



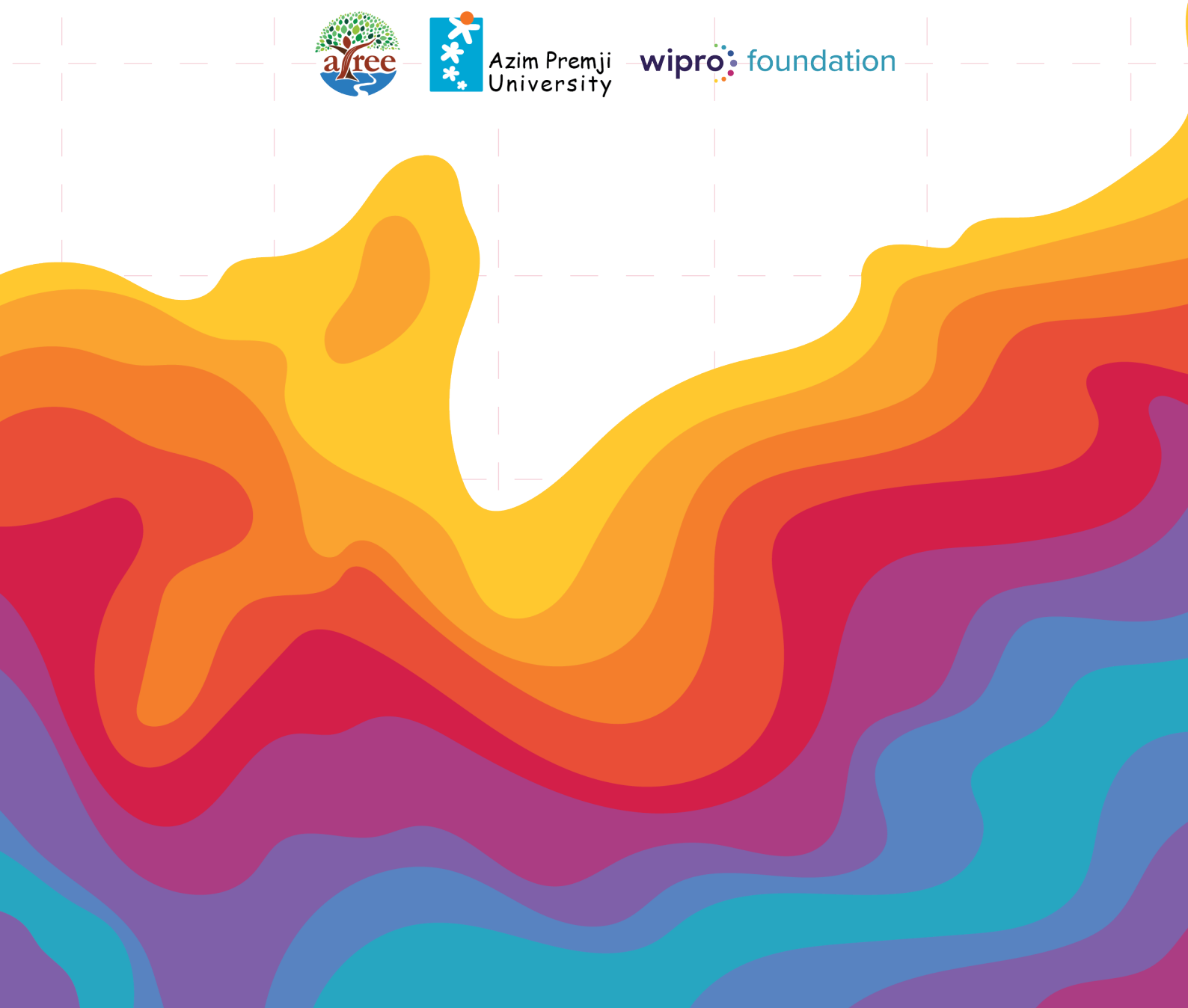
BENGALURU, OCTOBER 2024

SYNTHESIS REPORT



Azim Premji
University

wipro: foundation



This Synthesis Report summarises the proceedings of the Rising Heat Convening, held on 24-25 October 2024 at the Azim Premji University (APU) campus in Bengaluru. The Convening was jointly organised by the Ashoka Trust for Research in Ecology and the Environment (ATREE), Wipro Foundation and APU.

