

Briefing

Urban; Climate change

Key findings and recommendations from IIED and partner research and action for urban policymakers and planners



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Key points

Local planning and climate responses should address the threat of rising global temperatures and the increased frequency of extreme heat days to the lives and livelihoods of people living in urban informal settlements.

Local knowledge and co-produced data is vital to filling gaps in city-level weather information and to understanding the impact of heat island effects on people in urban informal settlements.

Individual responses to heat are limited by poverty and a lack of knowledge about how to reduce risks through adaptations to homes, local environments and behaviours.

Policymakers and planners can reduce heat risk in urban informal settlements by using nature-based solutions, like planting trees, and encouraging people to take earlier, preventative action.

Overheating cities: lessons from informal settlements in Dar es Salaam

As global temperatures rise, cities are overheating, putting the most vulnerable populations in urban informal settlements at greatest risk. Gaps in localised data on heat and humidity, plus a lack of engagement by governments of people living in informal settlements, reduces the effectiveness of adaptation measures for vulnerable populations. This briefing draws on findings from community-led data collection in two informal settlements in Dar es Salaam, Tanzania, which reveal the effects of rising temperatures on residents' health, livelihoods and education. The findings can inform targeted and effective local action by policymakers, planners and communities to address heat risks and underline the importance of community-led data collection.

There is a global crisis of overheating cities. Driven by rapid population growth and patterns of dense residential and commercial development, cities are heating up at twice the global average rate.¹ An additional 2.2 billion people are expected to be living in cities by 2050, with 90% of this growth taking place in Asian and African regions that are most exposed to rising temperatures. To inform climate-resilient urban design and development, better evidence is urgently needed on how heat affects the most vulnerable urban residents.

Previous assessments by the Intergovernmental Panel on Climate Change (IPCC) have underlined the significance of urban heat islands, whereby development and the loss of green space in cities is further increasing rising temperatures.² Concrete and asphalt, used to construct buildings and roads, absorb and retain heat in urban areas, while human activity, such as industry and traffic, further adds to heat levels.

This makes cities significantly hotter than surrounding countryside, where vegetation helps to cool the environment.³

Temperatures can vary widely across small areas within cities, with 'micro-heat islands' created when built environments trap heat in dwellings and neighbourhoods. In densely packed urban informal settlements, there is little space between buildings for heat to dissipate or tree cover to offer shade. With extensive use of corrugated iron sheets as a primary construction material for housing, local conditions can create intolerable temperatures within homes.

However, consistent evidence about the impact of rising temperatures on informal settlements is lacking, raising concerns about disproportionate increases in risks among people in lower socioeconomic groups.² This is supported by case studies of informal settlements, which show housing occupied by low-income communities in

Climate change is very different from patterns of summer heatwaves experienced historically

South Africa can have indoor temperatures 4–5°C higher than outdoor temperatures,⁴ and in Makassar, Indonesia, temperatures in an informal settlement averaged 2.6°C higher than surrounding areas.⁵

Cities across the globe are seasonally hot, but climate change is substantively different from the patterns of summer heatwaves experienced historically.

Not only is average

temperature rising year on year, but the frequency of extreme heat days is increasing. Within a 1.5°C global warming scenario, 67 cities will experience 150 days or more every year with temperatures above 35°C. This rises to 197 cities under a 3°C global warming scenario.⁶ The greatest impact will be on tropical zones, with research suggesting a 700% global increase in the number of urban poor living in extreme heat conditions, most significantly felt in West Africa and Southeast Asia.⁷ Endemic heat levels require more than merely adjusting to seasonal heatwaves; to avoid the worst effects of extreme temperatures, city strategies must orientate urban policy to cope with near-constant high temperatures throughout the year.

Data for better planning and early action

Informal settlements house a majority of populations in many cities across the global South, but there is a significant gap in directly recorded data on heat levels and the implications of rising temperatures for the urban poor living in these areas.⁸ Evidence is particularly lacking when it comes to the effects of heat on people who are already overlooked in much climate policy, including those engaged in informal economy livelihoods, children and older people, and women, who have a greater share of caring responsibilities due to gendered roles.

In general, heat receives less policy attention than other climate risks such as flooding, and ready acceptance of rising temperatures is dangerous in places where more extreme and prolonged periods of heat are happening and where specific risks to vulnerable, low-income groups are not fully understood. Growing awareness of heat issues, alongside the use of mapping and modelling technology at a city level, is helping to demonstrate patterns of exposure to extreme temperatures. However, the specific conditions found in urban informal settlements are rarely considered or are indistinguishable in

city-level satellite imaging and climate models.

