



# World Bank City Resilience Program Urban Heat Hackathon

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**Q1:** What island is this? (c. 1609)

**Q2:** Which would have the greater impact on local temperatures, rain, and wind?

A) 400 years of climate change

B) Building a city here



Manhattan 1609



Manhattan 2009



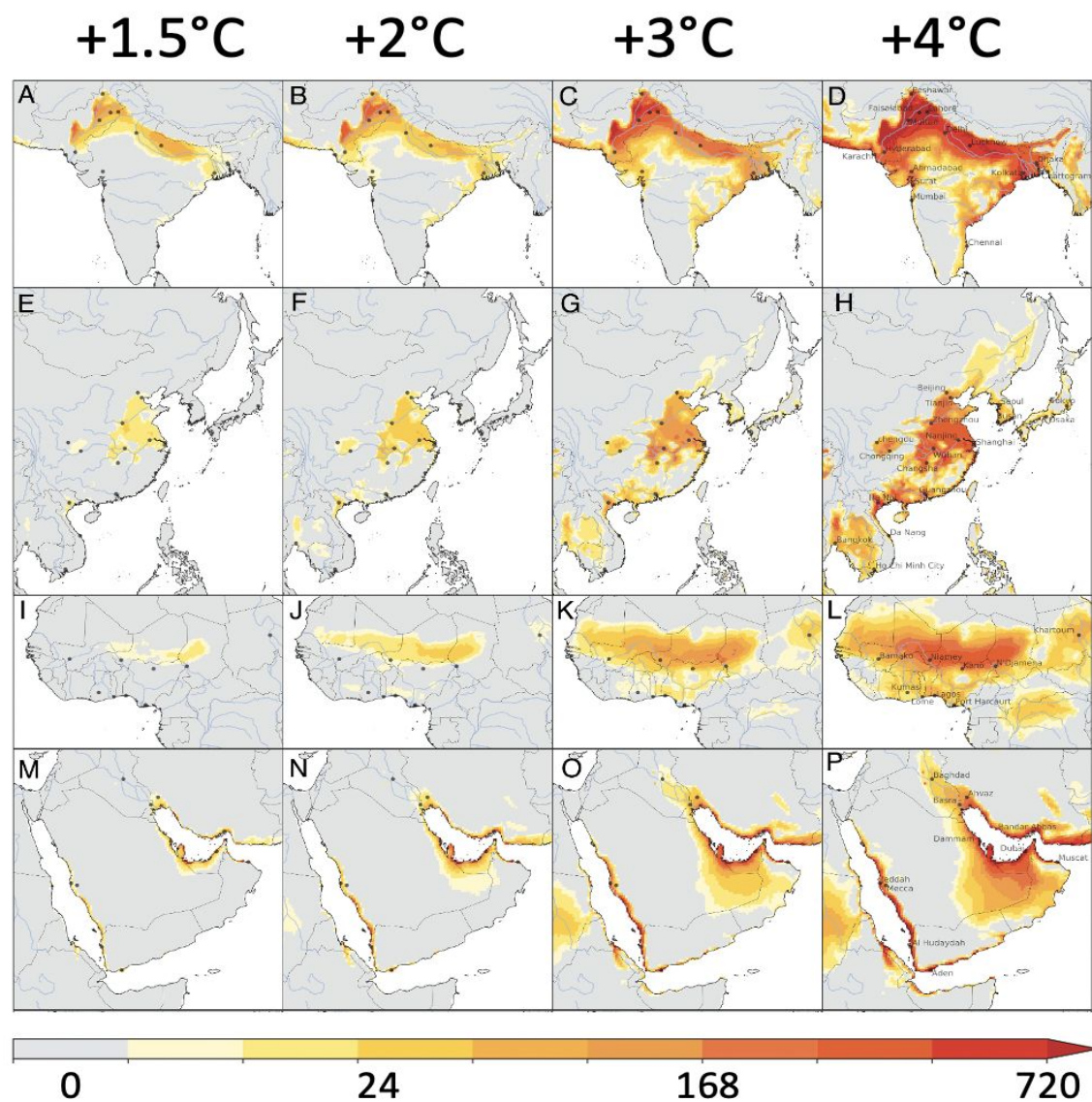


Manhattan 1609



Manhattan 2009