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EXECUTIVE SUMMARY

The Rising Heat Convening, held on the 24th and 25th of October at the Azim Premji University, Bangalore brought together experts, academics, researchers, and grassroots organisations. Co-organised by the Ashoka Trust for Research in Ecology and the Environment (ATREE), Wipro Foundation, and Azim Premji University, the eight sessions over the two days collectively explored the multifaceted impacts of heat, urging a shift in how it is understood, addressed, and mitigated.

Beginning with framing heat as an Environmental, Social, and Governance (ESG) challenge, participants discussed its far-reaching impacts and consequences on livelihoods and urban systems. While many policies like the Heat Action Plans (HAPs) have been developed, they often lack an integration of social and local ground realities. The discussions highlighted the importance of integrating lived experiences, to create inclusive and effective solutions.

Over the two days, the Convening examined the diverse impacts of heat stress through various perspectives. Housing inadequacies, particularly for migrant communities living in tin sheds, exacerbate vulnerability, raising questions about the affordability of climate-resilient design. Livelihoods face significant disruptions as workers - from construction labourers to gig workers - work in unsafe conditions with limited institutional support, such as rest areas or heat-related insurance. Health impacts, both physical and mental, are pronounced among informal workers and women, with domestic violence and alcohol use linked to extreme heat stress. These findings underscored the urgent need for intersectional approaches, robust data collection, and policies that account for the subjective 'feels-like' temperatures.

Discussions challenged dominant narratives around heat. The Global North's framing of solutions, often technical and centralised, was critiqued for its failure to resonate with the realities of urban spaces in India. Participants explored harmful stereotypes, such as blaming generational differences for heat tolerance or critiquing air conditioning use without considering class and caste dynamics. Instead, they advocated for narratives rooted in lived experiences, using accessible language and framing heat stress as part of broader systemic inequities.

Solutions presented ranged from the innovative to the community-driven. Ideas included a heat shelter design, designed with locally sourced materials, and participatory cooling measures, such as rooftop gardens and sustainable building and roofing materials. Experts called for ecologically integrated strategies, emphasising biodiversity conservation alongside infrastructure development.

Yet, discussions were able to emphasize persistent challenges, including the lack of integration between HAPs and broader policies, inadequate local involvement, and the ad-hoc nature of current responses. They also highlighted the unintended consequences that may result from inefficient and ill-thought technocratic interventions which ignore local realities. Calls for systemic approaches, such as year-round resilience toolkits and localised heat thresholds, were discussed.

A key theme was the intersection of governance, planning, and equity. Panelists critiqued the oversimplification of nature into data and the exclusionary

design of urban systems that perpetuate inequality. Solutions were discussed that prioritise equity and acknowledge ethical considerations. The spatial segregation of marginalised communities near polluting industries was a critical issue, highlighting how urban planning decisions exacerbate vulnerability to extreme heat.

The discussions throughout the two days also addressed the evolution of HAPs in India, which, despite progress, remain limited by their urban focus. The panel stressed the importance of decentralised, ward-level planning and balancing top-down policies with grassroots initiatives. Effective implementation hinges on stronger relationships with local agencies, financial incentives for green infrastructure, and comprehensive evaluations to ensure long-term impact.

The suggestions from the discussions emphasised the need to:

- *Identify vulnerable communities:* Focus on understanding and addressing the specific needs of the most at-risk groups.
- *Evaluate existing plans and policies:* Review current policies and urban plans across sectors and departments to assess their relevance to heat stress and their effectiveness in addressing its impacts.
- *Build community preparedness:* Encourage local communities to be proactive and prepared for extreme heat.
- *Engage the public through awareness, education and empowerment:* Increase public knowledge about impacts and adaptive strategies through effective advocacy and outreach.

