

Leveraging PPGIS for Sustainable Urban Solutions

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Henna Ylimaa, Hilary Mvungi, & Siiri Sandberg



KADI



**UNIVERSITY
OF TURKU**

WHO ARE WE



Hilary Mvungi
Urban Planner
Faculty of Science
University of Turku



Henna Ylimaa
MSc
Geographer-Statistician
University of Turku



Siiri Sandberg
MSSc, M.A.
Anthropologist
University of Helsinki

PROBLEM DESCRIPTION

How do people experience urban challenges in the times of accelerating global climate change and exacerbating informal urbanization?

- Health risks for urban dwellers
- Lack of geospatial data and understanding of
 - Heat
 - Floods
 - Pollution
 - Waste
 - Disease outbreaks
 - Crimes
- Feasible solutions to mitigate urban and environmental risks: technological and behavioral approaches



Heat wave in China 2023
Greg Baker/AFP.



Heat wave in India 2023
CX Daily

THE SOLUTION

Our solution combines location-based data with experiential insights on thermal sensation

Why?

- User-friendly way to collect PPGIS data
- Cost-effective
- Better data - better decisions
- Bridging the gap between citizens and urban planning

Pre-processing
and analysis



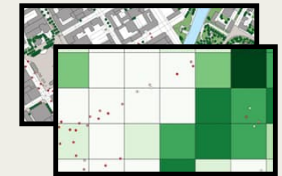
PPGIS data
collection with
QR-codes



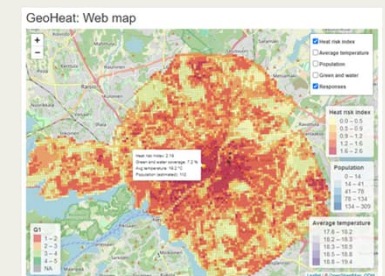
Data processing
and integration



Prototype solution



stop_id	timestamp	Q1	Q2
778	2025-03-25T08:00	3	4
1708	2025-03-25T08:01	1	4
1494	2025-03-25T08:02	5	5
888	2025-03-25T08:03	3	2
840	2025-03-25T08:04	3	3
1513	2025-03-25T08:05	5	3



USERS

City planner

- Experience-based data for planning cooler cities

Residents

- Engaging in the city planning & improved well-being

Reseachers

- Data for urban, health, and environmental research

Business industries

- Understanding the thermal sensation impact on user experience



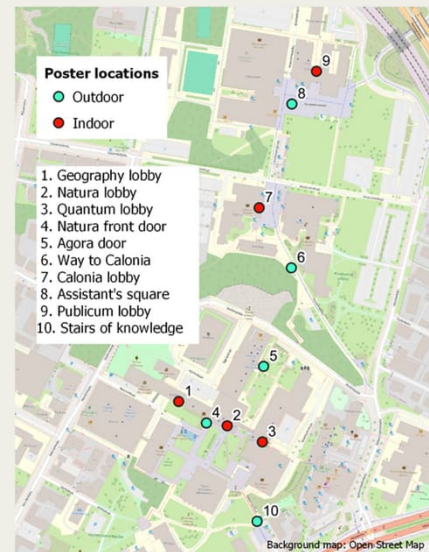
PILOT 1 - TURKU

What did we do?

- 1st pilot at the University of Turku Campus
- 2 weeks, 10 locations
- 2 questions
 - How do you feel right now? 1-5
 - Do you feel comfortable? 1-5
- Overlaid existing geospatial data with the user experience data

What did we learn?

- Partner to collaborate with
- Finding strategic locations
- Raising awareness and mobilizing the community
- Technical solution for PPGIS



Onks kuuma? Feelin' hot?

B I U ↻

"Onks kuuma?"-pilotitidatan keruukampanjan järjestää GeoHeat-tiimi osana Geospatial Challenge Camp 2025 -kursia. Tässä pilotihankkeessa keräämme tietoa ihmisten koetuista lämpöaistimuksista, ja myöhemmin yhdistämme nämä tiedot paikkatietoaineistoihin (GIS).

The "Feelin' hot?" pilot data collection campaign is organized by the team GeoHeat from the Geospatial Challenge Camp 2025. With this pilot data collection, we are collecting experienced thermal sensations and, later on, combining them with GIS data.

Lue lisää Geospatial Challenge Camp 2025 -tapahtumasta / Read more about the Geospatial Challenge Camp 2025: <https://challenge-camp.geoportti.fi>

Jos sinulla on kysyttävää datan keruusta, voit ottaa yhteyttä tiimiin / If you have any questions, feel free to contact the team:

Henna Ylimaa: hylim@utu.fi / Hilary Mvungi: hjumvu@utu.fi / Siiri Sandberg: siiri.sandberg@helsinki.fi

Automaattisesti täytetty paikka, älä vaihda / Prefilled location, do not change

Lyhyt vastaukseksi

Miltä sinusta tuntuu juuri tässä paikassa? Arvioi oma lämpöaistimuksesi. *

How do you feel right now at this location? Evaluate your personal thermal sensation.

