

POLICY BRIEF #6

JUNE 2025

WHO BUILDS URBAN CLIMATE RESILIENCE? GOVERNING PREPAREDNESS AND ADAPTATION

Key points

Adapting to climate change-related risks is essential to ensure the resilience of urban areas. While the European Environment Agency (EEA, 2021) has identified key climate hazards affecting different sectors and geographic areas across Europe, their impacts are not evenly distributed. Therefore, the first step in improving climate resilience is to assess the specific risks, vulnerabilities and capacities of each territory.

The **Murcia Lab** focused on the city of Murcia, a medium-sized municipality in southeastern Spain. Its neighbourhoods are increasingly affected by rising temperatures, shifting precipitation patterns, and more frequent extreme weather events. The Murcia Lab identified six strategic domains for policy action:

- New Data – To update exposure and vulnerability maps at the neighbourhood and street scales.
- Plans and Strategies – To develop integrated, forwards-looking policy frameworks.
- Projects and Interventions – To implement urban measures that increase climate resilience while delivering co-benefits.
- Emergency Management – To test and improve coordinated response protocols through real-life scenarios.
- Governance Change – To coordinate multilevel actions across diverse public and private actors.
- Evaluation – To measure the effectiveness and impact of implemented adaptation policies.



Introduction

The European Union has established a robust framework to advance climate resilience, notably through the *EU Strategy on Adaptation to Climate Change* (2021) and the *EU Mission on Adaptation to Climate Change* (2022), which seeks to support regions and communities in becoming climate resilient by 2030. These initiatives promote local adaptation planning, knowledge exchange, and the integration of climate risks into policies and investments. They also encourage nature-based solutions, risk assessments, and improved governance mechanisms.

Building on these foundations, the Murcia Lab goes further by incorporating anticipatory foresight and promoting collaboration between citizens and multidisciplinary experts. Focusing on two vulnerable neighbourhoods in the city of Murcia—Vista Alegre and Espinardo—the Lab explored **local adaptation pathways by envisioning future scenarios and stress-testing urban systems under conditions of uncertainty**.

Through participatory workshops and cocreation sessions, the Murcia Lab engaged public authorities, residents, professional associations, and academic institutions to jointly identify vulnerabilities, develop plausible futures, and assess relevant adaptation policies. The Lab focused on five strategic actions: mapping neighbourhood-specific vulnerabilities through GIS and community input; involving citizens and experts in co-creating climate scenarios; using evidence-based assessments to guide adaptation planning across diverse futures; fostering institutional coordination and coherent policymaking; and integrating monitoring and evaluation frameworks to track progress and enhance long-term resilience. The results constitute a **practical and transferable roadmap for urban climate resilience**, with potential applications in other Mediterranean and semiarid urban contexts.



How to deal with urban adaptation to climate change in semiarid areas?

Murcia, often considered a paradigmatic case of a semiarid European climate, faces three major climate-related challenges: flash floods, urban heat island effects, and low urban compactness. Notably, the most arid climate zone in Spain—and Europe—coincides with a region inhabited by approximately 3.5 million people, equivalent to the population of Madrid.

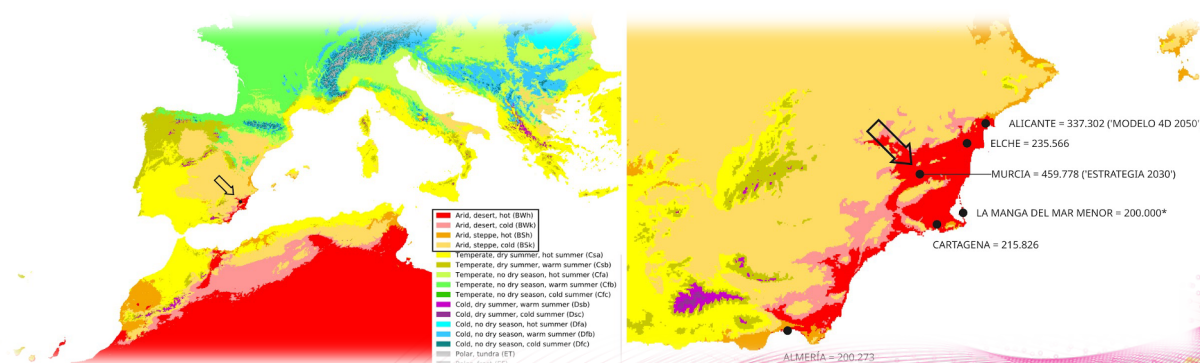


Figure 1. Location main cities of the semiarid climatic zone. Source: Beck et al. (2023)



Urban adaptation in semi-arid cities such as Murcia must address the following:

- **Reducing the impacts of urban heat islands** is essential for improving liveability and public health. In Murcia, heat islands reduce thermal comfort and pose significant health risks—especially to vulnerable populations—while increasing the energy demand for cooling, amplifying greenhouse gas emissions and stressing energy systems. Addressing this challenge also requires considering equity and environmental justice.
- **Mitigating flood risk** is a priority in urban areas with significant population and infrastructure exposure. In Murcia, heavy rainfall events can damage critical infrastructure, endanger lives, and degrade ecosystems by destroying habitats and contaminating water sources. The social impact is particularly severe in vulnerable areas, widening existing inequalities.
- **Increasing compactness** is vital for reducing climate vulnerability. Sprawled developments contribute to excessive energy use, long commutes, and limited access to essential public services, particularly in peripheral neighbourhoods.