The sessions underscored that addressing heat stress requires reframing it as a systemic issue that demands inclusive, intersectional, and context-sensitive approaches. Bridging the gap between policy and lived experiences, fostering community driven solutions, and ensuring equitable access to resources are essential steps towards sustainable heat resilience in India.



01

HEAT IN INDIA

Section 1.1

Heat stress in India - as we know it today

Section 1.2

Who is affected by heat and how?

Section 1.3

Addressing narratives and indicators for heat stress in India

1.1

HEAT STRESS IN INDIA – AS WE KNOW IT TODAY

Format

Initial input by the facilitators, followed by a group activity

Facilitators

Swastik Harish (Swastik Harish and Associates) and Anant Maringanti (Hyderabad Urban Lab)

DISCUSSION POINTS



- Heat as a lived experience
- Heat as a systemic issue
- Gap between top-down policies and on-ground realities
- Urgency of heat action

“Heat is not an abstract concept; it is felt in my skin.”

The session began with facilitators framing heat as a multifaceted issue impacting the environment, society, and governance (ESG). Beyond mere temperature, heat profoundly influences livelihoods, reshapes communities, and exacerbates social inequities. Participants highlighted how systemic perceptions of heat stress shape policy responses, often neglecting marginalised communities and their lived experiences. Discussions underscored the need for Heat Action Plans (HAPs) to integrate social implications and community awareness.

Group discussions explored heat’s impacts through four lenses.

Group 1, Heat and Housing, emphasised inadequate housing, particularly for migrant communities in tin sheds, and the lack of climate-resilient design. Rising domestic violence and migration linked to extreme weather were noted. The group questioned the affordability of truly resilient housing.

Group 2, Heat and Livelihoods, examined unsafe working conditions for labourers, gig workers, and fisherwomen. Issues included inadequate facilities, lack of rest areas, and absent heat-related insurance. Advocacy efforts in Hyderabad for improved workr conditions were highlighted.

Group 3, Heat and Health, focused on physical and mental health impacts, particularly for informal workers and women. Alcohol use and domestic violence were linked to heat stress. The group called for inclusive HAPs addressing vulnerable populations.

Group 4, Heat and Community, focussed on the various interconnections between heat and wellbeing. Participants described heat stress impacts from

a variety of lenses, using recent policy developments and public incidents, highlighting the extent of cross-sectoral action required.

The session concluded by urging for robust data collection, intersectional approaches, and policies accounting for “feels-like” temperatures to address heat stress effectively.



Swastik Harish (left) and Anant Maringanti introducing the session.

The session started by the facilitators shared their perspectives on heat by highlighting three main aspects: environment (E), society (S), and governance (G). Discussing the physical and societal impacts of heat, they highlighted how heat was more than a mere measurement of temperature and humidity. Instead, it profoundly affects livelihoods and reshapes communities. In urban areas, the impacts of heat stress have evolved much beyond just visible physical impacts like heatstrokes to encompass broader, more complex, slower and imperceptible impacts that are more difficult to measure.

Moreover, they discussed how the perception of heat stress plays a significant role in shaping responses - whether we see it as an isolated physical phenomenon or part of a broader systemic issue. Decision-making on HAPs involves various stakeholders, from policymakers to funders, but there is often a disconnect between top-down approaches and on-ground realities. The way communities respond and interpret heat stress may be primarily shaped by the interaction between heat and material structures, which top-down approaches often fail to address.

They went on to note how policies need to be developed in such a way that they consider not only the tangible influence of heat, but also its social implications. Additionally, the issue of public awareness must be contextualised, as most people may not be able to see the scale of how heat stress influences their daily lives. This initial input provided the framework for a group discussion that had participants analyse the effects of heat from diverse perspectives, guided by several thought-provoking questions that applied to four different topics: (1) health, (2) housing, (3) livelihoods, and (4) community.

The discussions centred upon lived experiences and case studies shared by fellow participants, classified under three categories: Environment, Social, and Governance (ESG). Participants spent a considerable time diving into the nuances of the heat crisis and the effect it has on various sections of society, particularly marginalised communities, daily wage labourers, women and children.

