



Empowering Organizations,
Enriching Lives



CLIMATE LINKED INFRASTRUCTURE MAPPING

2025

BRIEF

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Acronyms

CLIM	Climate Linked Infrastructure Mapping
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ICE	Institution of Civil Engineers
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NGOs	Non-Governmental Organizations
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Executive Summary



THE CONTEXT:

Uganda's communities face escalating climate shocks floods, droughts, and landslides that destroy infrastructure and cut off access to essential services. Yet the local knowledge most critical to understanding these risks has, until now, been systematically excluded from resilience planning.

WHY IT MATTERS:

The pilots demonstrated that bottom-up, community-led risk mapping surfaces actionable intelligence that top-down technical surveys consistently miss. Communities produced concrete resilience action plans, local authorities gained ground-truth data, and residents reported renewed agency and civic accountability. The methodology is low-cost, replicable, and ready to scale across Uganda.

WHAT WE DID:

thinkIT, in partnership with the UK Institution of Civil Engineers (ICE) and Makerere University, pioneered a six-step participatory spatial mapping methodology. Piloted in Awoja (Eastern Uganda) and Gerenge (Lake Victoria), the approach equipped communities to map climate risks to local infrastructure roads, bridges, power lines, water sources and trace how failures in one system cascade into others.



Introduction



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**PILOT
COMMUNITIES:
AWOJA &
GERENGE**

6

**STEP
PARTICIPATORY
MAPPING
METHODOLOGY**

**Low-Cost
& ADAPTABLE
FOR NATIONAL
SCALE-UP**

Communities in Uganda are increasingly vulnerable to climate-related disasters floods, droughts, and landslides that don't just damage individual assets but trigger cascading failures across roads, electricity, and water systems. thinkIT, in collaboration with the UK Institution of Civil

Engineers (ICE) and Makerere University, piloted a participatory spatial mapping framework in two communities Awoja, a flood-prone swamp region in Eastern Uganda, and Gerenge, a peninsula community near Lake Victoria to put local knowledge of these interdependencies at the center of climate resilience planning.

Problem Statement

When climate events strike Ugandan communities, they rarely damage a single asset in isolation. A flooded road can cut off access to a clinic; a downed power line can cripple a water supply. Traditional top-down risk assessments consistently fail to capture these on-the-ground interdependencies between infrastructure and community needs.

Existing mapping methods for climate risk were also too complex or resource-intensive for use at the community level, lacking simple participatory tools to engage local residents. In poor rural areas like Awoja and Gerenge, this gap meant that critical insights from villagers the people who understand their own infrastructure best were not informing resilience planning.

Overlooked Local Knowledge

Which road cuts off a clinic when flooded, or how a power outage disables a water pump, is often invisible to remote, top-down risk assessments.

No Simple Participatory Tools

Existing mapping methods were too complex or resource-intensive for everyday use by residents in low-resource rural communities.

The challenge, in short, was to develop a bottom-up mapping approach that empowers communities to identify their own climate risks to infrastructure, understand how failures in one system affect others, and contribute to action plans for resilience.



Our Approach

thinkIT, ICE, and Makerere University pioneered a participatory spatial mapping framework built around a six-step participatory mapping tool, drawing on best practices in community mapping and disaster risk reduction. The approach was people-centered and iterative from the outset.

The team began with preparatory visits to Awoja and Gerenge to build trust and gather preliminary information.

Local workshops then brought together elders, local leaders, and schoolteachers to create maps of their area, marking critical infrastructure and noting past climate events. Facilitators guided participants through all six steps from identifying key assets to tracing how a single failure ripples out to affect others.



Figure 1. The six-step participatory mapping tool, from preparatory visits through to co-created solutions.

The tool combined visual mapping activities large village maps and symbols with guided questions that prompted discussion, such as "If this road is flooded, what happens to children getting to school?" Participants worked in small groups to ensure inclusive input, with women, youth, and the elderly all contributing knowledge of different kinds of infrastructure use.

The approach also trained local volunteers as mapping facilitators, building lasting local capacity. Community map data was later transposed onto digital maps and a simple dashboard, so district officials and engineers could view the findings. Throughout, the emphasis was on co-creation: communities not only provided data but helped interpret it, identifying the most critical infrastructure linkages and brainstorming potential solutions this resilience-from-below approach ensured the mapping was rooted in local reality.

Impact and Results

The participatory risk mapping proved to be a powerful tool for community resilience. In both Awoja and Gerenge, residents were able to articulate and visualize the impact of climate events on their infrastructure like never before.

