



EUROPEAN UNION



# EU MISSIONS

ADAPTATION TO CLIMATE CHANGE



August 2025

## Effectively tackling heat waves at the local level in Amadora, Portugal

The city of Amadora follows a holistic heat adaptation strategy to meet heatwave-related challenges

*An early warning System protects Amadora's residents from heatwaves and ensures appropriate resident behaviour.*

### Key Learnings

- **Political commitment:** Amadora takes a collaborative, structured approach to improve heat risk management, supported by strong political and operational leadership. The mayor's active backing ensures alignment across departments, keeps heat risks high on the agenda, and secures stakeholder buy-in for coordinated planning and action.
- **Coordination and implementation:** Civil Protection is the technical lead and main coordination point for implementing disaster risk reduction strategies, including those for climate change adaptation and urban heat. Multiple municipal departments contribute to a cohesive, multi-agency approach to managing heat risks across the city.
- **Integration:** Aligning urban planning with emergency and contingency strategies is key to embedding heat risk reduction into Amadora's broader resilience and strategic framework. This coordinated approach supports long-term climate adaptation goals.

## About the region

Located within the Lisbon Metropolitan Region, the city of Amadora covers an area of about 24 km<sup>2</sup> and is home to almost 171,500 inhabitants, making it the most densely populated city in Portugal (2021 census). The Lisbon Metropolitan Region has 18 administrative divisions, including Amadora as one of them. Heatwaves are becoming more frequent and increasingly threaten public health. In Amadora, limited green space, high building density, and impermeable surfaces intensify urban heat and increase the risk of flooding compared to surrounding areas.

Framework of Lisbon area and Amadora city in Portugal



## Climate Hazards

Extreme Heat

## Sector

Urban, Buildings, Land use Planning

## Key system

Health and Wellbeing

## Climate Threats

Over the past 30 years, Amadora has experienced higher average temperatures for 20 of those years compared to the previous century. Projections suggest a further warming of 0.4°C by the end of this century. In 2022, Portugal recorded 2,212 heat-related deaths associated with a heatwave. Amadora's population is especially vulnerable to heat caused by the densely populated city with largely sealed surfaces and higher inner-city temperatures compared to its surroundings. Other key drivers of heat exposure include limited green spaces and capacity for their expansion. Socioeconomic factors, including the low-income levels of much of the population, affect energy efficiency and limit access to cooling for the city's residents.

Moreover, at-risk populations, such as the elderly and low-income households, are particularly threatened during these extreme heat events. Due to its growing population, the city replaced green spaces with buildings, aggravating the heat in the city.

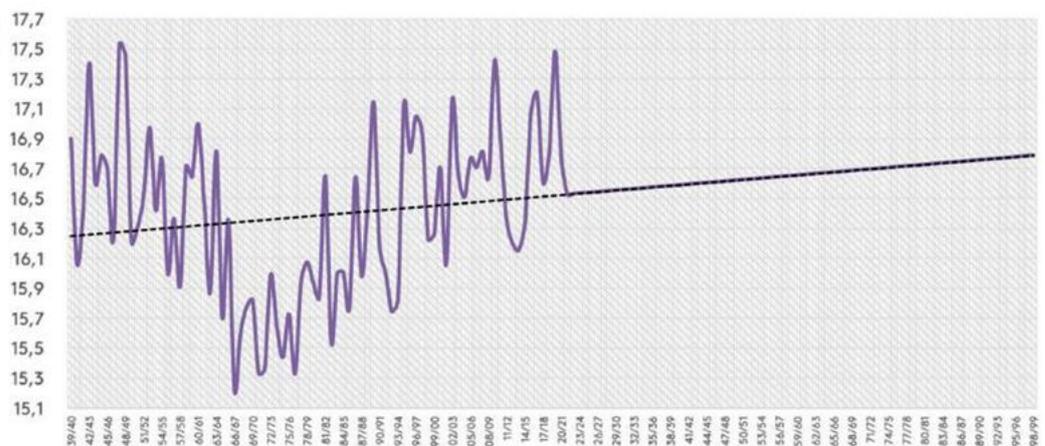


Figure 1: Average annual temperature increase in Amadora from 1939 to 2021. Image Credit: Climate Profile Report (City of Amadora).

## **Aligning Urban with Emergency Response Planning for Better Adaptation**

To address those challenges, Amadora has integrated urban planning with emergency and medical response planning to ensure that development aligns with heat resilience goals. Community involvement is also a key part of this integration, with residents invited to take part in planning through workshops and webinars. The participatory approach enhances urban design and raises public awareness about the importance of green infrastructure for managing heat risks. It shows the municipality how urban heat affects people at the community level.

To ensure effective heat adaptation, the strategy engages with several relevant urban actors. Civil Protection is leading the integration process, being the focal point for coordinating and implementing disaster risk reduction strategies within urban planning. The strategies include climate change adaptation and urban heat risk measures. Several municipal departments contribute to heat risk reduction and follow a cohesive, multi-agency approach to managing urban heat risk. The Urban Planning Department integrates heat risk reduction into city design, the Social Action Department supports at-risk groups, including the elderly and homeless, the Environment Department enhances green spaces and natural cooling areas, and the Health Sector is a key stakeholder for monitoring public heatwave health impacts.

These initiatives represent essential steps toward embedding heat risk reduction into the city's structural and strategic framework for sustainable urban resilience.

