

AI-based Waste Mapping for Addressing Climate-Exacerbated Flood Risk

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Relevance

Urban flooding is a growing climate change-related hazard in rapidly expanding cities, where inadequate waste management often blocks drainage systems. This study presents an AI-powered waste mapping workflow that empowers local communities to build resilience against flooding.

Case Study

In Sub-Saharan Africa, less than half of municipal solid waste is formally collected, with up to 70% openly dumped. Dar es Salaam, Tanzania, was selected as a case study to test our workflow, given its rapid urban growth and critical waste management challenges. With a population of 5.38 million in 2022—projected to exceed 10 million by 2030—the city generates approximately 4,600 tons of waste daily, of which less than 40% is formally collected.



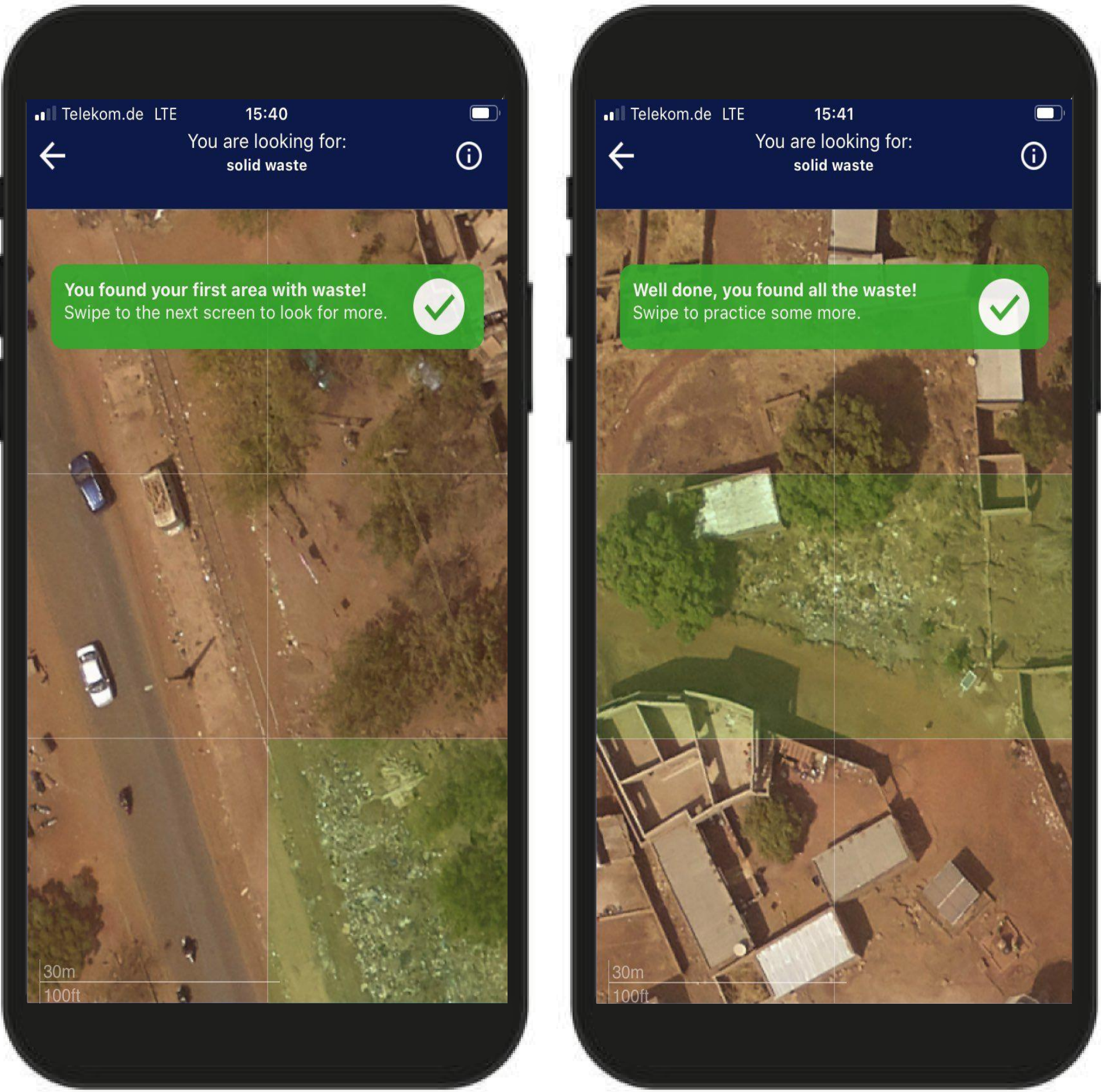
Community-driven Data Acquisition



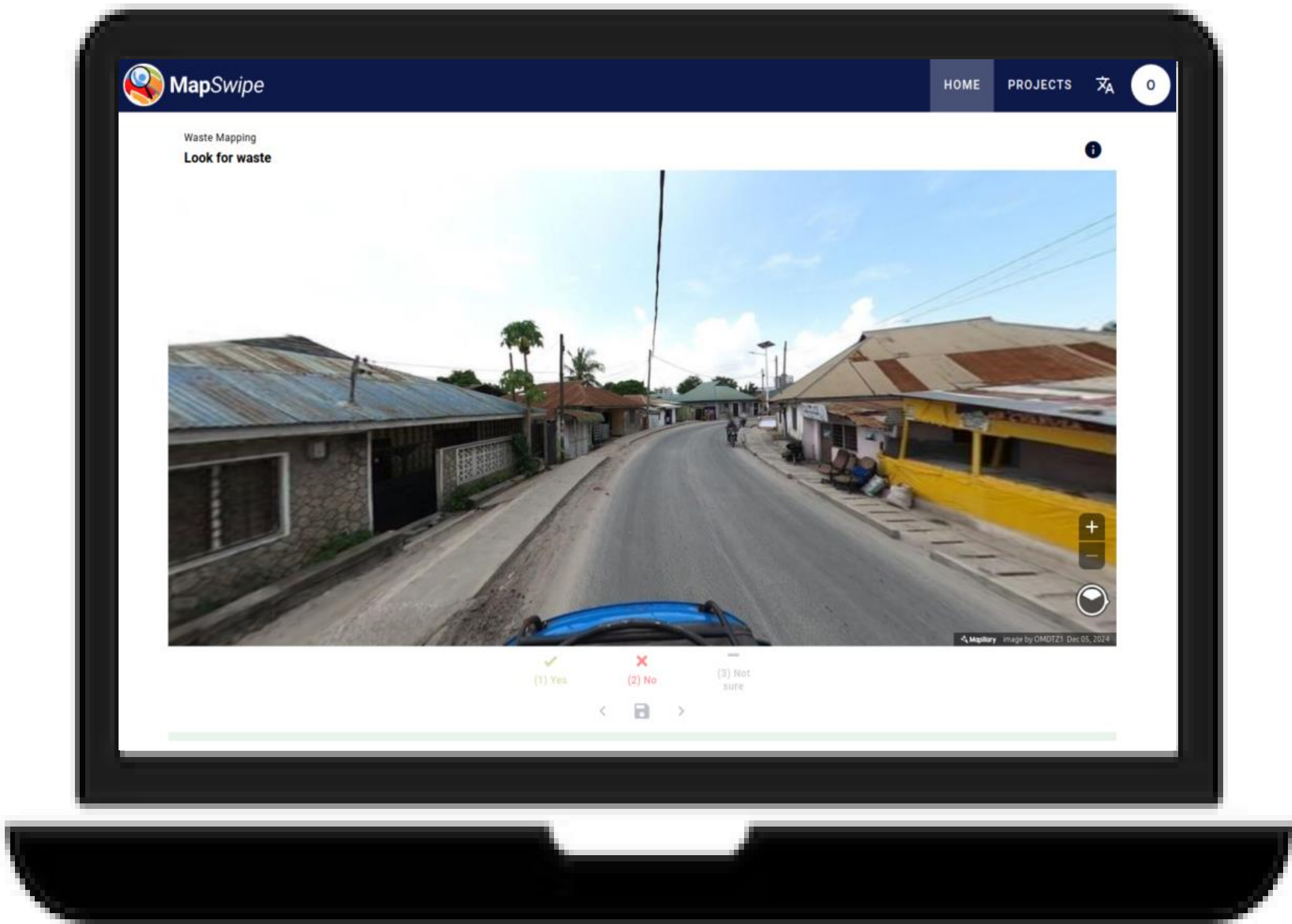
A two-week data collection campaign combined UAV and street-level imagery to capture diverse views of municipal solid waste. Drone flights produced 19.2 km² of high-resolution orthomosaics (~9 cm GSD), while a 360° camera mounted on a tricycles recorded over 494,000 panoramic images along 1,500 km of streets. All data was uploaded to Panoramax and OpenAerialMap for open access.