Crowdmapping intersecting technical expertise

To increase climate resilience, Murcia Lab developed detailed vulnerability maps that went beyond merely outlining exposed areas by identifying critical vulnerabilities, such as ground-floor dwellings located in flood-prone zones or buildings constructed under low insulation requirements placed in severe urban heat islands. Furthermore, these maps can be complemented with citizen crowdmapping data, providing community street-level knowledge that enriches and validates vulnerability assessments.



Figure 2. Vulnerability map on a) compactness of Vista Alegre, b) flood risk in Espinardo, c) urban heat in Vista Alegre; and crowdmapping exercise



What type of stakeholders should be involved?

The complexity and scale of climate adaptation in urban areas demands the **mobilisation of a broad spectrum of stakeholders across sectors, disciplines, and levels of governance**. In the Murcia Lab, participants included municipal and regional technical staff from departments such as urban planning, infrastructure, green areas and the environment, emergency management, and public health. Their involvement ensured alignment with institutional frameworks, technical regulations, and spatial planning instruments.

In parallel, the Lab actively engaged professional associations (architects, civil engineers, biologists, geographers, and public health experts), citizen groups, neighbourhood associations, and staff from public facilities such as schools, health centres, and cultural venues. These actors serve as daily connectors between institutions and residents. Their participation enabled a multidimensional understanding of local resilience, integrating technical expertise, lived experience, and social dynamics within the cocreation process.

Policy interventions

On the basis of the analysis of evidence and scenario cocreation, the Murcia Lab identified five strategic areas for adaptation policy and **tested up to 30 measures** drawn from European best practices, including the FutuResilience Knowledge Base, other EU-funded research projects and policies and actions implemented in the Region of Murcia or Spain. These actions respond to specific urban vulnerabilities and offer a roadmap for operationalising climate resilience in mid-sized cities.

Category	Actions
NEW DATA: Enabling smart climate action	- Develop detailed flood hazard maps at the neighbourhood scale. - Create urban thermal comfort maps, validated with onsite temperature data. - Improve forecasting of extreme events and implement early warning systems.
STRATEGIES AND PLANNING: Scaling adaptation citywide	- Embed climate adaptation criteria in urban planning regulations. - Identify priority areas for nature-based solutions (NBSs) and sustainable drainage systems (SUDSs). - Promote eco-neighbourhoods as replicable models for urban resilience.
PROJECTS AND INTERVENTIONS: Transforming the city	- Produce technical guidelines for heat and flood mitigation. - Offer incentives for green roofs and façades. - Promote community codesign of NBS interventions. - Launch block-scale retrofitting and tactical urbanism pilots. - Upgrade infrastructure to make it climate resilient.
EMERGENCY MANAGEMENT: Preparing to respond	- Install risk signage and real-time warning systems. - Prepare flood shelters and protocols for vulnerable populations. - Develop a shared risk message library across emergency services. - Use temporary barriers and design evacuation routes in critical zones.
GOVERNANCE AND EVALUATION: Institutionalising climate resilience	- Establish dedicated climate resilience teams within the municipal structure. - Enhance cross-departmental coordination and use policy coherence tools. - Implement citizen awareness campaigns and educational programs. - Develop monitoring and evaluation tools for adaptation efforts.



Policy implications and recommendations

The Murcia Lab highlights **key lessons and strategic recommendations** for strengthening urban climate resilience in semiarid contexts.

- **Coordination is essential.** Create a governance framework that consolidates actions, ensures coordination, tracks results, and embeds climate adaptation into the municipal agenda.
- It is crucial to **prioritise actions** on the basis of impact, feasibility, and social equity, directing resources where they are most needed. Also, **adaptation strategies** must remain flexible and be updated regularly.
- **Invest in data tools** that inform professionals while remaining accessible and understandable to the public, enhancing transparency and citizen engagement.
- Shift from isolated pilot projects to **scalable, participatory, and integrated interventions** supported by local budgets and EU funding streams.
- **Citizen participation** should be embedded in both the assessment of risks and the design of responses, improving legitimacy and effectiveness.

Project Identity

Project Name	Creating FUTure societal RESILIENCE through innovative, science-based co-creation labs [FUTURESILIENCE]
Consortium	[Coordinator] European Future Innovation Systems (EFIS) Centre – Belgium; NTNU Social Research – Norway; Fraunhofer ISI – Germany; University of Ferrara – Italy; University of Urbino – Italy; Maastricht University – Netherlands; Regional Development Institute – Greece; Polytechnic University of Cartagena – Spain; Copenhagen Institute for Futures Studies – Denmark; Foresight Centre at the Riigikogu – Estonia; Mid-Sweden University – Sweden; Bulgarian Association of Personalised Medicine – Bulgaria; Municipality of Murcia – Spain; Municipality of Chios – Greece
Funding Scheme	Horizon Europe / HORIZON-WIDERA-2022-ERA-01: An experimentation space for the uptake and use of R&I results for EU resilience and future preparedness
Website	www.futuresilience.eu
Duration	36 months (January 2023 – December 2025)
Budget	€2,889,406.25

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