Climate Adaptation Services

Guide

Crowdsource tool

March 2025

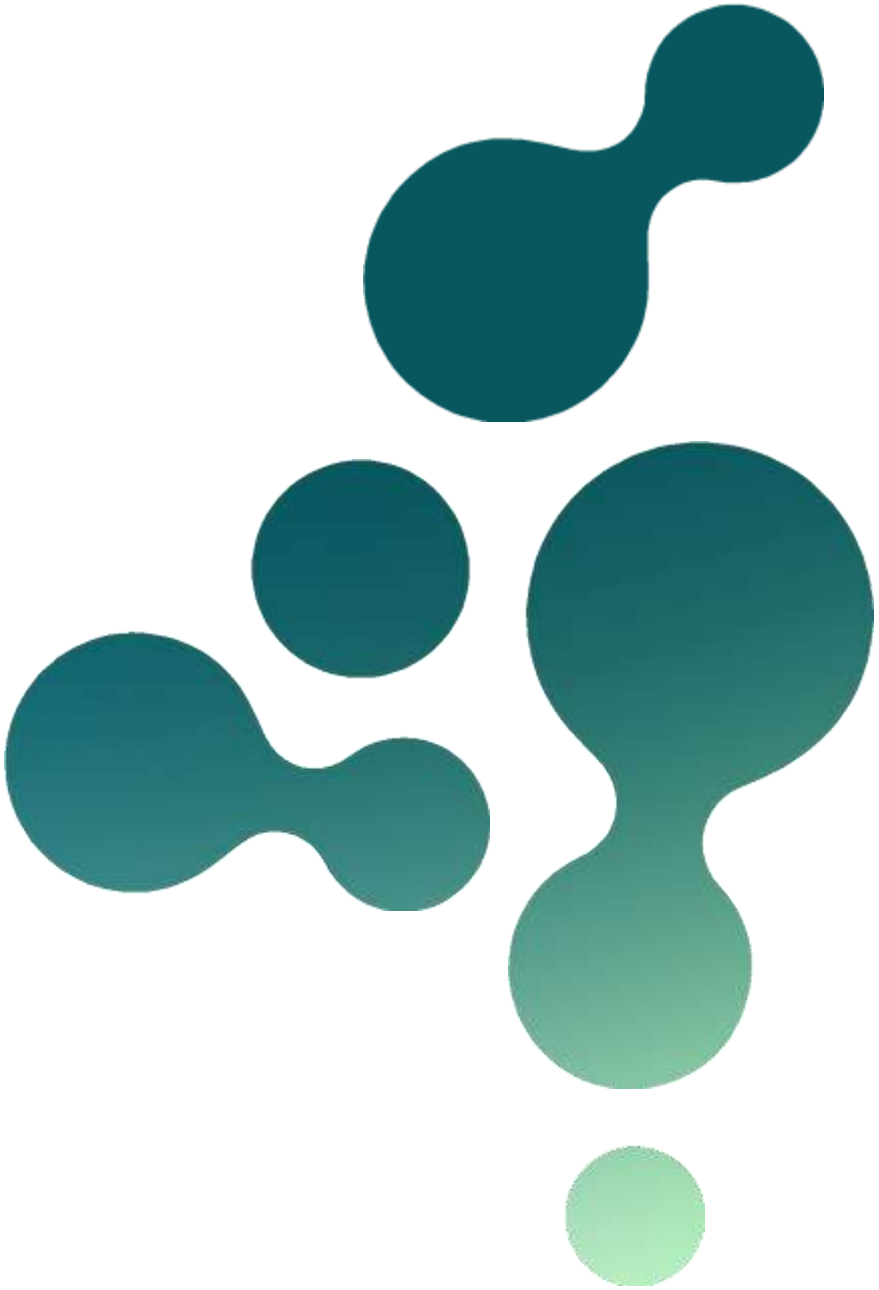

Table of content

1. Introduction

The Crowdsource Module for Climate Hazard Mapping is a tool designed to engage the community in identifying and mapping climate impacts. This tool can be configured using either free or commercial software licenses and is particularly useful for city representatives planning climate adaptation actions. The module visualizes publicly generated data on a digital map, helping to validate existing data and inform decision-making. The crowdsourcing module serves multiple purposes:

- Identifying vulnerable areas to climate hazards such as heatwaves and flooding.
- Validating existing flood/heat maps with real-time community input.
- Engaging citizens, stakeholders, and local organizations in climate adaptation.
- Complementing scientific knowledge with local and experiential insights.