This absence of localised data results in climate and urban development plans that fail to recognise the vulnerability of low-income populations to extreme temperatures. Accurate data are needed to inform climate-resilient upgrades to housing and settlements and to effectively target early warning systems and interventions, including individual behaviour change. Filling this gap, building on local knowledge co-produced with communities, is vital to reducing the risks of extreme and persistently hot conditions and to informing climate investment and local action.²

Participatory models of data collection and adaptive climate action show how active community engagement can reduce exposure to heat and other risks that affect residents of informal settlements.⁹ An initiative in Buenos Aires, Argentina, illustrates how integrating nature into the redesign of the Villa 20 informal settlement is helping to address growing problems of heat and flooding. Through the structure of an 'urban lab', partners from local government, nongovernmental organisations and universities are engaging in community data collection, discussion and consensus-building to develop bespoke actions to build a more climate-resilient settlement.

How heat is affecting lives in Dar es Salaam

Community-led research in Dar es Salaam¹⁰ highlights the vulnerability of informal settlements to climate change and reveals how people are coping with adverse weather conditions in contexts of extreme poverty. For residents of Kombo and Kwa Pakacha settlements, rising temperature is a primary climate concern, with 83% of people feeling uncomfortable or very uncomfortable in their homes on hot days. Heat levels particularly affect the wellbeing of children, older people and people with pre-existing medical conditions. The key findings show that heat effects are insidious, impacting health, livelihoods and young people's participation in education.

Health: over half of residents (53%) reported skin rashes and around one in ten (12%) reported respiratory effects and urinary tract infections (10%) due to high temperatures. Nearly half (49%) had sought medical treatment to address heat-related health issues. Given that just 10% of people in these settlements have health insurance, heat exposure creates a financial burden.

“Children have difficulty sleeping and sometimes they get skin rashes, due to extreme heat. Also, adults with blood pressure are much affected by extreme heat.”

— focus group participant, Kwa Pakacha

Livelihoods: with most people engaged in insecure informal trading, extreme heat can lead to lost workdays and can substantially affect earnings. Food vending is the largest area of self-employment, undertaken by more than a third of respondents. Vegetables and cooked food can spoil quickly in the heat, which reduces sales, loses capital investment in goods and increases waste. However, for vendors selling water and juices, hot days can increase sales and income levels.

Education: overcrowded and poorly insulated classrooms make learning particularly difficult in hot conditions. Extreme heat and uncomfortable environments reduce attention spans and can lower attendance levels. Children without access to transport may be exposed to high temperatures when walking to and from school.

“... in school there are no ceiling boards, so learning in extreme heat can get difficult. With more than 100 students [in my class] it is difficult to learn.”

— youth focus group participant, Kwa Pakacha

The density of the settlements and lack of green space increases exposure to high temperatures. Unplanned environments limit the flow of air between dwellings and with just 25% of homes having tree cover, they can easily become overheated.

Building construction: all dwellings in both settlements have corrugated iron roofs, which easily transfer heat. With just 50% of homes having ceilings, there is limited protection from solar radiation through roofs. Low-grade materials used for the construction of walls provide limited

heat resistance and contribute to high internal temperature levels during the day and night.

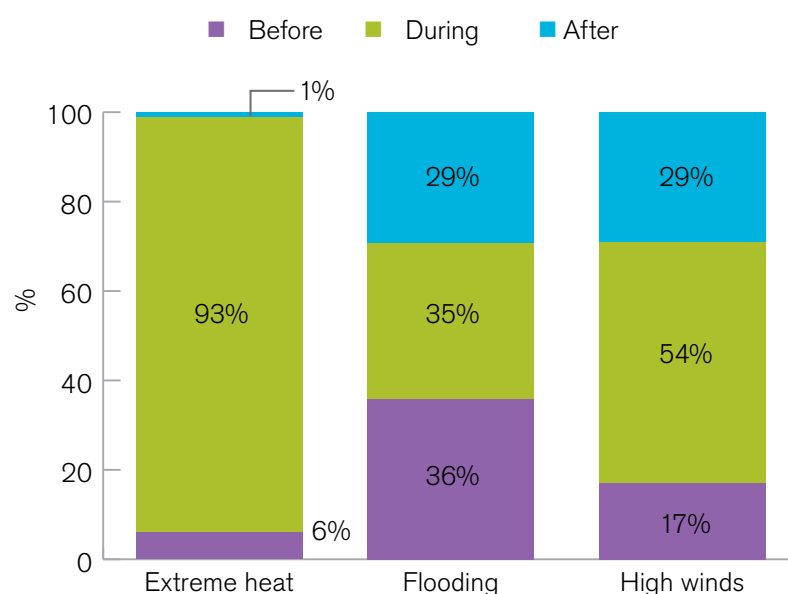
“The government should help us to plant trees [...] and encourage at least every individual to plant a single tree to houses with spaces, to reduce extreme heat.”