Development of MapSwipe

Crowdsourced Labeling Platform to Capture Local Perspectives



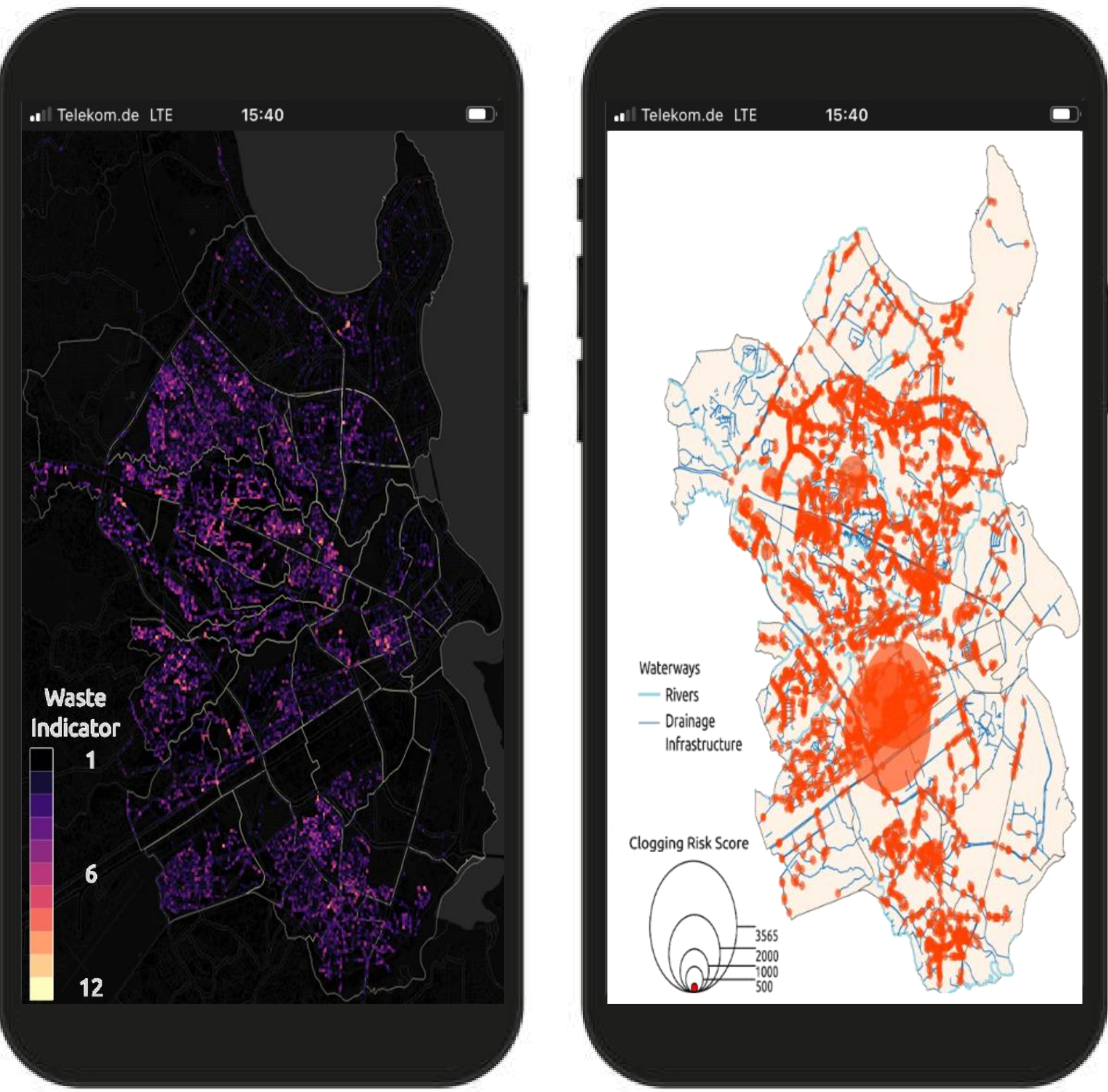
Waste Pile (yes / no)



AI-based Waste Mapping

Waste Contamination

Waterway Clogging Risk



Community-driven Drainage Clean-up