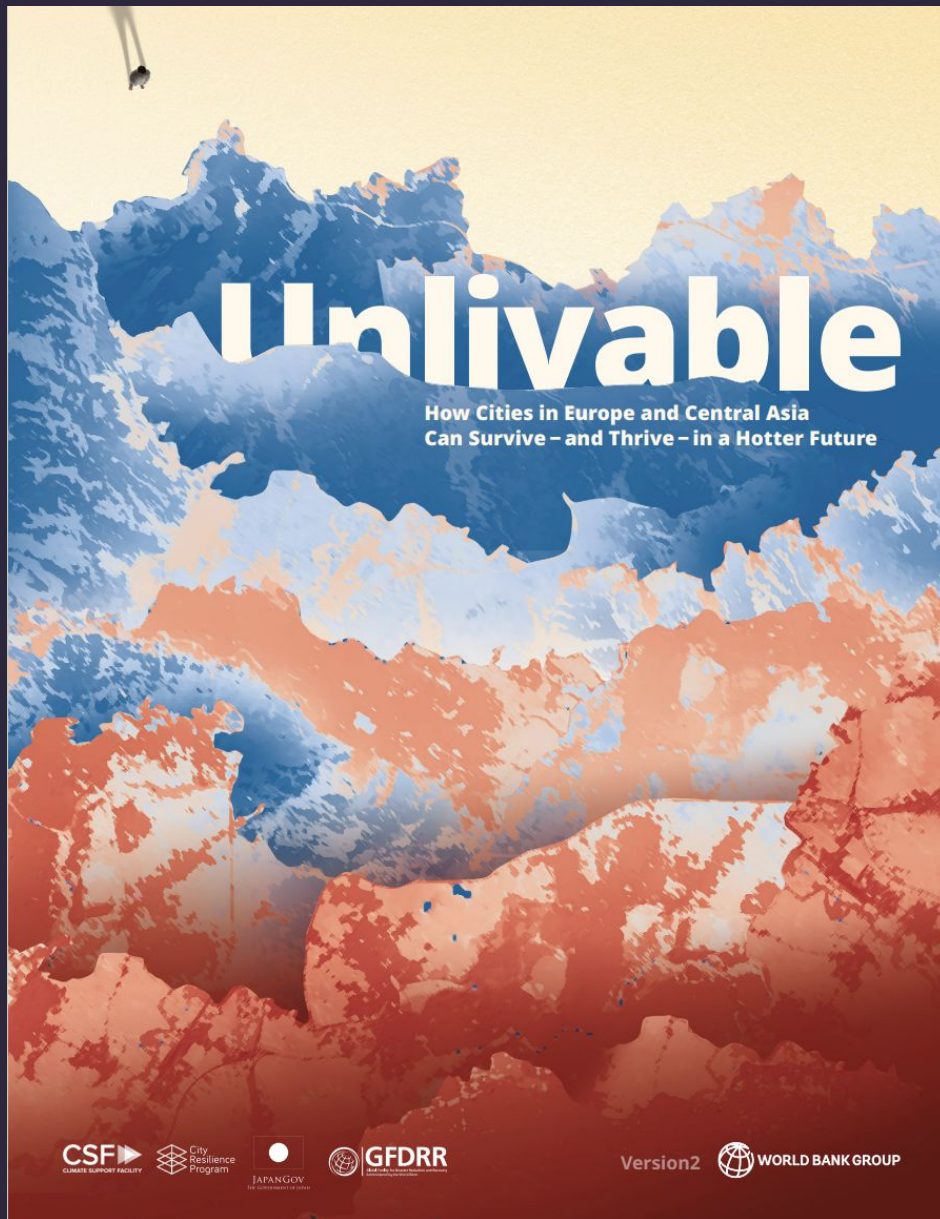




**Extreme heat in 2050:** Annual hours above acute heat stress threshold (35°C WBGT) under climate scenarios

**“Humans can only withstand certain combinations of heat and humidity before their bodies begin to experience heat-related health problems. As climate change pushes temperatures higher, billions of people could be pushed beyond these limits.”**

