of the EU's Southern Neighbourhood

Opportunities for
the EU Green Deal

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and Hanne Knaepen**



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Summary

Cities in the Middle East and North Africa are already suffering the effects of climate change. Weak urban regulation, ineffective climate policies, limited decentralization and insufficient empowerment of local authorities and civil society further decrease urban resilience. Future climate scenarios and projected urban growth threaten the stability of the region; with potential negative knock-on effects on Europe. This CASCADES Spotlight Study examines climate vulnerabilities in urban areas in countries to the south of the EU and the wider Middle East and North Africa region and advocates for systemic approaches to addressing urban climate resilience by strengthening the water-energy-food nexus, as well as other enabling factors such as decentralization. It concludes with recommendations on how the European Green Deal can help cities in the region adapt to climate impacts, based on a water-energy-food nexus approach.

Over the past two decades, the European Commission has stepped up its support for urban climate action and resilience. An increasing number of programmes financed under the European Neighbourhood Policy (ENP) South have addressed urban climate resilience in response to the region's rapid urbanization and the high climate vulnerability of cities.

The number of urban dwellers in the wider Middle East and North Africa region is estimated to reach 527 million in 2050, an increase of 72% compared to 2020. At the same time, climate impacts – including both slow onset changes and sudden disasters – are putting additional stress on urban infrastructure. This stress is aggravated by weak urban regulations that have created unsustainable development trends which undermine the potential benefits of urbanization and adversely affect urban climate resilience. The prevalence of highly centralized administrative systems and incomplete decentralization reforms hamper local capacity building and decision-making, which are prerequisites for effective adaptation and resilience.

The convergence of the region's harsh climatic conditions with rapid, unsustainable urbanization and the associated socio-economic burdens can exacerbate existing political instability, conflict-induced migration and poverty. These developments could cascade into the EU, altering security, trade and diplomatic relations with the Southern Neighbourhood. The EU's evolving approach to working with local authorities on urban infrastructure and climate governance is a first step towards addressing the region's intertwined urban and climate crises. However, this approach is still in the early stages and there is a need to reflect on lessons learned and how urban spaces, climates and governance are evolving in the region.

This study suggests that the EU's overwhelming focus on supporting cities in the region with energy efficiency and the transition to sustainable energy systems is not enough to strengthen urban climate resilience. In cities of the Southern Neighbourhood, which typically struggle with resource management and scarcity, climate resilience will increasingly depend on local capacities to formulate and implement nexus approaches, especially in the water, energy and food sectors. Based on case studies of three small and intermediary urban areas, the study advocates for a systemic approach to addressing urban climate

resilience in Southern Neighbourhood cities. Considering the established effectiveness of applying a water-energy-food nexus approach to improving climate resilience, the paper stresses the need for local governments to explore nexus opportunities between the water, energy and food sectors in order to achieve resilient and sustainable urbanism, while also highlighting other enabling factors such as decentralization. It concludes by exploring how future external action around the European Green Deal and its ambitions for systemic transformation could benefit from stepping up cooperation with cities in the Southern Neighbourhood around the water-energy-food nexus.

Introduction

Over the past two decades, the European Commission has progressively stepped up its support for urban climate action and resilience, signalling its recognition of the important role local governments play in the transition to a climate-neutral Europe (Kern, 2019; Abdullah, 2021). In line with these efforts, the strategists behind the European Green Deal (EGD) stress that cities “will have a huge role to play in the fundamental transformation that the Green Deal is to drive in our societies” (European Commission Vice President Frans Timmermans quoted in European Committee of the Regions, 2019). The new Climate-Neutral and Smart Cities mission run by the Horizon Europe research and innovation programme, which supports and showcases cities as innovation hubs that can accelerate and lead on the EGD, is one example of pioneering initiatives under way (European Commission, n.d.a). As urban experimentation with climate mitigation has shown, cities are the optimal scale for the elaboration and implementation of policy innovation (Bulkeley & Castán Broto, 2012). They are large enough to test and pilot new ideas before modelling solutions, and small enough to discard them if they do not work well without excessive costs.

Climate resilience at subnational level has also become a focus area of the EU's work with its neighbours to the south. The European Neighbourhood Policy (ENP) is a foreign relations instrument for cooperation with neighbouring countries and the Southern Neighbourhood covers ten partner countries: Algeria, Egypt, Israel, Jordan, Lebanon, Libya, Morocco, Palestine, Syria and Tunisia. In response to the region's rapid urbanization and the high climate vulnerability of cities, an increasing number of programmes financed under ENP-South address urban climate resilience. In addition, the Union for the Mediterranean (UfM) – the intergovernmental organization of the 27 EU member states and 15 partner countries from the Mediterranean basin – adopted its first Urban Agenda in 2017 (UfM, 2017), signalling the political willingness to establish a more coordinated approach to urban policy, including on climate resilience.

Despite being home to some of the oldest continuously inhabited cities of the world, the Middle East and North Africa (MENA) region, which extends from the Maghreb in northwest Africa to the Levant, Iraq, and the Arabian Peninsula, is a latecomer to urbanization compared to Europe and North America. While western Europe urbanized in the 19th century, reaching 40% urban population at the beginning of the 20th century, urban dwellers in the MENA region represented only 16% of the total population at that time. During the 20th century, the globalization of hinterlands allowed cities of the MENA region to overcome their limited natural resources, which fuelled rapid growth in urbanization. The region's urban population grew from 35% of the total in the 1960s to 65% today, and remains higher than the global average (World Bank, 2021; Elgendy & Abaza, 2020).

Estimates project that the number of urban dwellers in the region will reach 381 million in 2030 and 527 million in 2050, the number of cities with one to five million residents will increase significantly, and the majority of urban agglomerations will grow at an annual rate of one to three per cent (United Nations Department of Economic and Social Affairs, 2018b). At the same time, climate hazards and change are putting additional stress on urban infrastructure. The Arab region will become

hotter and drier, with expected increases in average annual temperatures of 1.2°C–2.6°C by the middle of the 21st century and up to 1.5°C–4.8°C by the end of the century, depending on the climate change scenario. Temperature increases are expected to be more pronounced in the summer, and in non-coastal cities. Average monthly rainfall will reduce, particularly in coastal cities, which will lead to increased aridity (United Nations Economic and Social Commission for Western Asia, 2017). The projected temperature increases do not capture the temperature extremes, which are exacerbated by urban build-up and already exceed what urban infrastructure can withstand in many places. Cities across the region, including Damascus and Baghdad, witnessed record temperatures in the summer of 2020, increasing health risks to residents (Alahmad et al., 2020; Al-Bouwarthan et al., 2019).

