Citizen Science Ferrara: community-based environmental monitoring for co-design mitigation actions and improve climate justice

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Abstract Traditionally, the development of policies has taken placed behind closed doors, under more traditional managerial approaches. It is against this background that co-design is seen as an alternative to provide a more open approach to the policy design process. This more open approach has proven that it can support synergies, learning and commitments to address complex problems and foster innovation.

The Citizen Science Ferrara (CSF) initiative represents an innovative approach to community-based environmental monitoring, promoted within the USAGE project (www.usage-project.eu) in collaboration with Fiumana APS association. This initiative addresses climate and data justice by empowering the local community in Ferrara (Italy) to actively participate in data collection and environmental policy-making processes.

CSF focuses on three critical environmental challenges affecting Ferrara's fragile urban ecosystem: extreme flooding events, urban biodiversity loss, and urban heat islands. These issues disproportionately impact vulnerable populations, making community involvement essential for developing equitable and effective adaptation strategies.

CSF prioritizes people-centered approaches, engaging over 100 students from three high schools and more than 200 citizens through training sessions (both in-person and online), informational materials, field data collection campaigns, and participation in environmental events (NoiSiamoAmbiente, City Nature Challenge, International Environment Day, Water Day, Biodiversity Day). Participants receive technical support from university experts (Padova and Ferrara Universities) and public institutions (ARPAE, Ferrara Municipality).

The initiative provides accessible data collection solutions including free mobile apps (iNaturalist, QField, GoogleForms) and low-cost sensors (MeteoTracker). A comprehensive "Citizen Scientist Manual" offers step-by-step guidance for using software and tools, with all training materials available at www.citizenscienceferrara.org.

This bottom-up approach to environmental governance demonstrates the potential for citizen science to bridge the gap between community knowledge and institutional decision-making in addressing urban climate challenges, by leveraging on standard-based sharing of citizen science sourced data through the city open data portal (https://dati.comune.fe.it) and via standard OGC protocols and formats.