— focus group participant, Kombo

Cooking: this is primarily undertaken in shared and living spaces (54%), adding to already high internal temperatures in homes, especially as stoves continue to emit heat even after cooking is completed. Charcoal is the main source of fuel (70%), which adds pollution to confined spaces and is a driver of tree felling in the local environment.

While people are concerned about rising temperatures, there is a lack of knowledge on how to respond to changing climate conditions. One in five respondents (20%) said they were not very aware or were unaware of the health risks associated with exposure to extreme heat. This is reflected in the lack of preventative action taken to reduce heat exposure or mitigate risks, with almost all respondents (93%) taking action during heatwaves rather than before (see Figure 1).

Figure 1. Climate risks – when do people act?



Most of the responses to extreme heat were behavioural: using fans (45%) to keep cool, wearing lighter clothing (19%) and drinking more water (19%). Focus group discussions indicated a lack of knowledge in communities about actions or adaptations that could reduce exposure to extreme temperatures or create cooler conditions in the home. Even where knowledge was present, potential costs were a major barrier, as insecure informal sector employment offers people limited flexibility to vary work arrangements or accumulate savings to improve the resilience and comfort of their homes.

Communities in Kombo and Kwa Pakacha are willing to work individually and collectively to reduce exposure to heat through housing and environmental adaptations. Through the Tanzania Federation for the Urban Poor (TFUP) and Centre for Community Initiatives (CCI), there are ongoing discussions in settlements and with local government on community-led tree planting and greening activities and small-scale adaptations to homes such as painting roofs white to reflect sunlight and insulating ceilings to reduce heat exposure.

Innovations in community data collection

Closing data and knowledge gaps on heat can help to identify underreported issues (like the unequal impacts of extreme heat on women and

girls) and is vital for targeting policies and resources towards inclusive housing improvements and affordable climate adaptations. The work in Dar es Salaam has led to a further pilot project, being undertaken in Tanzania (in Kombo), Kenya (in Mathare settlement in Nairobi) and Zimbabwe (in the town of Kariba), to develop a participatory method of heat data collection. Working alongside the Slum Dwellers International (SDI) secretariat, communities are gathering temperature and humidity data in their homes to record heat levels and compare readings to external temperatures in their city, to demonstrate variations in urban heat island effects.

The pilot project aims to build a method to localise data collection to educate communities on the risks of heat. This will help to inform individual and collective action and strengthen partnerships with local government and national meteorological offices. If successful, the method will be integrated into SDI's Know Your City programme, to build local ownership of data and action and help raise the profile of the impacts of rising temperatures on people living in urban informal settlements.

Wayne Shand, Mussa Raido and Marcelle Mardon

Wayne Shand, senior associate, IIED; Mussa Raido, researcher, Centre for Community Initiatives, Tanzania; Marcelle Mardon, researcher, IIED.



Knowledge Products

IIED's mission is to build a fairer, more sustainable world, using evidence, action and influence in partnership with others.

The Centre for Community Initiatives is the national support NGO formed by Tanzanians to build the capacity of the urban poor communities to initiate sustainable development that improves their livelihoods.

Contact

Wayne Shand
wayne.shand@iied.org

Marcelle Mardon
marcelle.mardon@iied.org

44 Southampton Buildings
London, WC2A 1AP
United Kingdom

Tel: +44 (0)20 3463 7399
www.iied.org

IIED welcomes feedback
via: www.linkedin.com/company/iied

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FIND OUT MORE

Learn more about IIED's work on heat resilience in informal settlements at: www.iied.org/building-heat-resilience-informal-settlements-community-led-data-collection

Notes

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