2. Choosing a Platform

The module can be implemented using either commercial or open-source solutions:

- Commercial Tools: ArcGIS Online offers an advanced and user-friendly interface but requires a paid license.
- Open-Source Alternatives: Tools like QField can be used but demand technical expertise for setup.

If an ArcGIS license is available, setup is relatively simple. Also a lot of different examples are available for ArcGIS Online. Without a license, an open-source solution must be configured, making the setup more complex.

3. Step-by-step approach

Step 1: Define the Purpose and Scope

- Determine the climate hazard to focus on (e.g., flooding, heat islands).
- Identify the target participants (e.g., citizens, students, local authorities).
- Establish the geographic scale (neighborhood, city-wide, or regional).

Step 2: Develop the Questionnaire

- Design questions that capture specific climate hazard data (e.g., location, severity, accessibility of affected areas).
- Allow users to submit photos and descriptions to enhance data reliability.

Step 3: Set Up the Mapping System

- Configure the tool to link questionnaire responses to a digital map.
- Implement a quality check system to ensure reliable data.

Step 4: Conduct a Pilot Test

- Engage a small user group (e.g., university students) for initial testing.
- Collect feedback and refine the questionnaire.

Step 5: Launch and Promote the Tool

- Implement an active communication strategy to maximize participation.
- Use social media, workshops, and partnerships with local organizations to encourage engagement.

Step 6: Using the Collected Data

- Analyze and visualize collected data to identify vulnerable areas.
- Validate technical models using real-world inputs.
- Inform city planning and climate adaptation strategies.

Figure 1: Example of questions

4. Strengths and Challenges of Crowdsourcing

Strengths:

- **Cost-Effective:** Reduces the need for expensive data collection efforts.
- **Broad Participation:** Engages diverse user groups and stakeholders.
- **Community Involvement:** Enhances local awareness and participation.
- **Rich Data Sources:** Collects varied data formats, including text, images, and geolocation.

Challenges:

- **Data Quality Issues:** Submissions may be inconsistent or inaccurate.
- **Limited Expertise:** Some users may lack the necessary technical understanding.
- **Bias in Participation:** Data may skew towards more engaged community members.
- **Technological Barriers:** Requires internet access and device compatibility.
- **Sustaining Engagement:** Long-term participation can be difficult to main

5. Case Studies

5.1 University of Cork Pilot Project

The module was tested by University College Cork (UCC) students to map climate vulnerabilities. A total of 49 inputs were collected and visualized on a public digital map, highlighting examples such as flooded areas, clogged drains, and low bridges. The tool not only helped validate existing maps but also guided climate adaptation priorities, ensuring that decision-makers could effectively prioritize areas requiring immediate attention.

Publication:
Holloway, P., Thelen, S., McCullagh, D., Tangney, P., Veenenbos, K. R., van der Horst, S. V. J., … O'Leary, N. (2025). Smartphone GIS: exploring technological competency in active learning across geography. *Journal of Geography in Higher Education*, 1–22. https://doi.org/10.1080/03098265.2024.2443908