These climate impacts and stressors are further aggravated by generally weak regulation (weak laws or weak enforcement or both) that has allowed unsustainable urban development trends that adversely affect urban climate resilience. Energy and water inefficiency, inadequate drainage, building on natural flood plains and a lack of alternative mobility modes are common features. In part, the lack of urban planning is due to highly centralized administrative systems and incomplete decentralization reforms, which hamper local capacity building and local decision-making. Administrations, both central and local, are often unable to keep up with urban expansion and rising demand for essential services, especially water, energy and waste management. The result has been an explosion of informal activities and a growing gap in standards between private and publicly managed spaces (Elgendy & Abaza, 2020; Farhan & Al-Shawamreh, 2019; Piffero, 2009).

The convergence of harsh climatic conditions with rapid, unsustainable urbanization and the associated socio-economic burdens will exacerbate existing inequalities and cause increasing poverty. This could lead to social and political instability, and possibly to conflicts that would in turn induce further poverty and migration (Abouelnaga, 2019). Europe will not be insulated from these potential chains of events, which will likely cascade into the EU, altering security, supply chain and trade and diplomatic relations with the countries of the Southern Neighbourhood.



The convergence of harsh climatic conditions with rapid, unsustainable urbanization and the associated socio-economic burdens will exacerbate existing inequalities and cause increasing poverty

The EU's evolving approach to working with local authorities on climate governance in the Southern Neighbourhood has been a first step towards addressing the region's intertwined urban and climate crises. Programmes launched under the ENP (see Box 1, page 25) have mainly assisted municipalities and governorates with the preparation of sustainable energy and climate action plans, and recent years have also seen nascent experience in financing and implementation of those plans (Almasri & Sarkar, 2021). Notably, the move towards working on urban issues under ENP-South has been part of a broader shift towards city-level climate action driven by global initiatives like the C40 Cities Climate Leadership Group, Resilient Cities Network and EBRD's Green Cities Action Plan, which include cities in the Southern Neighbourhood among their members.

But urban climate cooperation between Europe and the Southern Neighbourhood is still in the early stages and there is further need to reflect on lessons learned and on how urban spaces, climates and governance are evolving. The European Commission's new agenda for the Southern Neighbourhood (European Commission, 2021b) highlights the green transition and climate action as priority areas and integral to the region's resilient post-pandemic recovery. Yet, while it recognizes the local and urban dimensions of these processes, the challenges and opportunities they pose require more elaboration.

Climate cooperation at the subnational level creates new challenges for the EU. For example, there is general consensus that a nexus approach to managing resources improves climate resilience (Medinilla, 2021; Mohtar, 2017; United Nations Economic and Social Commission for Western Asia, 2016). The EU's development projects and plans in the Southern Neighbourhood that focus on national-level infrastructure and agriculture often adopt a single-system approach. EU city-level programmes have so far largely focused on finding sectoral solutions for energy (see Box 1, page 25). But as demonstrated by the regional case studies in this paper, the transformation of a single urban sector is not enough to strengthen city-level climate resilience. Instead, exploring synergies between urban sectors – in particular water, energy and food – can provide more resilient and sustainable solutions (GIZ & ICLEI, 2014). This type of approach has not been applied much in urban cooperation programmes.

With the EU currently charting the external dimension of the EGD (Council of the European Union, 2021), this is an opportune moment to assess how climate and energy diplomacy could benefit from stepping up cooperation with cities around water-energy-food nexus approaches. The EGD's ambition for systemic transformation calls for a systemic approach to urban climate resilience and sustainability that identifies trade-offs and strengthens synergies between sectors.

This study examines the specific climate vulnerabilities in urban areas in the Southern Neighbourhood and wider MENA region, and, based on case studies of three small and intermediary urban areas,¹ It advocates for a holistic vision and systemic approach in addressing urban climate resilience in cities. Considering the established effectiveness of applying a water-energy-food nexus approach to improving climate resilience, the paper stresses the need for local governments to explore nexus opportunities between the water, energy and food sectors in a systematic way in order to achieve resilient and sustainable urbanism, while highlighting other enabling factors such as decentralization. It also identifies the water-energy-food nexus as an effective entry point for advancing EGD goals in the Southern Neighbourhood.

The structure of the paper is as follows:

- **Part 1** provides an overview of the region's exposure to impacts of climate change that increase vulnerability and reduce resilience of cities and urban areas. It analyses factors limiting cities' capacity to adapt and barriers to integrating urban sustainability and resilience, and the region's water-energy-food nexus.

¹ Intermediary cities are cities with a population between 50,000 and one million people that generally play a primary role in connecting rural and urban areas to basic facilities and services.

- **Part 2** presents case studies of three small and intermediary cities in Morocco (Chefchaouen), Lebanon (Hammana) and Tunisia (Gabès) to examine current regional approaches to urban resilience and sustainability which do not always explore linkages with other sectors.
- **Part 3** explores how external action around the EGD provides an opportunity to move beyond sectoral urban cooperation and towards a more systemic approach that supports cities in formulating and implementing water-energy-food nexus approaches.
- The paper concludes with **Recommendations** on how the EU can build on the cooperation and partnerships it has already established with subnational actors to better unlock the potential for building climate resilience in cities of the Southern Partnership.

1. Urban climate vulnerabilities in the Southern Neighbourhood, and barriers to resilience

Urban climate impacts

Cities of the Southern Neighbourhood and wider MENA region² face a number of climate risks.

Average annual temperatures across the region are predicted to rise by 1.5°C–2.3°C or 3.2°C–4.8°C by the end of the 21st century, depending on the climate change scenario used. Maximum temperatures are expected to rise from 43°C to 50°C, especially in inland cities. The warming effect is expected to be stronger in summer than in winter, with the number of very hot day projected to increase steeply from about 16 days a year in the period 1986–2005 to 83–118 days annually by mid-century (United Nations Economic and Social Commission for Western Asia, 2017). Major cities are expected to experience more warming than other areas (United Nations Economic and Social Commission for Western Asia, 2017). These changes are expected to increase both heat stress and energy demand for cooling, and in some cities this would be compounded by the urban heat island effect, which occurs when an urban area is significantly warmer than its surrounding rural areas due to human activities.

Cities are also at risk from increased variability in rainfall and likelihood of extreme weather events and floods. Cities exposed to flooding risks include Casablanca and Amman. This is compounded by construction in floodplains in Casablanca and the wadis in Amman.

The increased rural desertification expected as a result of reduced rainfall is also expected to increase the prevalence of sand and dust storms in inland cities.

Sea level rise presents risk to some coastal cities, including Alexandria, and cities in the Nile Delta. It is estimated that half of the population of the Arab region lives within 100 kilometers of the coast, and that a sea level rise of just one metre would directly affect 41,500 square kilometres of coastal lands, home to at least 37 million people, and 43 port cities (Tolba & Saab, 2009).

Climate change impacts are expected to directly affect the water, energy and food sectors. Higher temperatures and heatwaves, especially during the summer, will require additional energy for cooling and will lead to increased evaporation, decreased soil moisture content and increased requirement for water for agriculture. The reduction in precipitation on the other hand – coupled with mismanagement

² While this study focuses on cities in the EU's Southern Neighbourhood, in some instances data and analysis relating to the MENA Region and the Arab world have been used due to the limited availability of data specifically on the Southern Neighbourhood.

of rangelands caused by overgrazing – will directly affect surface water, the amounts of water stored in dams, groundwater recharge, and ultimately reduce water supply for both municipal and irrigation needs. This is expected to increase demand for energy for groundwater extraction and desalination. Reduced water supply for irrigation, together with lengthening of the dry season, desertification, extreme weather events, and loss of agricultural land in areas such as the Nile Delta, are all expected to reduce agricultural productivity and food security.

