



## Designing a Participatory Risk Management System to support Urban Climate Resilience

Climate change is increasing the likelihood and severity of extreme weather events. Its impacts, including heat waves and flooding, require immediate responses and proactive planning, not only from responsible institutions, but also from communities and citizens. The Citizen Sensing project explored how citizens, local authorities and organizations in four European cities could contribute to climate adaptation, through the co-design and testing of a Participatory Risk Management System (PRMS).

Urban climate adaptation requires high-resolution temporal and spatial information of risks and impacts. Communities and citizens can assist in the provision of site-specific information. By taking advantage of the ubiquity of technologies, citizen sensing as a methodology, can provide a rapid and effective means of communication among citizens and with authorities, to promote and support urban climate resilience.

Citizen sensing (CS), where citizens act as sensors to collect and share information, constitutes a means of communication that facilitates interaction between citizens, communities and authorities, allowing an active involvement of citizens in assessing and responding to climate-related risks.



### Background and main objectives

Cities are particularly exposed to climate-related risks, and need to continuously adapt to events and impacts that negatively affect citizens' health and wellbeing. Extreme weather events are increasing in severity and frequency. Impermeable surfaces, high building density and sparse vegetation, intensify flooding and urban heat. Citizens and communities can help identify potential impacts and risks to strengthen urban resilience.

In the Citizen Sensing project, citizens reported weather conditions and impacts, as well as images and comments, and obtained adaptation recommendations. The research

was carried out in four European cities: Norrköping (Sweden), Porto (Portugal), Rotterdam (Netherlands) and Trondheim (Norway), that spanned diverse climatic, political, socio-cultural and economic contexts.

### Citizen engagement in assessing and responding to climate risks

Extreme weather events can occur suddenly and cause local impacts. Citizens and communities can quickly report site-specific information of emerging conditions. With multiple reports, authorities gain a high spatial and temporal resolution of data, to guide them in their emergency responses and municipal climate adaptation plans and actions.

## The Participatory Risk Management System

The Participatory Risk Management System (PRMS) is a climate service developed in the Citizen Sensing project. It was co-designed in a process with stakeholders from local authorities and institutions. The core idea of the PRMS is to engage citizens as **providers** and **receivers** of information. The PRMS includes:

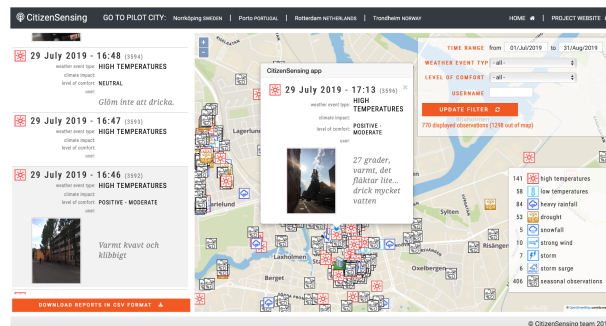
The *CitizenSensing Web Application* - allows citizens to provide site-specific information by uploading reports with data, images and text. Citizens could receive sensor-based weather data and adaptation recommendations.



The *Sensor Network* - collects real-time weather data (air temperature, pressure, humidity and precipitation) by retrieving data from external weather station networks and the project's weather sensors.



The *CitizenSensing Web Portal* - integrates and visualises citizens' reports for interactive data exploration.



### KEY RECOMMENDATIONS

- Ensure that the co-design process is legitimate, collaborative and transparent.
- Engage diverse groups of citizens and stakeholders, at an early stage, to understand and include their concerns, needs and priorities.
- Connect to existing systems, networks, apps and platforms.
- Invest sufficient time and resources to support the co-design process to ensure that everyone can contribute to and benefit from the climate service.

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