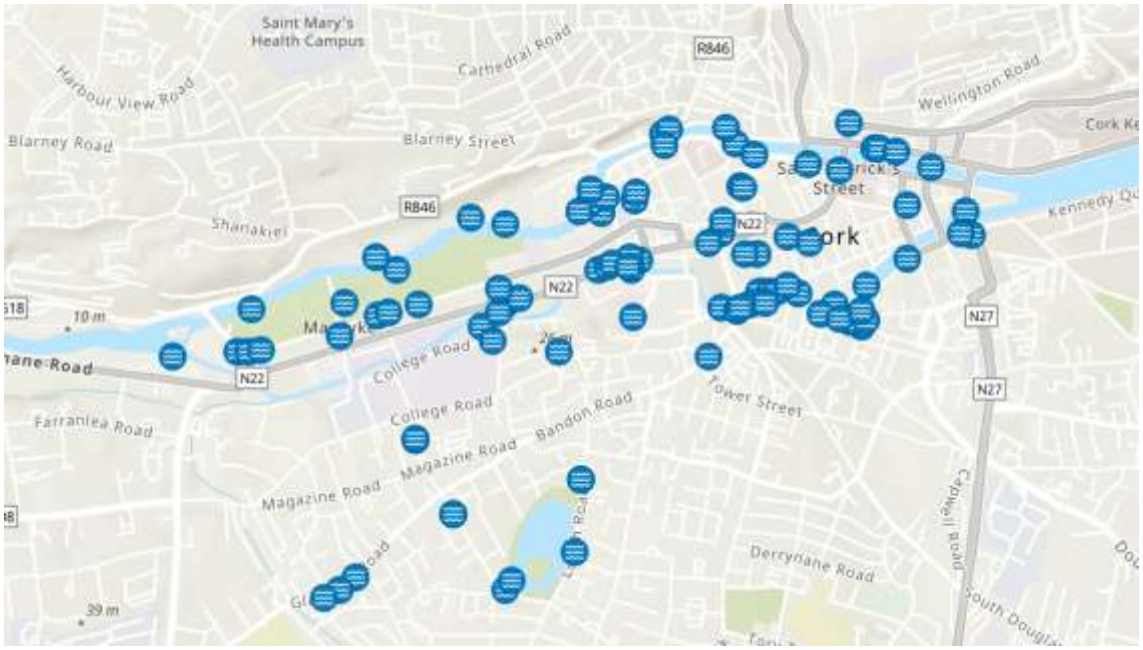

Figure 2: Crowdsource tool results in Cork

5.2 Lillestrøm

Lillestrøm experienced heavy rainfall and used this event as an opportunity to launch their crowdsourcing tool. This tool allows citizens to report areas where water is accumulating, contributing valuable data to validate local model results. The municipality promoted the tool through a news item on their official website and an article in the local newspaper Romerike Blad, featuring an interview. The initiative saw a response with around 40 data points collected within the first few days. You can explore the tool here: Reachout - VannPunkt Lillestrøm (arcgis.com).

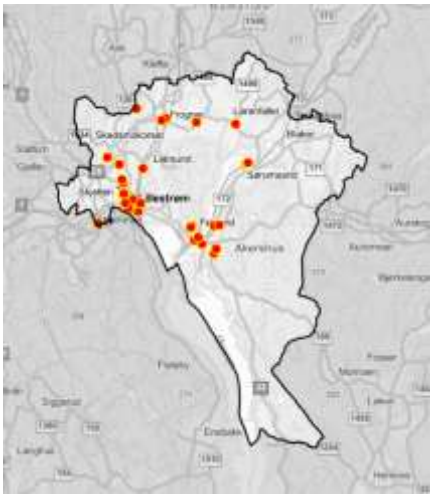

Figure 3: Crowdsource tool results in Lillestrøm

6. Readiness Levels (Technology Readiness Level - TRL)

With License: TRL 8 (Fully functional system working in the intended environment).
Without License: TRL 5 (Technology validated but requires further development for full deployment).

7. Conclusion

The crowdsourcing tool for climate hazard mapping is a valuable resource for urban climate adaptation. While software selection depends on available resources, engagement and data collection are the key challenges. A well-executed communication strategy and quality control mechanisms will ensure the tool successfully collects meaningful, actionable data to support climate resilience efforts.