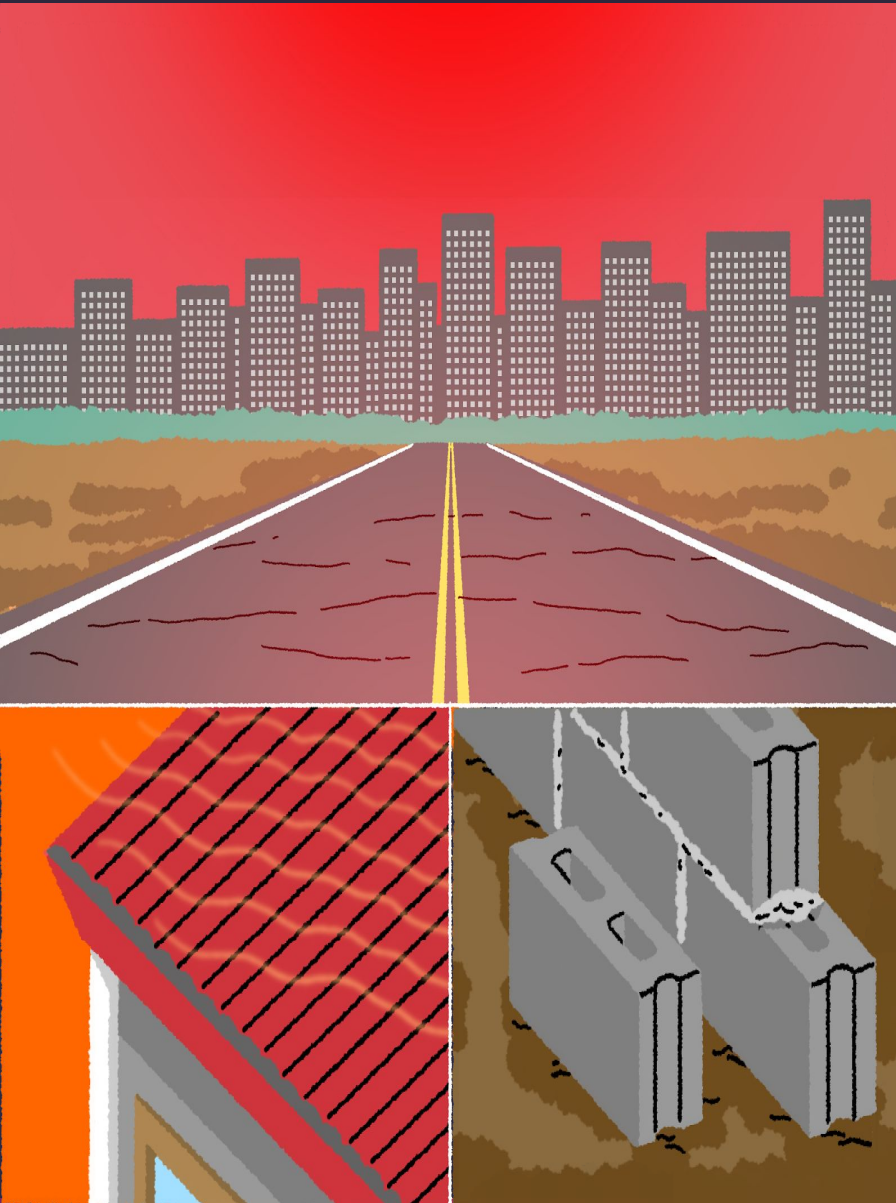
Climate Driven Heat May Make Parts of Earth Too Hot for Humans – Aaron Wagner, October 2023. Analysis by Patrick Vecellio et al.