Limited urban adaptive capacity

The concentration of resources and flows of material, energy, water, waste, etc, in cities is widely recognized as a powerful driver of the transition to sustainable development (Parnell, 2016). The opportunities include the economic, social, and environmental benefits created by agglomeration, economies of scale, and the network effect. Proximity, for example, provides conditions for more efficient use of energy as well as lower mobility costs. The cost advantages of economies of scale enable higher economic efficiency, while the network effect keeps attracting financial and human capital. However, cities of the Southern Neighbourhood have had limited success in reaping the resource efficiency benefits of urbanization, despite having every reason to improve the efficiency of natural resource usage to manage scarcity.

Regional cities' failure to capitalize on urbanization is due to trends that undermine it and counteract its benefits. Some of these are related to the speed of urbanization, such as the high concentration of populations in capital cities as is the case of Cairo and Beirut (United Nations Department of Economic and Social Affairs, 2018), the growth of informal areas and informal urban systems, as is the case in Beirut, and the convergence of new rural migrants into 'urban villages' within cities, as in Cairo. These trends have prevented cities from achieving the full potential of urbanization.

Other trends relate to low urban density and poor public transportation networks which reduce overall efficiency and increase environmental footprint. Many recent urban developments in the region followed a car-dominant American urban model which is inappropriate to the regional climatic conditions and results in high levels of energy use and carbon emissions. This trend is compounded by de-densification, a process where the size of the city grows faster than its population, which is common across the region (Elgendy, 2021).

Rapid urbanization and its trends (concentration, informality and urban villages), as well as the challenges mentioned above, have all placed significant pressures on cities and adversely affected cities' resilience, leaving them vulnerable to climate change and other shocks and stresses, such as displacement, and food price shocks caused by import dependence.

With urban infrastructure struggling to catch up with ever-increasing demand for energy, water and food, and struggling to manage issues such as traffic congestion, air pollution and poor solid waste management, cities lack the flexibility, redundancy, robustness and integration of urban systems that are necessary to withstand shocks and stresses.

Most cities in the MENA region remain dependent on one or two sources of water, one mode of transport and one or two sources of energy. This lack of flexibility and redundancy is a structural vulnerability for many cities. In addition, other challenges such as environmental degradation, socio-economic inequality, and – as we show

below – poor urban governance and lack of inclusivity in decision-making have all left cities of the region with limited adaptive and absorptive capacity to deal with the impacts of climate change, natural disasters, epidemics or conflict.

In a region where two-thirds of the population live in cities, improving resource efficiency and increasing urban resilience are not only critical for climate action but are also intertwined. In a context where cities are unsustainable, a standard urban resilience model, where cities can recover and restore their functionality following shocks and stresses, only means restoring cities to their original unsustainable state. Conversely, a steady-state approach to urban sustainability is unrealistic for cities which are vulnerable to social shocks and stresses. Cities therefore need a model of urban resilience that would trigger a change to a more sustainable state, integrating urban sustainability in a way that facilitates long-term resilience. In this context, synergies between strategies for urban sustainability and urban resilience are crucial, and especially in the highly interlinked water-energy-food nexus.

Water, energy and food in urban areas under climate stress

Rapid urbanization, climate change and growing demand for water, energy and food in cities are among the key macro trends putting regional resource security at risk. The three issues are interlinked: climate change is expected to result in increased average temperatures, reduce water availability, and reduce agricultural productivity. This will increase the demand for energy, driving up competition for energy between cooling, desalination and agriculture uses. For example, as groundwater levels drop due to reduced precipitation and aquifer recharge, additional pumping will be required. And the deeper the water is pumped from, the higher the likelihood of salinity, which in turn would require more energy for desalination. All this would increase energy demand and the cost of food production. In addition, if energy is sourced from fossil fuel sources, this could result in higher greenhouse gas emissions (Borgomeo et al., 2018).



In many parts of the MENA region, policy is skewed towards energy, which is used to support limited water and food production capability

Clearly, in the context of climate change and increasing pressure on limited resources, a nexus approach to managing natural resources such as water, energy and food can improve environmental, climate, human and political security (Mohtar, 2017; United Nations Economic and Social Commission for Western Asia, 2016; Medinilla, 2021).

In many parts of the MENA region, policy is skewed towards energy, which is used to support limited water and food production capability. Energy is needed for groundwater extraction, desalination, treatment, conveyance and distribution as well as wastewater treatment. Energy is also needed for the production, processing, transportation and distribution of food. The water and food systems are also interdependent. Naturally, water is critical for agriculture and animal

breeding, but imported food also provides much of the MENA region's needed water (Allan, 2003). Water is also needed in hydrocarbon extraction and refining, in cooling of conventional power plants, and in some instances is used to generate electricity using hydropower and to clean solar panels to maintain their generation efficiency. More recently, water is being used to produce 'green' hydrogen from electricity through electrolysis.

Improving climate resilience will require improving the resource efficiency of each system. For the water system, for example, this includes improving domestic water efficiency, improving the efficiency of urban agriculture and landscape irrigation, improving wastewater treatment so it can be reused in agriculture and landscape irrigation, and improving stormwater management for aquifer recharge. Examples in the energy and food systems include reducing demand for energy, reducing food waste and improving the efficiency of urban food production.

More notably, a nexus approach requires optimizing synergies between the three systems. For example, the implementation of rooftop agriculture can produce food while reducing the need for cooling in buildings. The use of treated sewage effluent in district cooling plants can reduce demand for freshwater while maintaining energy efficiency. And green infrastructure can manage stormwater and reduce the need for irrigation while also reducing the urban heat island effect and associated energy demand for cooling.

However, knowledge of nexuses between urban water, energy, and food systems, their implications for urban governance and for the wider surroundings of cities is still evolving (Artioli et al., 2017; Arthur et al., 2019). Very few cities in the Southern Neighbourhood have explored these synergies or successfully implemented a water-energy-food nexus approach so far. Constraints to implementing a nexus approach include sectoral institutional silos, insufficient incentives for integrated planning and policy-making at all levels, limited vision, knowledge and practical experience to guide effective implementation, low public engagement levels and a lack of local autonomy despite decentralization efforts. Bureaucratic structures often face enormous challenges to arrive at a coordinated and coherent approach (Medinilla, 2021). In addition, there is an overly technocratic approach to nexus governance, which underestimates the importance of local interests and incentives of key actors (Hoff et al. 2019; Andrade Guerra et al. 2021).