Miltä sinusta tuntuu juuri tässä paikassa? Arvioi oma lämpöaistimuksesi. *

How do you feel right now at this location? Evaluate your personal thermal sensation.

1 2 3 4 5

Kylmä / Cold ○ ○ ○ ○ ○ Kuuma / Hot

Onko sinulla mukava olo tällä hetkellä tässä paikassa? Arvioi oma lämpö mukavuutesi. *

Do you feel comfortable right now at this location? Evaluate your personal thermal comfort.

1 2 3 4 5

Mukava / Comfortable ○ ○ ○ ○ ○ Epämukava / Uncomfortable

Sana on vapaa - jätä meille kommentti. Kiitos vastauksestasi!

Word is free - leave a comment for us. Thank you for your response!

Pitkä vastaukseksi

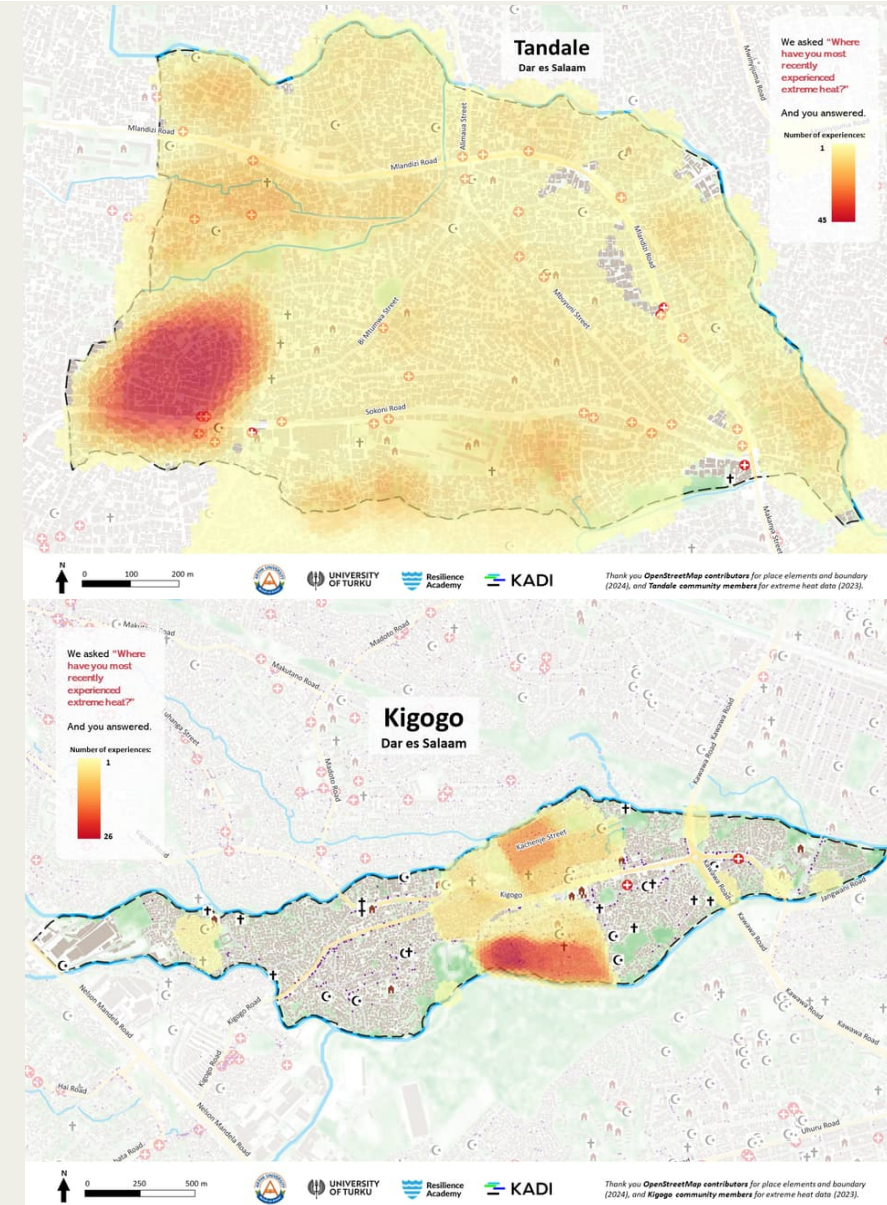
PILOT 2 - TANDALE & KIGOGO

How does the tool work?

- Open data sources + simple PPGIS method:
 - Scan QR codes → two-question survey.
 - Posters placed in different locations – 9 in Kigogo and 6 in Tandale.
 - Each QR code corresponded to a pre-filled location.
 - Respondents scan the QR codes with their smartphones.
- Overlaying previous heat data

How were the posters placed?