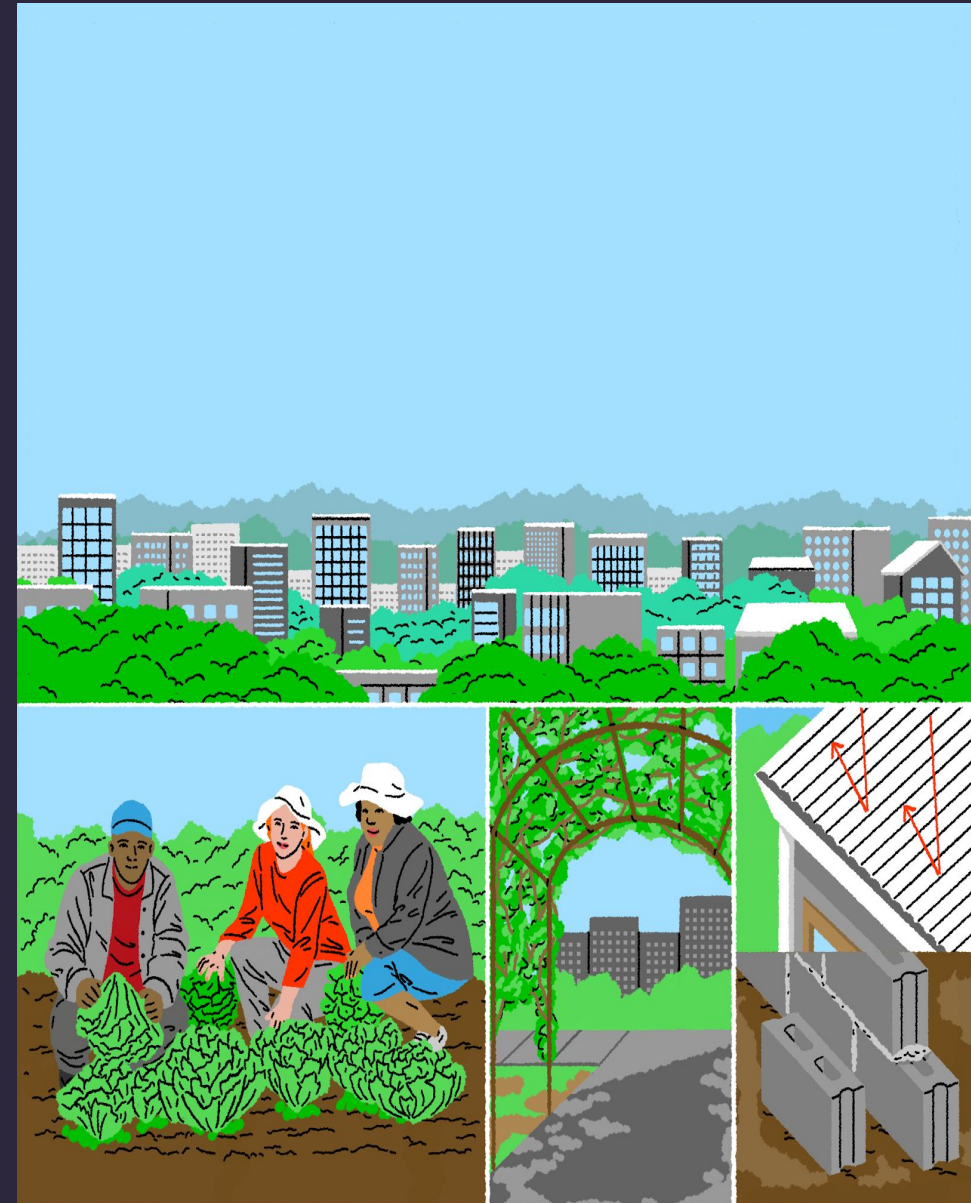
In Europe and Central Asia, cities could experience 40–70 additional hot days per year by mid-century.