## **An SMS Alert System for Timely Local Resident Warning**

Amadora has developed an Early Warning System with private sector support from the local SMS marketing platform [uSendit](#) to inform residents about heatwave risks and promote public safety. A dense network of meteorological stations within the city collects the required data on temperature, humidity, wind and rain that feed into the alert system. The system primarily operates through SMS alerts, which provide timely warnings and recommendations based on data from the [National Meteorological Institute](#) and health authorities. To receive the SMS alerts, the citizens register in the system by sending a written authorisation SMS to a local register under [Civil Protection's](#) lead in cooperation with uSendit. Civil Protection further coordinates these efforts, ensuring that information is swiftly communicated to the community when the National Meteorological Institute predicts heat waves.

When the SMS-alert system sends out a heatwave warning, Amadora activates a response protocol, an extraordinary briefing with all municipal entities (health, relief, security and civil protection) to launch concrete response actions. The city holds coordination meetings with the local Health Authority, the Fire Department, the Red Cross, the Social Intervention Division, the local police, the public hospital and the Civil Protection Service to finalise strategies, assign responsibilities, and craft clear messaging. To maximise clarity, the system distributes short templates with colour-coded alerts and recommended actions via SMS, Facebook, and other social media channels.

## **Protection Efforts for at-risk Groups**

Key stakeholders, including the Red Cross, local police, and the Social Department, are working together to enhance outreach, especially to at-risk groups like the elderly and homeless people. During the summer, health and social departments conduct bi-weekly visits to about 3,000 to 4,000 residents, ensuring they receive the necessary support and information.

Amadora municipality also prepares designated emergency shelters – public sports pavilions – during extreme heat events. These shelters offer safe, cool spaces for at-risk populations, including elderly residents, individuals with health concerns, and those without adequate cooling at home. The shelters are a key component of the city’s heatwave response, providing relief and immediate protection during high-temperature periods.

While largely effective, the Early Warning System still faces challenges such as the need for multilingual messaging to serve non-Portuguese-speaking residents. Amadora acknowledges this gap and aims to provide critical updates in English and French to ensure inclusive access to information. In addition to these direct interventions, the city has started awareness campaigns to inform the public about the dangers of extreme heat. Educational campaigns and community engagement have helped residents understand how to protect themselves during heat waves.

*"Heatwaves are an increasingly critical issue in Amadora, with extreme temperatures severely impacting health and the environment. The collaborative stakeholder network enhances Amadora's ability to manage heat risks, combining local knowledge, academic research, international insights, and technological support to create a community-centred approach. Coordination, participation and cooperation are essential for the city's resilience to the impacts of heat waves."*

*Vitor Ferreira (Mayor | Municipality of Amadora)*

## Success Factors for Managing Heat-Related Risks

- **Strong Political Leadership:** The mayor's active long-term support has been essential, providing high-level alignment across departments and ensuring that heat risk management remains a city priority. This political backing has been crucial for gaining buy-in from all stakeholders involved.
- **Dedicated Focal Point in Civil Protection:** Civil Protection acts as the central coordinator, overseeing heat risk strategies and consolidating efforts from the urban planning, social, environmental and health departments. This focused leadership helps institutionalise heat risk management, ensuring effective implementation and more streamlined decision-making.
- **Collaborative Governance:** Effective coordination between city departments has enabled a comprehensive and cohesive approach to managing heat risks.



Figure 2: Colour Coded Alert. Image Credit: City of Amadora.

- **Stakeholder Engagement:** Partnerships with key local stakeholders, including the Red Cross, local police, the SMS marketing provider uSendit and the Social Department have strengthened Amadora's Early Warning System and outreach to at-risk groups. Figure 3 shows representatives of the Red Cross raising awareness at a primary school.
- **Participation in the Making Cities Resilient Campaign:** Amadora's involvement in the former Making Cities Resilient Campaign and [MCR2030](#) provided essential frameworks for assessing heat risk, completing a scorecard assessment, and developing a Disaster Risk Reduction plan that highlighted urban heat as a key vulnerability, guiding the city's resilience strategies.

### Challenges for Moving Forward in Climate Change Adaptation

While the city's awareness of urban heat as a critical climate risk has grown fast, its efforts regarding long-term changes in urban design, building standards, infrastructure upgrades, and land use planning have been moving slowly. This is due to the complexity and high resource demand of larger-scale projects, lengthy regulatory processes, physical space limitations in densely built-up areas, and challenges related to retrofitting existing infrastructure. Addressing immediate needs often takes priority, which can delay broader, structural adjustments. Increasing awareness of the full range of available solutions also takes time, as it involves adapting traditional practices and expanding knowledge and capacity around innovative, climate-resilient strategies.



*Figure 3: Awareness session at a primary school about the meteorological risks in Amadora in 2023. Image Credit: City of Amadora.*

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## Summary

Amadora, a densely populated urban municipality in the Lisbon Metropolitan Area, is increasingly vulnerable to extreme heat due to rising temperatures and the urban heat island effect. Over the past three decades, Amadora has experienced a significant increase in temperature, with projections indicating further rises by the end of the century. The city's strategies to combat these heat risks include the development of green spaces, early warning systems, and cross-sectoral collaboration between local government, academia, the private sector, and international bodies. Key lessons from Amadora's experience highlight the importance of leveraging strong political leadership, establishing a dedicated focal point for heat risk management, and institutionalising heat risk within broader climate adaptation efforts.

## Further information

- <https://www.facebook.com/amadora.resiliente>
- <https://www.cm-amadora.pt/pt/protecao-civil>

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