Limited decentralization and inclusivity as barriers to urban resilience

In terms of governance, the MENA region is one of the most centralized in the world, with ruling elites often perceiving decentralization as a risk to national unity, stability and peace (El-Mikawy, 2020). Following the Arab revolts of 2011, Tunisia, Morocco, Jordan and Lebanon initiated decentralization reforms in an effort to overcome the crisis of confidence and legitimacy in state-society relations and to address two of the protestors' key demands: "more participative governance and more efficient and accountable public services" (Houdret & Harnisch, 2018). However, decentralization is a long-term process that not only involves complex changes in governmental structures, but also requires changes in political cultures and societal self-understanding.

Regional decentralization reforms have been slow in general and have so far failed to sufficiently empower local authorities. Lebanon is a case in point: decentralization reforms were first introduced with the Ta'if Agreement in 1989 under the banner of “extensive administrative decentralization” (Baroud, 2021 and Democracy Reporting International, 2017). Yet, more than three decades on, the necessary structural changes and reforms have still not been made. Even when legal frameworks to devolve power to the local scale are in place, we often find what Bergh (2020) describes as “a deconcentrated rather than decentralized governance system”, which includes unfunded mandates, weak fiscal capacity, and a high dependence on transfers from central governments.

This weak capacity of local governments often forces the EU and other international funders supporting urban resilience to cooperate with national governments rather than local authorities. A model of urban development cooperation “for cities but not with cities” (Bergh, 2020), where central governments and national urban plans take the lead, and municipalities have an implementing role at best, has emerged as a result. This top-down approach is problematic for two key reasons: first, it often fails to respond to the most pressing needs of cities and prevents more inclusive forms of governance that engage citizens and other urban stakeholders in decision and policy making; and, second, it inhibits the development of much-needed technical and other capacities at city level.

The absence of national funding for local sustainable development projects in most countries of the region is another reason for the scarce resources available to municipalities. Most municipalities lack strong leadership, a pipeline of viable projects and sufficient capacities for proposal writing and the implementation of projects. Many also lack creditworthiness, bankability, and the ability to attract international project funding (International Finance Corporation, 2018). While international project funding can kick-start urban innovation and local climate action, longer-term support is urgently needed to assist regional municipalities in strengthening their administrative structures and capacities to raise and make use of funds.

More support for municipalities in Southern Neighbourhood countries is also needed to provide the right conditions for inclusive climate action that informs and empowers citizens and other stakeholders. As the closest level of government to citizens, municipalities would be well positioned to lead climate dialogues with a wide range of stakeholders to inform people about options, prompt behavioural change and formulate joint solutions. In countries with some decentralization, such as Morocco and Tunisia, local authorities are experimenting with new arrangements that provide more opportunities for participation, stakeholder collaboration, accountability, transparency and public engagement, such as the Open Government Partnership in Jordan, Morocco, and Tunisia (International Center for Non-Profit Law, 2021). That said, many of these new channels have been based on non-binding consultation tools (Bergh, 2020).

2. A closer look at urban resilience in three cities

Three case studies demonstrate the current approach to urban resilience of cities in the Southern Neighbourhood. Small and intermediate cities were chosen rather than metropolises, to provide practical lessons for other cities. Large metropolitan cities wield a disproportionate share of political power in the region and are growing more rapidly than smaller ones. However, they are not representative of the experiences of the majority of the urban population, who live in smaller cities. Resilience solutions tailored for metropolitan cities are also harder to replicate elsewhere as they are often influenced by local power politics and other factors.

Morocco, Tunisia and Lebanon were selected as they have made reforms towards decentralization. Yet, the level of decentralization and the implementation of the reforms vary. That said, the reforms have opened some room for willing and inventive local authorities to roll out municipal services that enable the development of urban resilience in the key sectors of water, energy and food, often with international financial and technical support.

In addition, Morocco, Tunisia and Lebanon have the region's most progressive aspirations for climate action set out in their Nationally Determined Contributions (NDCs), which highlight the actions governments aim to implement as a contribution to achieving the global targets set out in the Paris Climate Agreement. Furthermore, the three countries are expected to be highly affected by climate change, including by a significant reduction in precipitation and an increase in average temperatures (Zittis et al., 2019).

The case studies aim to cover initiatives on water, energy and food and to represent three different size settlements: Hammama in Lebanon with a population of 7,000 and an emphasis on water and energy, Chefchaouen in Morocco with a population of under 50,000 and an emphasis on energy, and Gabès in Tunisia with a population of approximately 110,000 and a focus on water and food.

Figure 1. The three cities discussed in this section



Hammana, Lebanon

Lebanon's first Nationally Determined Contribution, submitted in 2015 and updated in 2021, pledges to reduce its carbon emissions by 20% by 2030 (compared to a business-as-usual scenario) with an additional reduction of 11% achievable under certain conditions, such as the availability of financial and technical support. It recognizes rapid urbanization as a challenge to development. However, it does not address the urban dimension of the adaptation and mitigation strategies planned in sectors such as energy production, transport, land use, solid waste and wastewater.

Despite being one of the few countries of the region that is rich in water resources, Lebanon suffers from water scarcity. Climate-induced water shortages, related to stressed surface flows and groundwater sources due to increased evaporation, reduced snow cover and river flows and saltwater intrusion, are partly responsible. But the larger problem lies with underperforming water and wastewater services that are the result of poor management and infrastructure deficits. This was exacerbated by the influx of Syrian refugees from 2015 onwards, which has increased national domestic water demand by around 12% (Republic of Lebanon, 2015). It is estimated that less than half of the population across Lebanon is connected to official water supplies, which often only provide services for one to three hours per day (United States Agency for International Development, 2021). The water crisis poses serious health and economic costs: up to 80% of Lebanese tap water is bacterially contaminated, and households spend three-quarters of their water budget on private water supplies (Ministry of Energy and Water, 2019).



The dysfunctional management of the water sector is closely related to Lebanon's heavily centralized system of government

The 2012 National Water Sector Strategy aimed to improve water availability and security with a commitment to environmental and economic sustainability over the next decade (Ministry of Environment, United Nations Development Programme & Global Environment Facility, 2016). But the country's highly deficient water policy framework, plagued by institutional fragmentation, the duplication of responsibilities and fiscal and capacity constraints (Gharios & Farajalla, 2019) has hindered implementation. The dysfunctional management of the water sector is closely related to the country's heavily centralized system of government, which makes it difficult for ministries to devolve power and resources to the regional water establishments that were set up in 2000 and to local authorities managing wastewater treatment plants.

Lebanon is a highly urbanized country with over 88% of its population living in urban areas in 2018 according to United Nations Population Division data. But despite decentralization being enshrined in the Lebanese Constitution, and the country having one of the highest numbers of municipalities and federations of municipalities in the region, the corresponding legal frameworks are poorly implemented (Democracy Reporting International, 2017). As a consequence, a large number of municipalities are often unable to provide basic services, such as clean water, to citizens.