This could reduce a city's GDP by 2.5% and cause as many as 100,000 heat-related deaths — comparable to today's mortality rate from road traffic accidents.



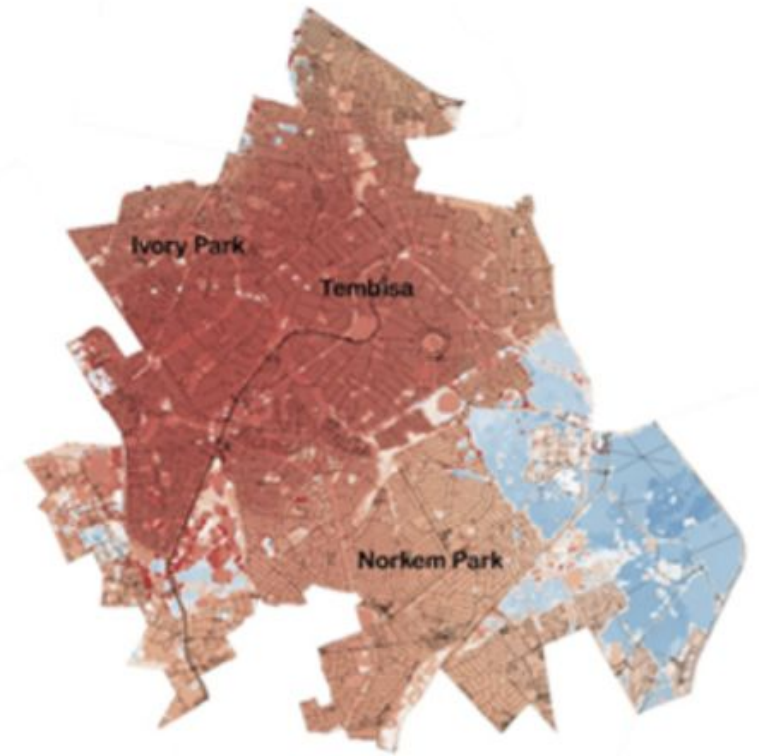
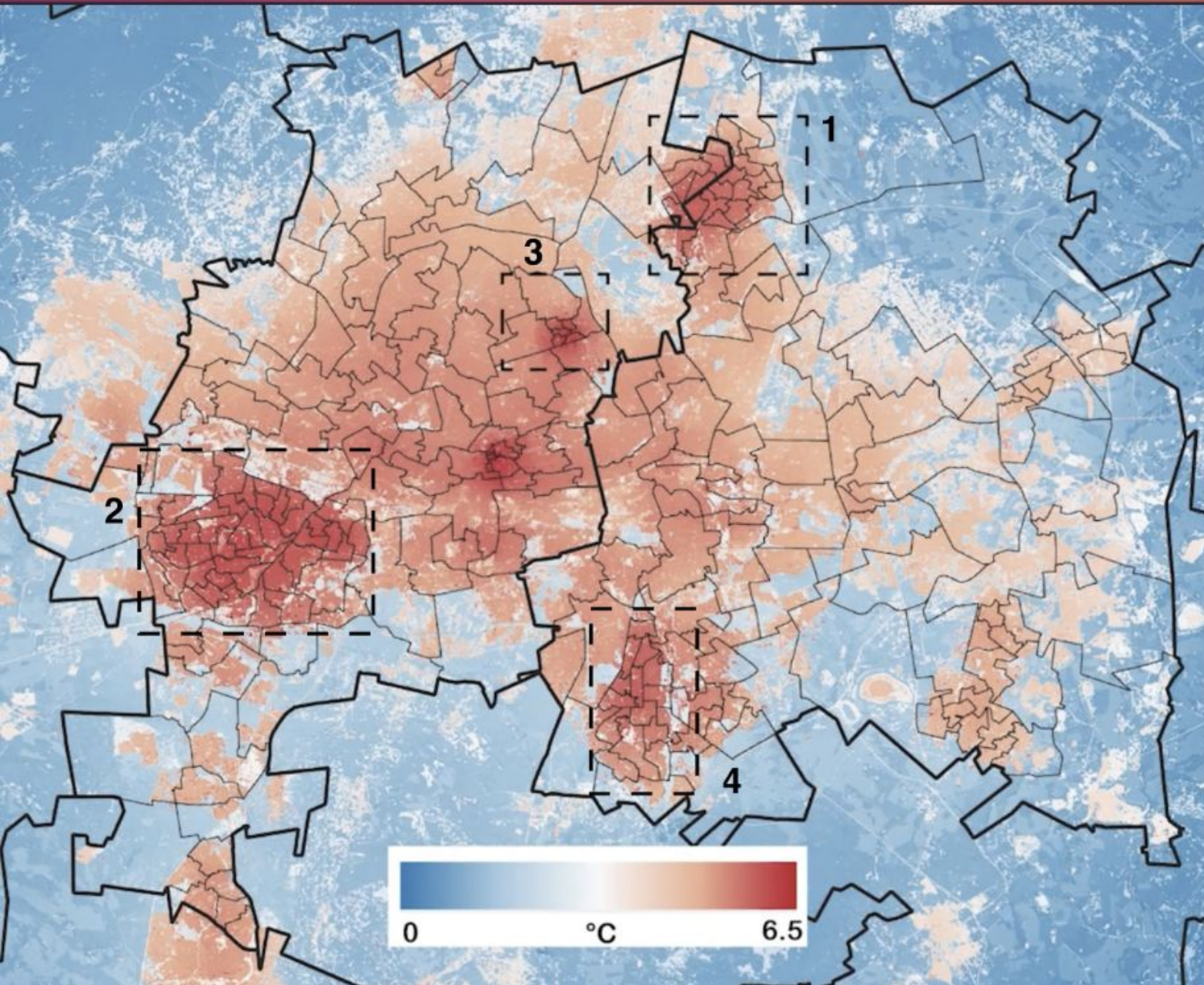