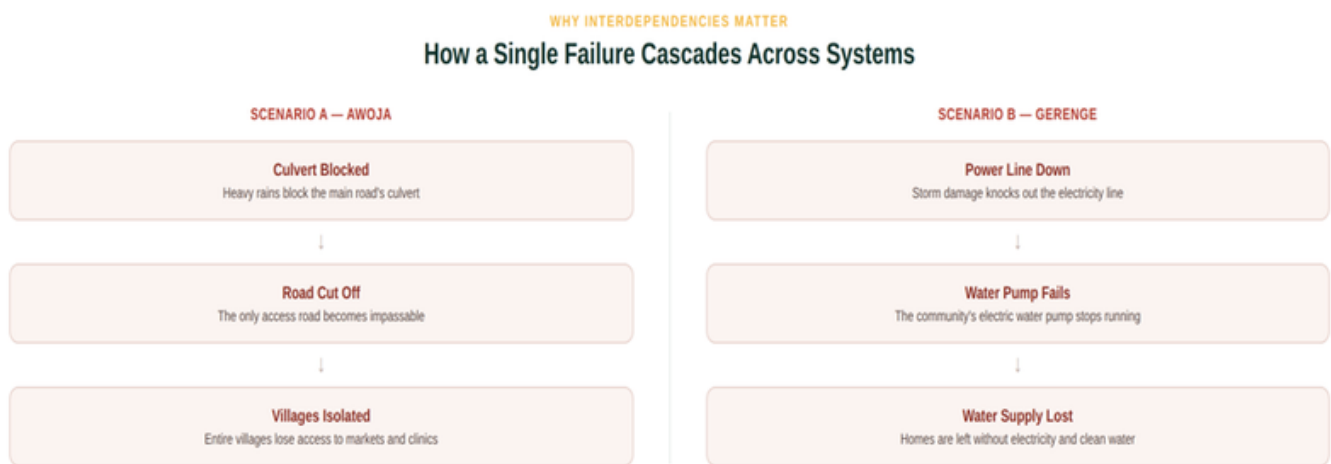


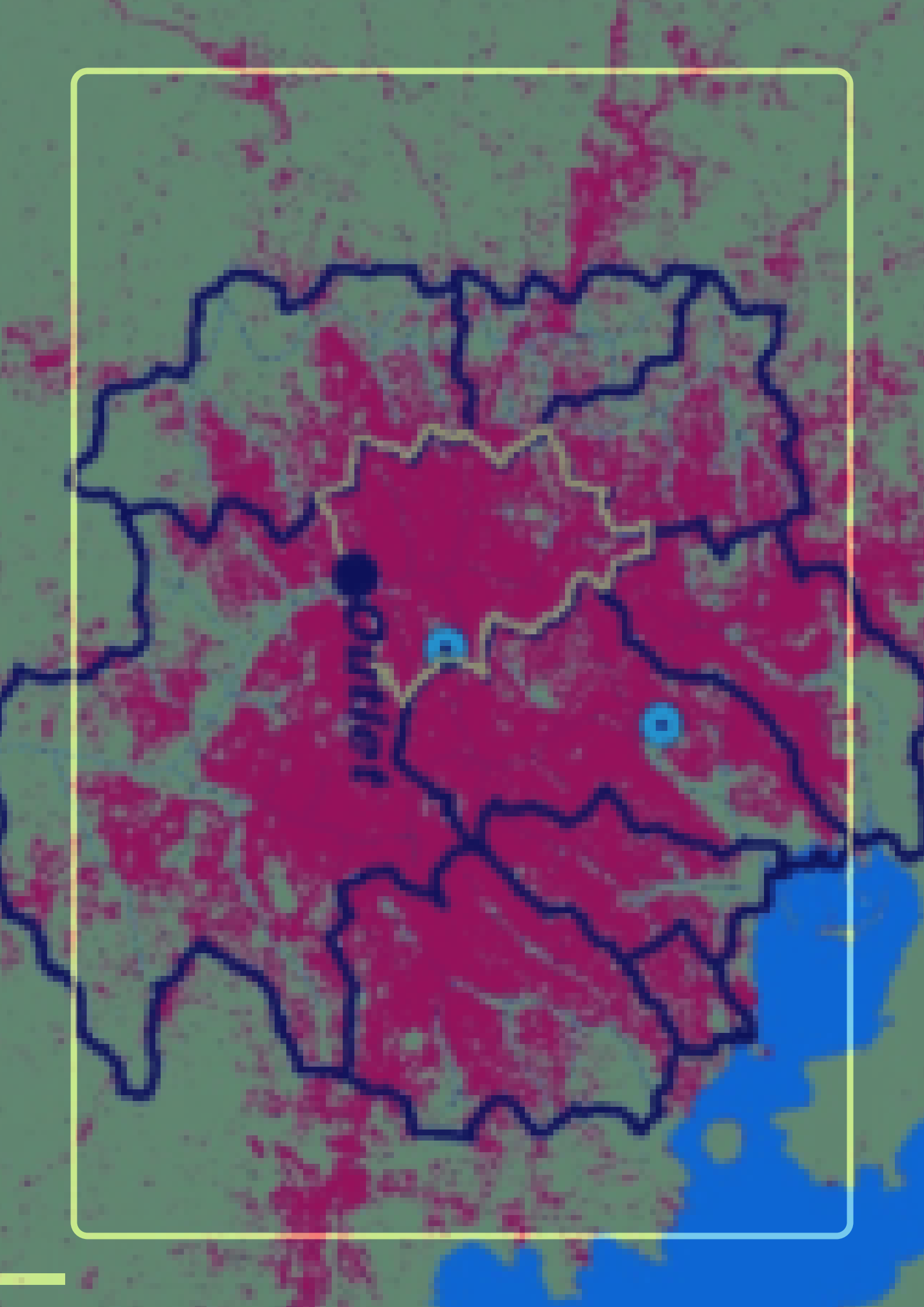
Figure 2. Community mapping surfaced concrete cascade effects a blocked culvert isolating villages, and a downed power line disabling water pumps.