With a revision of the National Water Sector Strategy underway, the Second Lebanese Water Forum held in 2019 identified the need for a paradigm shift in Lebanese water governance.³ Currently, a key problem is citizens' distrust of public water services and the unwillingness of many to pay their bills, which leaves the regional water authorities with no financial capacities to improve services. To rebuild trust, the forum recommended a shift from a top-down large-scale infrastructure approach to a service-based approach which is evaluated on the basis of the quality of services delivered (Lebanese Republic Ministry of Energy and Water & Oxfam, 2019). Further, it recommends participatory and outreach mechanisms to increase ownership of future water reforms and give citizens a chance to express their needs and interests. Municipalities have a major role to play in this new approach, which will require clearly outlined responsibilities and better cooperation between central, regional and local authorities.

In 2018 Lebanon secured more than \$11 billion in loans and grants, a third of which were for water-related projects.⁴ Conditions attached to these grants and loans included moves towards a more effective and transparent multi-level water governance system. Enabling conditions and financial and capacity support for local authorities need to be ensured, including supporting their creditworthiness. Collaboration with United Cities Lebanon (the national branch of United Cities and Local Governments, an umbrella organization for cities and local and regional governments), which promotes municipal capacity building and seeks to improve coordination between municipalities and the central government, could be of great benefit in this phase of international support for Lebanon's water governance.

Several Lebanese municipalities have demonstrated their willingness and capacity to actively engage in water governance, especially by improving wastewater collection and treatment. One of the most successful examples is Hammana, a town of 7,000 residents in the Governorate of Mount Lebanon. The town runs a wastewater treatment plant that was first constructed in 1976 but destroyed during the war, then rebuilt with co-financing from USAID in 2001 (Ministry of Environment, 2001: 236). A signatory of the Global Covenant of Mayors for Energy and Climate (CoM), Hammana recently produced a Sustainable Energy and Climate Action Plan – Self Sufficient Programme (SECAP-SSP), using a new methodology that simplifies the preparation of the emissions baseline, making it more accessible to local authorities lacking experienced technical staff and relevant data (Saad et al., 2020). In line with the CoM's 2030 target, Hammana aims to reduce its emissions by 40% by 2030, compared to 2016 levels.

As part of its SECAP, Hammana has retrofitted its wastewater treatment plant to run on solar energy instead of electricity and diesel, reducing both the plant's environmental impact and its operating costs. The project, which cost \$100,000 and was financed by UNDP, was awarded the 2019 Energy Awareness Award under the local government category, co-organized by UNDP (IPT Group, 2021).

Hammana's SECAP will not only improve the quality of life of residents and reduce the environmental impact of energy and water services, but it will also raise awareness among and engage citizens in local climate action.

3 The forum was held under the project Improving Access to Safe and Affordable Water to Vulnerable Communities as part of the EU Regional Trust Fund in Response to the Syria Crisis.

4 Funding was secured at the CEDRE international donor conference, *Conférence Économique pour le Développement, par les Réformes, et avec les Entreprises*, which took place in April 2018.

Chefchaouen, Morocco

Morocco has been recognized as having climate policies almost compatible with the Paris Agreement's 1.5°C global warming target, and as one of the few developing countries expected to be able to curb its emissions by 2030. It plans to reduce its carbon emissions by 17% by 2030 (compared to a business-as-usual scenario) with an additional reduction of 25% conditional on the availability of financial and technical support (Climate Action Tracker, n.d.). Morocco's NDC covers a number of sectors including cities. While it doesn't specifically mention urban resilience, it lists urbanism and infrastructure strategies that enable the implementation of its adaptation objectives (Kingdom of Morocco, n.d.).

Morocco's flagship climate action is its renewable energy programme, which targets increasing the share of renewable energy sources (solar, wind, and hydropower) in electricity generation to 52% of total installed capacity by 2030. In 2018, the share was close to 34% and Morocco is considered on track to meet this objective (Climate Action Tracker, n.d.). Growth in renewable energy generation however, has meant that already scarce resources such as freshwater and land will need to be managed in an equitable and sustainable manner. This has been a concern especially with regard to the allocation of communal lands and scarce water resources to clean solar power plants and for cooling (Desmidt, 2021).

In addition to its renewable energy programme, Morocco's National Energy Efficiency strategy aims to reduce its total final energy consumption by 15% by 2030. In charge of implementing this strategy is AMEE (Agence Marocaine pour l'Efficacité Énergétique). Morocco has developed mandatory energy efficiency regulations and improved thermal regulations for new buildings, implemented minimum energy performance standards for appliances and air conditioning systems, and banned the import of old cars with poor energy efficiency (International Energy Agency, 2019; AMEE, n.d.). In addition, the 2009 Green Morocco Plan includes several measures relating to energy, water and food production, covering irrigation, water saving, water efficiency, water tariffs, the development of conventional and non-conventional water resources, and water resources protection (Fanack, 2021).

At the municipal level, the administrative decentralization reform process which started in 2011 has focused on allowing Moroccan regions and municipalities a degree of autonomy that allows them to provide public services and develop regional and local infrastructure while coordinating with the governors. Administrative decentralization allowed regions to receive a significant increase in funding and in competencies, particularly with regard to economic development, education and training, rural development, transport, culture, environment and international cooperation (Houdret & Harnisch, 2017).

At the municipal level, it allows municipalities to develop a six-year action plan, in line with regional development plans (Houdret & Harnisch, 2017). The mandate allowed the development and management of a wide range of municipal services such as electricity distribution, water and sanitation, mobility (collective urban transport, roads, and parking), public lighting, solid waste management and public spaces maintenance (Arab Reform Initiative, 2019), creating opportunities for local adaptation and resilience building.

In 2010, the elected council of the municipality of Chefchaouen, a city of under 50,000 residents in northern Morocco, took a decision to transform Chefchaouen into an 'ecologically sustainable town'. It set itself a target to reduce its

greenhouse gas emissions by 20% by 2020 compared to business as usual, based on a reference inventory of emissions in 2016 (compiled in partnership with the German development agency GIZ).

The municipality has also been working to integrate energy management systematically in local planning through the development of a Sustainable Energy Action Plan (Commune de Chefchaouen, 2017). In line with the Action Plan, Chefchaouen has developed a municipal energy accounting and management system and a computerized dashboard to audit and communicate its energy use. The project was carried out in collaboration with the EU's Sustainable Urban Demonstration Projects Support Mechanism (SUDEP) (Moroccan Ministry of Energy, Mining and the Environment, 2020).

Another project carried out in collaboration with SUDEP was the development of an Energy Information Centre to provide advice and raise public awareness locally on issues relating to renewable energy and energy efficiency. The centre engages with citizens, civil society and young people, and provides training to professionals in sectors such as construction and tourism.

The municipality has also implemented energy efficiency measures such as providing priority areas with energy efficient lighting and heating the municipal swimming pool using solar energy. Chefchaouen also installed rooftop solar panels on the municipality building, the roofs of parking lots, and on the new Museum of the Mediterranean Diet. The museum itself was created by retrofitting an existing building, which included bringing its energy efficiency in line with national energy efficiency regulations. Chefchaouen demonstrates that public buildings are an obvious starting place for energy efficiency improvements that can both increase resilience and save authorities money.