**Urban materials  
absorb & radiate  
the sun's energy**





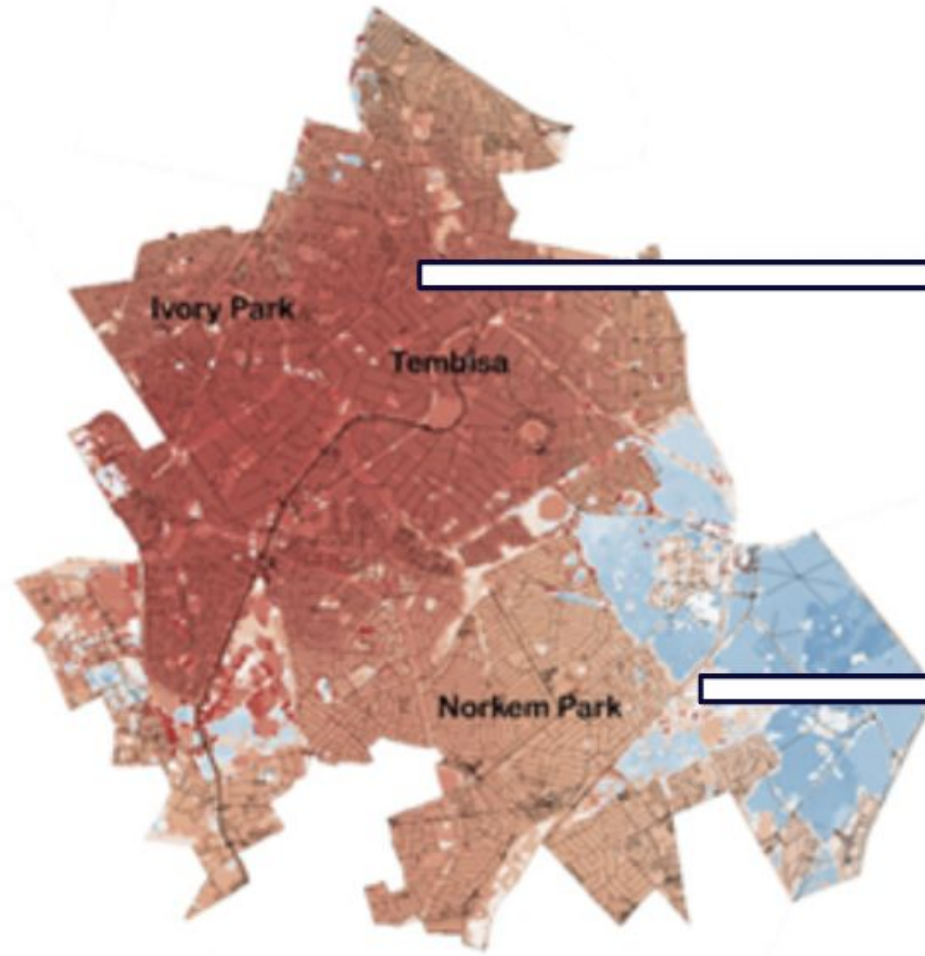
## Cities like Johannesburg face sharp disparities in heat exposure



Map shows the topography-corrected urban heat island effect (mean daytime temperature compared with a rural reference point).