- Spatial coverage, e.g., shaded areas, open spaces, near buildings
- High foot traffic, e.g., markets, schools, and walkways
- Community relevance, e.g., residential houses, public buildings.
- Accessibility and visibility.
- Temporal variation
- Existing heat map data



Kigogo and Tandale extreme heat maps are part of research by Venla Aaltonen, UTU

WALKING TOUR:KIGOGO ROUTE

9 locations
ID K01 – K09






KIGOGO WARD SITE SURVEY ROUTE



Legend

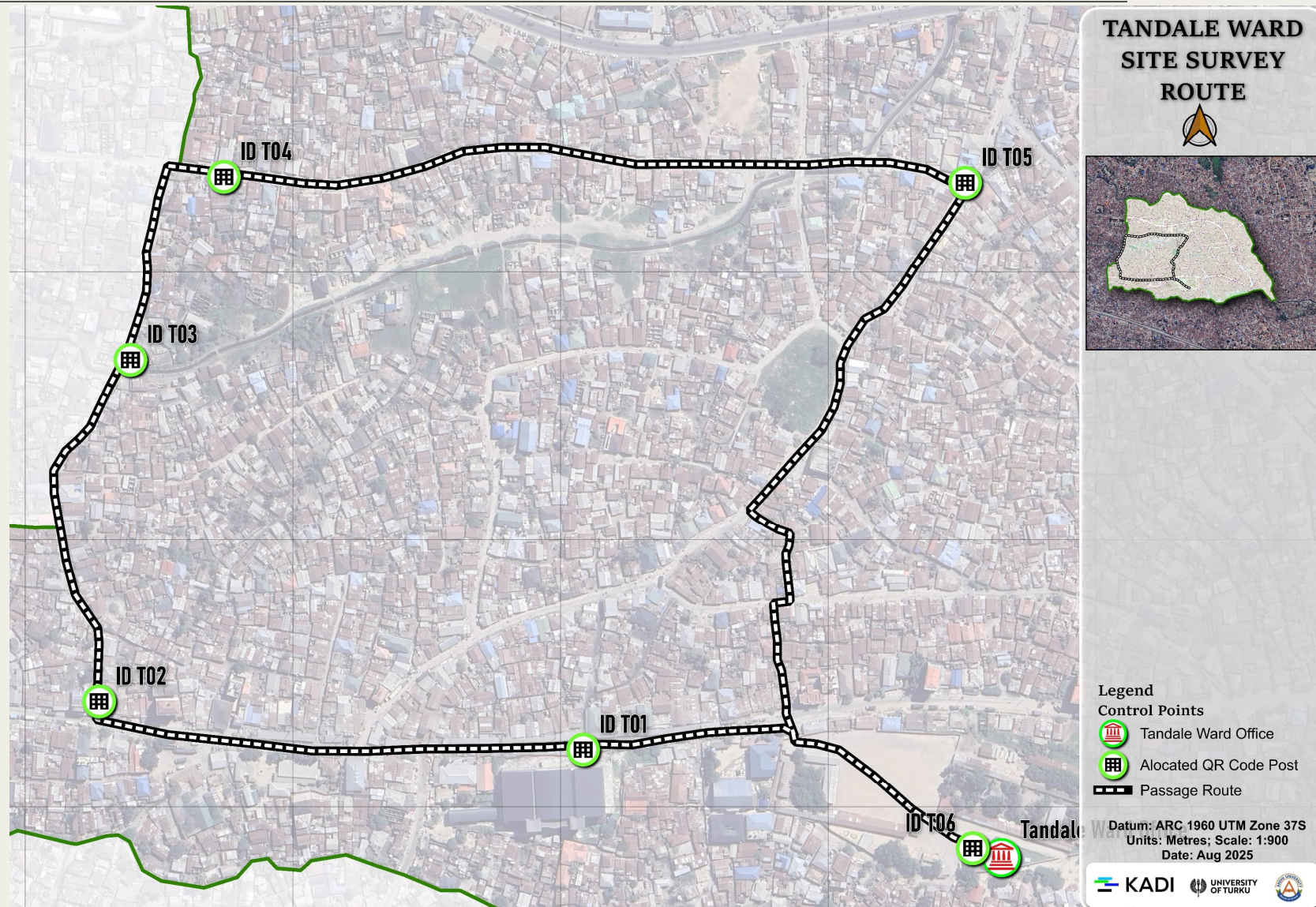
Control Points

-  Kigogo Ward Office
-  Allocated QR Code Post
-  Passage Route

Datum: ARC 1960 UTM Zone 37S
Units: Metres; Scale: 1:500
Date: Aug 2025

WALKING TOUR:TANDALE ROUTE

6 locations
ID To1 – To6



Care to participate?

- Use your smartphone camera or a QR scanner app to scan the code.
- Access a short online multilingual survey with 2 questions
- Fill the form, provide feedback, and submit.
- Responses are anonymously collected with a timestamp
- No sensitive information such as name, age, gender, location, or ethnicity.
- The information is entirely based on personal experience and opinions.

Kampeni ya Joto Kali

Feelin' Hot Campaign - Kigogo



JOTO KALI?

Skani msimbo (QR code) na
utuambie zaidi kuhusu hisia
zako za hali ya joto:

FEELIN' HOT?

Scan the code and tell us more
about your thermal sensation:



Dodoso hili ni sehemu ya mradi wa KADI chini ya Chuo kikuu Turku, kwa kushirikiana na Chuo Kikuu Ardhi.
This survey is part of the KADI project under the University of Turku, affiliated with Ardhi University.

ID K01



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ASANTENI SANA!
THANK YOU!