Chefchaouen's work on energy does not appear to have benefited from a water-energy-food nexus approach and has remained limited in scale. Having said that, the city has implemented some measures in other sectors, such as mobility, where it has encouraged active travel, integrated cycling lanes, and introduced electric bikes and scooters for municipal services to reduce dependence on private vehicles and improve air quality, despite its hilly terrain. It has also installed smart bus shelters.

Chefchaouen also participated in the establishment of the Relief Organization Plan for the Tangier-Tetouan-Al Hoceima Region, which identifies climate risks such as droughts, floods and landslides and proposes measures to prevent them.

Finally, to encourage skills transfer, Chefchaouen shares good practice lessons with other municipalities in Morocco via the eco-city association it created and chairs, known as the Moroccan Association for Eco-Cities.

Gabès, Tunisia

Tunisia is extremely vulnerable to climate impacts particularly because of its reliance on the agri-food sector, which accounts for up to 14% of the country's gross domestic product (Amamou et al. 2018; USAID 2018, cited by Knaepen, 2021). Recognizing this, the country's new Constitution, adopted in 2014, incorporated climate action as a permanent feature. Yet, so far, Tunisia's climate response has mostly been emphasized in the energy sector and less policy attention has gone to resilience building and adapting to climate change (Knaepen, 2021).

In its updated NDC (2021), Tunisia pledged to reduce its carbon intensity by 45% by 2030 (compared to 2010). The NDC emphasizes mitigation measures, especially relating to energy. The plan also mentions ‘cities’ at several instances: on the one hand, it says that ineffective land use planning and the lack of reliable infrastructure (e.g. the creation of unregulated neighbourhoods and informal settlements on floodplains) has put considerable pressure on cities. On the other hand, ‘cities’ are seen as hubs that have the responsibility to curb greenhouse gas emissions, since at least 50% of these emissions occur within urban perimeters, due to intercity transportation, construction, and so forth. When it comes to climate adaptation, Tunisia has planned activities in several sectors, including in the health, disaster risk management and food security sectors (Republic of Tunisia, 2021).⁵



The institutional set-up within Tunisia limits an adequate response to climate risks: climate change is not yet mainstreamed throughout all line ministries

The NDC states that the costs of adaptation could amount to \$4,223 million for the period 2021–2030. The recent NDC states that the international financial partners have to play a ‘significant role’ in meeting Tunisia’s adaptation needs, while underlining the importance of national and private funding sources.⁶ The contributions by international partners should amount to more than \$230 million a year by 2021 to reach more than \$276 million a year by 2030. However, thus far external adaptation financing has been quite low (27.1% during the period 2010–2018) (Stockholm Environment Institute, 2021). The institutional set-up within Tunisia limits an adequate response to climate risks: climate change is not yet mainstreamed throughout all line ministries. The Ministry of Agriculture, Water Resources and Fisheries, the only ministry with a Focal Point for Climate Change, has been unable to provide a robust vision for development of Tunisia’s agri-food system (Knaepen 2021).

The 2014 Constitution dedicated an entire chapter to a new system of administrative, political and fiscal decentralization. In 2018, a new Local Authorities Code was adopted, transferring powers to local and regional councils. However, the decentralization process continues to face structural, logistical, cultural and psychological challenges (Yerkes & Muasher 2018, cited by Knaepen 2021), making progress towards a much-needed integrated, community-led, bottom-up approach to adaptation extremely slow. The most recent NDC recognizes these issues and states that “special effort will be put towards strengthening Tunisia’s institutional framework and climate governance to meet the requirements of the Paris Agreement” (Republic of Tunisia, 2021: 44).

Gabès, the capital city of the Gabès Governorate, located on the coast of the Gulf of Gabès in the south of Tunisia, has approximately 110,000 inhabitants. The city is widely known for its rare oasis ecosystem, in which a microclimate allows for an impressive diversity of plants, typically grown in three layers.

5 In 2018, Tunisia launched the process to develop its National Adaptation Strategy, but this has not been finalized at the time of writing.

6 Note that the initial NDC (2015) stated that the adaptation costs had to be borne entirely by the international community.

The oasis provides the bulk of the fruits and vegetables consumed in the city. However, its ecosystems are degrading and the soil is becoming increasingly infertile and desalinated.⁷ Many farmers have abandoned their plots in the oasis, leading to the build-up of salt on uncultivated land that seeps into nearby plots. Furthermore, small-scale farmers are competing over water access and availability with nearby industry, in particular a chemical, phosphate factory and a cement plant.⁸ These industries are also large energy consumers, including energy coming from fossil fuels. So far, the use of renewable energy in the city is almost zero, despite the great potential for solar energy (United Nations Development Programme et al., n.d.).

Development partners have undertaken several projects to restore the oasis and better manage water, demonstrating some consideration of the nexus between water and food but not with energy. For instance, the French Development Agency (AFD), working closely with NGOs like the Network for Sustainable Development of the Oasis (RADD0), focused on better management of groundwater in the oasis (Agence française de développement, n.d.; Réseau Associatif de Développement Durable des Oasis, n.d.).

The Madinatouna Project, implemented in Gabès, within the framework of the Cities Alliance country programme, coordinated by the United Nations Development Programme, and in partnership with MedCities, GIZ, and the National Federation of Tunisian Cities, among others, is working on strategic urban planning initiatives since 2016. One of the objectives has been to make local authorities develop and implement an inclusive, sustainable, more climate-resilient urban strategy. Concretely, one of the smaller projects looks at restoring the oasis. Another one is to halt industrial pollution in the Gulf of Gabès (United Nations Development Programme et al., n.d.).

The EU has worked toward better environmental governance in Gabès, with a project which ran from 2014–2018 seeking scientific solutions to the groundwater pollution caused by heavy industry (Jamaity, n.d.). The chemical factory is exploring ways to desalinate sea water for its use (Takouleu, 2020).

The challenges of Gabès' agri-food system strongly relate to issues of water access and availability, due to climate change as well as competition with large-scale industry in the vicinity of the oasis. This industry is also causing pollution, while using brown energy. The project examples aim to build resilience in the water, food or energy sectors. However, more is needed for a full-fledged and effective water-energy-food nexus approach, including a socio-economic and political shift at a larger scale. This shift will require the empowerment of local authorities, farmers and NGOs, a stronger institutional set-up for climate action and a climate approach that recognizes the diversity of the various regions and ensures more adaptive capacity at the local level.

7 In Tunisia, 18% of vegetation has been lost in the last three decades due to groundwater salinization, according to a study published in 2019. A 2014 study puts global crop losses due to excessive salt at €24.3 billion (\$28.16 billion, using an exchange rate of €1 = \$1.15899, xe.com, accessed 9 November 2021) each year (Foroudi, 2020).

8 The industry is also emitting toxic gases, causing severe health issues on top of environmental degradation (Blaise, 2020).