# Cities like Johannesburg face sharp disparities in heat exposure





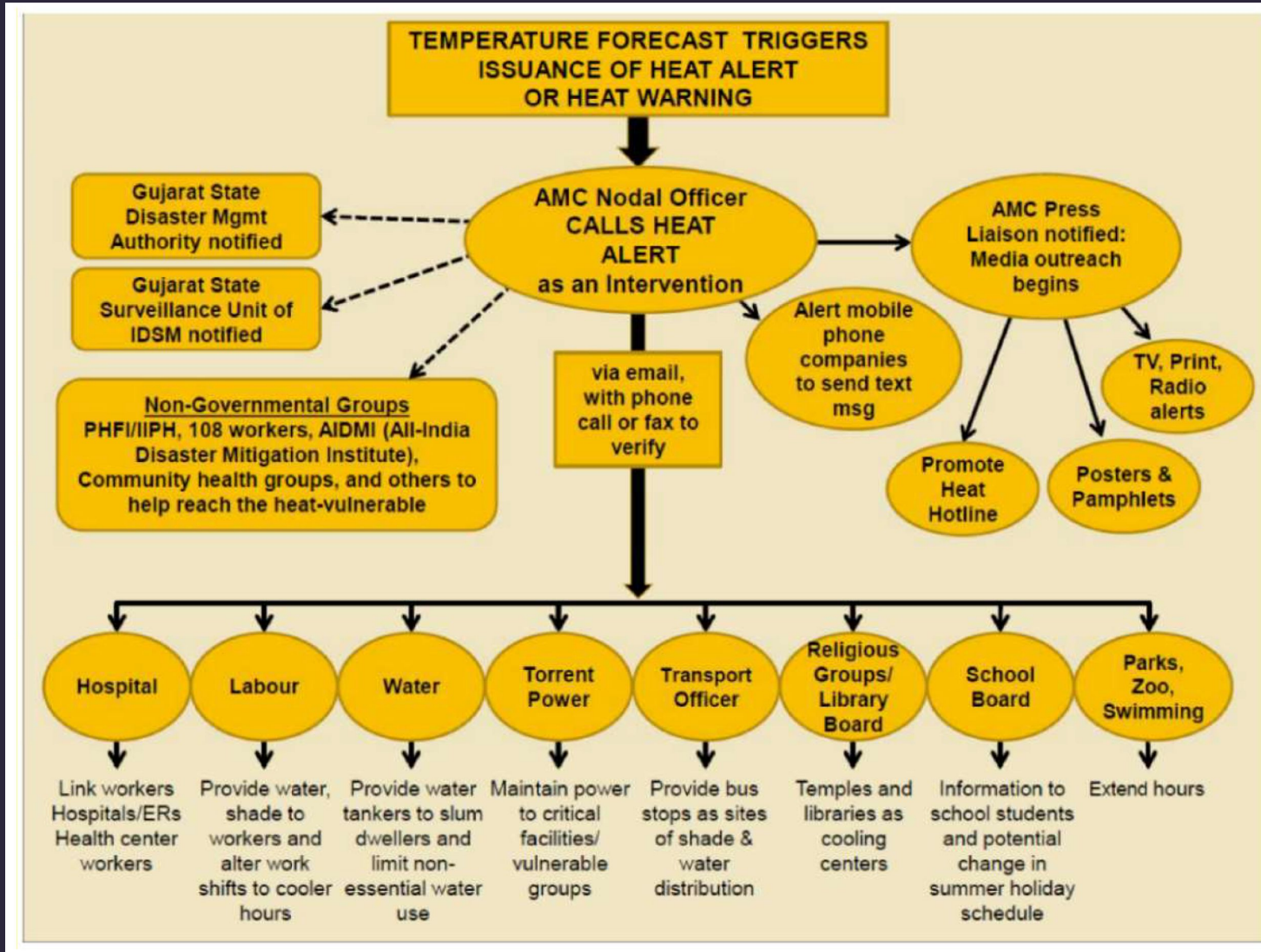


Water and  
vegetation-based  
interventions can  
lower peak daily  
temperatures by

**2-7°C**

according to an  
evaluation of data  
from 220 projects.





A 'traffic light' early warning system that activates measures to protect vulnerable groups saved an estimated

**1,190 lives**

during heat waves in Ahmedabad, India.



# From initial awareness to action: policy roadmap

PHASE



1. TAKE STOCK



2. BUILD THE  
EVIDENCE BASE



3. BUILD A "COOL  
CITY COALITION"



4. INVEST, MONITOR,  
MAINSTREAM

Have heat island studies been conducted?

What heat mitigation actions are in place? Are they working?

How could heat mitigation contribute to existing city strategies?

How does heat intensity differ between neighborhoods?

Which communities are most affected and how?

What opportunities to cool places and protect vulnerable people?

Which stakeholders can be effective champions?

What departments can use their core budgets, staff and operations to reduce heat impacts?

How can residents, employers, and civic organizations help?

Which cooling measures offer immediate, high-impact benefits?

What actions would protect most people at lowest cost?

How to mainstream heat across government?



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**Key constraint: heat hazard data**



# The Holy Grail



Heat hazard data that is

- ▣ **Credible:** grounded in science.
- ▣ **Available:** can be rapidly produced for low-income cities globally.
- ▣ **Useful:** tailored to planners, engineers and health authorities – not just your PhD supervisor.



# The Holy Grail



Most city officials face heat with no credible information about the UHI effect, no projections at neighborhood or building scale, and no easy way to use data for planning or budgeting.

## Our challenge

This isn't a quest for the perfect model. It's about building the **most helpful** one.

Solutions that

- ▣ tell mayors which school needs shade.
- ▣ help planners decide where to plant trees
- ▣ help finance ministers justify cooling centers.



“Cape Town’s workforce is at particular risk, specifically those working outdoors whose exposure to heat for long periods can have devastating heat impacts.”

**Eddie Andrews,**  
Deputy Mayor of Cape  
Town