By piecing together such community knowledge, the mapping cemented the community's memory of past climate impacts on infrastructure and illuminated the interdependencies among systems how a road, a marketplace, and a health center rely on one another. This shared understanding has already stimulated important conversations, with residents beginning to question and hold relevant authorities accountable for maintenance.

"We never realized how a flooded road affects everything. Mapping it out together opened our eyes, now we're working as a community to fix these issues." — **Community Participant, Awoja Mapping Workshop**

People who participated reported feeling more connected and informed, organizing around solutions such as volunteer groups to monitor infrastructure during extreme weather. Planners and engineers found the community-generated maps incredibly insightful, offering ground-truth data that remote surveys missed.

The approach proved low-cost and adaptable, effectively complementing technical assessments and ensuring resilience plans are grounded in local realities. Concrete action plans were drafted in each community reinforcing a flood embankment, establishing an emergency phone tree while the exercise itself built social cohesion around a shared goal of protecting local infrastructure and livelihoods.



Next Steps

Building on the success of the Awoja and Gerenge pilots, thinkIT and its partners recommend a coordinated set of actions to scale, refine, and institutionalize the participatory mapping approach.

Test adaptability in new contexts

1. Conduct a second pilot in a different setting for example, a densely populated urban neighborhood or a drought-affected region to test the tool's adaptability and compare results.
2. Use these results to solidify the six-step methodology, adjusting parts that need tweaking, such as simplifying questions or adding steps suited to urban settings.

Prioritize high-risk regions for expansion

3. Engage regions of Uganda highly affected by climate shocks, such as mountainous areas prone to landslides, which could offer valuable insight into the tool's wider applicability.

Enable independent local implementation

4. Finalize and distribute the facilitator's guide, template kit of mapping materials, and online portal for uploading and visualizing community map data, so local governments and NGOs can run participatory mapping without intensive external support.

Mainstream findings into policy

5. Continue engagement with Uganda's National Emergency Coordination and Operations Center and the Ministry of Works to embed community-identified interdependencies into district development plans and infrastructure maintenance schedules.
6. Work toward community-driven climate-infrastructure mapping becoming a regular practice a kind of local climate risk audit conducted in villages and towns nationwide, targeting investment to the most vulnerable infrastructure links while keeping citizens actively involved in resilience-building.

Conclusion

The Awoja and Gerenge pilots show that resilience planning is strongest when it starts with the people who live the risk every day. By giving communities a simple, low-cost tool to map their own infrastructure interdependencies, thinkIT, ICE, and Makerere University have surfaced insights that remote, top-down assessments consistently miss and, in the process, built local ownership and accountability around resilience. As the six-step methodology is tested in new contexts and mainstreamed into national policy, Uganda has an opportunity to lead the way in demonstrating how participatory science can bolster climate adaptation at the grassroots level.

Ready to map climate risk in your community? Contact us via we@thinkit.africa to discuss how participatory risk mapping can be adapted to your region's infrastructure and resilience planning needs.



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