Lessons from the case studies

Although the urban dimension is not always strongly reflected in countries' NDCs, the above case studies show that various actors are building climate resilience in cities in the Southern Neighbourhood. In all three case studies, national or local actors have adopted climate and energy policies. The case studies also demonstrate that some efforts have been made to recognize some interlinkages between the water, energy and food sectors. Yet, a systemic water-energy-food nexus approach is still missing. Sectoral thinking predominates in local resilience solutions. Often this is the result of entrenched institutional and government structures as well as low levels of local autonomy. In Lebanon, for example, local authorities are unable to provide basic services such as clean water, among many other causes.

Yet the case studies from Hammana and Gabès also show early signs of emerging nexus approaches at the local level. In Hammana, linkages were created between water and energy, and in Gabes between water and food. Overall, however, these initiatives still fall short of the holistic vision and systemic climate-adaptive approach needed for water-energy-food integration.

The EU and other international partners could further support urban resilience in cities in the Southern Neighbourhood by encouraging integration of the water, energy and food sectors, which will require enhanced coordination between different stakeholders. Such efforts would benefit from an approach that extends beyond technical aspects and creates the necessary enabling conditions for more integrated policy making. A key factor here is support for enhanced decentralization that supports local institution building by promoting a governance system in which local authorities do not only serve administrative functions but are also granted political decision-making powers. Crucially, this needs to come with better access to financial resources, capacity building, and mechanisms for strengthening local democracy and citizen participation.

3. Bringing the Green Deal to the Southern Neighbourhood: An opportunity to step up cooperation with cities around the water-energy-food nexus

The European Green Deal (EGD) provides an opportunity for the EU to address the climate resilience of cities, building on experience from recent and ongoing programmes. Over the past decade, the EU has run innovative cooperation programmes with local authorities in the Southern Neighbourhood to build climate resilience (see Box 1). The majority of these have focused on providing technical assistance with energy efficiency and energy sustainability, for example through the production of local Sustainable Energy Action Plans and Sustainable Energy and Climate Action Plans, which are a requirement for joining the Covenant of Mayors for Energy and Climate.

However, urban resilience is about much more than local sustainable energy transitions. In cities of the Southern Neighbourhood which typically struggle with resource scarcity and management, urban climate resilience often depends on the capacity of municipal authorities to formulate and implement an approach that considers the connections between the key sectors of water, energy and food, and synergies beyond them. But decision makers often fail to identify, recognize or act on these synergies.

The European Commission is currently moving beyond established energy-centric visions towards a more systemic approach to urban resilience and sustainability. As part of the EGD, the Commission launched two new instruments: the Green City Accord and the Circular Cities and Regions Initiative, which will complement the Covenant of Mayors for Energy and Climate by assisting cities in other priority areas, including improving air and water quality, conserving nature and biodiversity, and making progress towards the circular economy.

Box 1. Projects financed under the European Neighbourhood Policy that have supported urban climate action and resilience in countries of the Southern Neighbourhood

- **2013–2018: CES-MED Cleaner Energy Saving Mediterranean Cities** provided training and technical assistance support to local and national authorities in eight countries (Algeria, Egypt, Israel, Jordan, Lebanon, Morocco, Palestine and Tunisia) to help them respond more actively to policy challenges. Through a practical on-the-job-training approach, 23 municipalities and governorates were helped to produce Sustainable Energy Action Plans.
 - **2014–2018: SUDEP Sustainable Urban Demonstration Projects** supported 12 local authorities and their partners in six countries (Israel, Jordan, Lebanon, Morocco, Palestine and Tunisia), enabling them to create their own working methodology and implementation models on sustainable energy actions, leading to energy savings, energy efficiency and more use of renewable energy sources at the city level.
 - **2018–2022: Clima-Med Acting for Climate in the South Mediterranean** supports the transition of eight countries (Algeria, Egypt, Israel, Jordan, Lebanon, Morocco, Palestine and Tunisia) towards sustainable, low-carbon and climate-resilient development by supporting climate and energy policies and strategies at national and local levels, including the formulation and implementation of local Sustainable Energy and Climate Action Plans.
 - **2019–2022: MED-InA Mediterranean Integrated Alliance on Waste for Cities and Citizens** works with three pilot cities (Irbid in Jordan, La Marsa in Tunisia, and Ribiera in Spain) to develop a Zero Waste methodology adapted to the public policies of Mediterranean cities as an exemplary and participatory approach for waste reduction, reuse and recycling. The methodology is based on a wide consultation with local stakeholders (public, private, associations, citizens) and prioritizes low-tech, low-cost solutions.
 - Other relevant programmes that have operated at national level but engaged local authorities include **MED-ENEC Energy Efficiency in Construction (2005–2009)**, **ClimaSouth Low Carbon Development for Climate Resilient Societies (2013–2017)** and **SwitchMed Switching to a Circular Economy in the Mediterranean (2018–2022)**.
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The EGD offers an opportunity to adopt a more holistic vision in future urban climate programmes under the ENP South. Recent cooperation programmes that provide assistance with circular waste management and the broader transition to circular development (e.g. MED-InA and SwitchMed, see Box 1) suggest that the Commission is gradually moving towards a more holistic vision. Yet, there is still some way to go towards the formulation of integrated water-energy-food nexus approaches at city level. New programming that is guided by the principles and goals of the EGD could potentially support urban nexus approaches with a focus on water, energy and food.

The EGD stresses the need for systemic transformation and encompasses a broad range of interrelating priorities that ultimately require a nexus approach. While the transition to clean energy and a fair and environmentally friendly food system are core pillars of the EGD, issues of water safety and security cut across the agenda. Further, the goal of sustainable water management is also at the core of the new EU Strategy on Adaptation to Climate Change (European Commission, 2021a), launched in February 2021, which calls for better integration of adaptation action and water

management across borders. In contrast to the 2013 Adaptation Strategy, the new Strategy aims to help increase climate adaptation globally, including in the Southern Neighbourhood, which it recognizes as a climate change hotspot. Another novelty is its prioritization of local adaptation action and its commitment to working with local authorities.

Addressing the strong interdependence between water, energy and food will be essential to bring about the integrated local policymaking that the green transition requires, in Europe and beyond, especially in cities of the Southern Neighbourhood. By elaborating Euro-Mediterranean urban cooperation programmes that support the formulation and implementation of nexus approaches, the EU could foster and accelerate nexus planning at all governmental levels in partner countries. Cities and towns are the optimal scale for experimentation with policy innovation: they are large enough to test new approaches before scaling solutions, and small enough to discard them if expected results are not delivered. With cities being primary sites of consumption, distribution, reuse, and in some cases production, of water, energy and food, municipal governments have much potential in the articulation of nexus problems and their solutions, for the urban territory and beyond (GIZ & ICLEI, 2014).

The promotion of nexus approaches at the city-level could also foster urgently needed urban governance reforms in the Southern Neighbourhood. A nexus approach can be a driver for policy change and promote joined-up government processes that are the basis for the transition to sustainable or smart city models (Artiolo et al., 2017). In this sense, it could potentially give a push to stagnant decentralization reforms, enabling city governments to seize political control of service provision and demand adequate technical and financial resources from central authorities.

Recommendations

In light of the challenges and opportunities explored in this paper, and the lessons highlighted by the case studies, we suggest the following policy actions to support climate resilience in cities of the Southern Neighbourhood:

- 1. Cooperation with the Southern Neighbourhood around EGD priorities should place greater emphasis on supporting urban climate resilience.**
The new agenda for the Southern Neighbourhood highlights supporting the green transition and climate change resilience as one of its five focus areas. More support for municipal governments could greatly strengthen Euro-Mediterranean cooperation around Green Deal priorities and related initiatives like the EU Adaptation Strategy. The EU has extensive knowledge and experience of building urban resilience and the transition to sustainable urban development models. Sharing this with regional partners at both national and local levels could transform their ability to address resilience and sustainability challenges. In doing so, the EU would help boost the potential of cities as hubs for sustainable and inclusive growth and innovation, while forging stronger links between rural and urban areas, building cities' resilience to shocks and harnessing opportunities for a low-emission and climate-resilient economy.
- 2. Include European cities and city networks working on climate action more systematically in Green Deal diplomacy in the Southern Neighbourhood.**
Partnering with European cities and city networks that are engaged in Euro-Mediterranean cooperation on climate issues will be key to strengthening the urban dimension of Green Deal diplomacy in the region. European cities and city networks can share their experience and knowledge on building urban climate resilience, and provide established partnership structures with regional cities and the relations of trust these are built on. By opening up programmes such as the Covenant of Mayors and CIVITAS to cities in the Southern Neighbourhood, the EU has already been moving in this direction. Yet, to be fully effective, these efforts need to be better integrated in the emerging Green Deal strategy. As one of the regions most affected by climate change, and with strong bonds between cities from both shores of the Mediterranean, the Southern Neighbourhood would be an ideal experimentation ground for a multi-level climate diplomacy.
- 3. Future programming under the ENP South could benefit from programmes that encourage whole-system thinking at the urban scale rather than ad hoc projects.** The interconnections between the water, energy and food sectors in countries of the Southern Neighbourhood mean that all three should be considered as one system. The synergies between carbon emissions reduction and resilience-building goals create opportunities for improving both sustainability and resilience with limited investments. The EU would be well advised to work with local stakeholders to identify synergies relating to water, energy and food at city level, and to prioritize supporting projects which have been identified as having the most impact across all sectors.
- 4. Support local capacity building and inclusive urban governance.** Building climate resilience in cities of the Southern Neighbourhood will ultimately depend on the capacities and resources of local governments. The EU and

other international funders have a major role to play in supporting regional city governments in developing their technical capacity to address climate-related issues as well as their capacity to apply for and manage the necessary financing. The latter may involve fostering dialogue between municipalities and the relevant ministries and supporting legal changes at the national government level. Partnerships should work to make urban governance more accountable and inclusive in ways that can regain citizens' trust. With the right support, regional cities have much potential to lead climate dialogues with civil society, the private sector and other stakeholders to inform about options, formulate joint solutions and prompt behavioural change.

5. **Empower civil society.** The EU has a longstanding civil society agenda in the Southern Neighbourhood that has focused on building deep and sustainable democracies (Colombo & Shapovalova, 2018). In response to the region's rapid urbanization, it will be key to channel civil society support towards questions around sustainable urban development, climate resilience and more broadly the 'right to the city' (Harvey, 2008). An increasing number of regional CSOs, NGOs, independent think tanks, cultural producers, and industry associations (such as Green Building Councils) are engaging with these issues, and they can act as powerful partners for local governments in awareness raising and citizen engagement, as well as much-needed watchdogs that can monitor urban public policies and their effects on people's lives (Abdullah, 2020).
6. **Increase EU climate funding for water, energy and food in cities, particularly funding for climate resilience.** Adaptation finance disbursements from all EU institutions – including the European Investment Bank and the European Bank for Reconstruction and Development – need to increase to achieve adaptation objectives, as set out in the Paris Agreement pledge. The EU budget for 2021–2027 has an overall climate target of 30% across all policies and programmes. The Neighbourhood, Development and International Cooperation Instrument – Global Europe plans to spend €7 billion (\$8.11) on the Southern Neighbourhood. However, even with the 30% climate target, the figures are insufficient to realize the ambitions of the EGD (Hackenesch et al., 2021)⁹.
7. **Work with the private sector.** Many of the EGD's objectives are compatible with business interests and the private sector can become a vehicle for cooperation in the water, energy and food sectors. For instance, profitable business opportunities lie in the harnessing of renewable energy and efficiency applications in and around cities in the Southern Neighbourhood, as well as in better integrated water management systems. And, with public-sector leverage and innovative financing schemes, the private sector can also play a strong role in adaptation and resilience building in agri-food sectors (Hackenesch et al. 2021). The European Commission's new agenda for the Southern Neighbourhood underlines the importance of co-financing sustainable investments funded by partners' sovereign recovery funds in the context of the European Fund for Sustainable Development (European Commission, 2021b). This will also increase the ownership of the adaptation response of countries and cities in the Southern Neighbourhood (European Parliament, 2021).

9 Using an exchange rate of €1 = \$1.15899, xe.com (accessed 9 November 2021).

- 8. Mobilize research and foster innovation for building more climate-resilient urban areas in the Southern Neighbourhood.** With its research and innovation programmes, the EU is increasingly investing in strengthening science-policy collaborations at city scale. The new Horizon Europe programme has made tackling climate-related urban challenges a priority by establishing a dedicated Mission area on Climate-Neutral and Smart Cities (European Commission, n.d.a), and the creation of the City Science Initiative at the Commission's Joint Research Centre (European Commission, n.d.b), which helps address urban challenges by supporting evidence-informed local policymaking. The knowledge networks established around these city-science interfaces will be vital for accelerating the uptake of scientific information by local policymakers in order to develop the cutting-edge technology, social and policy innovations that the EU's 2030 and 2050 climate targets require. EU Green Deal actions in the Southern Neighbourhood should build on these networks, providing support to innovative partnerships and projects in urban planning, local mitigation and adaptation in the region. The EU should further open up EU research and innovation programmes to academic and local government partners from the Southern Neighbourhood. Research and practical projects should build on the work of city networks in Southern Neighbourhood countries, many of which already cooperate with local and international research institutions. Leading research institutions in the Southern Neighbourhood already engaged in city-science partnerships include the Urban Lab at the American University of Beirut (Lebanon),¹⁰ The Center for the Study of the Built Environment in Amman (Jordan),¹¹ and Studio-X Amman,¹² the research hub of Columbia University's Graduate School of Architecture Planning and Preservation in the Middle East region.

10 www.aub.edu.lb/msfea/research/Pages/urban.aspx.

11 www.csbe.org.

12 www.arch.columbia.edu/environments/11-studio-x-amman.

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