Participants organised themselves into 4 groups.

Group 1, Heat and Housing, discussed what constitutes adequate housing, emphasising the social stratification in housing and its impact on people's ability to articulate their experiences with heat. There is a lack of attention to the materials used in housing construction, contributing to rising heat-related deaths. Climate resilience in urban areas is undermined by current built environments that often strip away natural protection.

A case study on migrant communities introduced by one participant was discussed, which revealed that many households, particularly in areas like Bellary, Karnataka, live in tin or blue sheds in heat-risk zones, with no fans or ventilation and limited awareness of heat stress as a primary issue. Rather, flooding was their main



Participants in conversation during the group session.



Group 2, Heat and Livelihoods, presenting their work.

concern. These conditions also correlate with rising domestic violence and migration due to extreme weather events.

The group highlighted that the middle class’s priorities indirectly harm vulnerable communities. The capacity to adapt to heat is limited, and cities are poorly designed to cope with heat stress. Policies addressing thermal comfort and resilience are missing. The session ended with the question, ‘How affordable is affordable housing?’ reflecting on the accessibility of climate-resilient housing solutions.

Group 2, Heat and Livelihoods, discussed the challenges faced by different worker communities under extreme heat conditions. Cab drivers and construction labourers face poor working conditions, including working inside warehouses made of low-quality materials and tools that become hazardous due to heat. Fisherwomen, working without proper storage, see their catch spoil quickly due to high temperatures. Workers also lack access to basic amenities like washrooms, sanitation, childcare, and clean water. Fisherwomen face stigmatisation, often being shamed and stereotyped, while gig workers, like Zomato and Swiggy drivers, are made to wait outside high-end restaurants without adequate resting spots. Activism is needed to improve conditions, such as clean restrooms and resting areas, as seen in Hyderabad under the advocacy of local worker unions. Relevant governance issues include the absence of work safety policies and no coverage of heatstroke in health insurance. There is also a lack of compensation for accidents, vehicle insurance, and policies ensuring the availability of necessary infrastructure. This leaves outdoor workers vulnerable to the impacts of extreme heat and unsafe work environments.

Group 3, Heat and Health, discussed the significant mental and physical health impacts of heat stress on informal sector workers. These workers face heightened vulnerability due to extreme weather fluctuations, such as droughts and heatwaves, which disrupt agricultural work and impact agrobiodiversity. Class and caste differences

were highlighted, noting how the urban middle and upper classes often disregards the struggles of the informal sector, assuming their bodies are 'better suited' for manual labour.

Group 4, Heat and Community, described how the communities that they work with interpret and experience heat stress. Participants discussed aspects around migration to cities, access to health care and poor working conditions, among others. The group emphasized how rural populations, who contribute least to climate change, suffer the most from its effects and are excluded from decision-making processes. Alcohol consumption among workers, particularly in agriculture and transport, was cited as a coping mechanism for heat stress, though it is ultimately harmful, leading to dehydration and increased health risks. Women face disproportionate heat-related health issues, including menstrual and hormonal effects, and heat flashes due to menopause. The intersection of heat stress and alcoholism leads to higher rates of interpersonal and domestic violence, exacerbated by the irritability caused by heat. A recent tragedy in Chennai highlighted the lack of disaster management for heat-related events, as unpreparedness led to heatstroke casualties. The group emphasised the need for inclusive HAPs that address the diverse needs of marginalised groups.

Closing the session, the government's role in addressing heat stress was discussed - underlining the lack of sufficient data and policies. One participant contributed by citing a survey among college students that revealed that heat affects their sleep, leading to irritability, rage, and climate anxiety. The group advocated for heat to be officially declared a disaster, with data documenting its impact on health to inform policies for managing heatwaves and preventing heat-related illnesses.

The intersectional nature of heat stress was emphasised, noting how factors like age, gender, socioeconomic backgrounds, and occupations (e.g., fishermen, auto drivers, agricultural workers) shape experiences. The group stressed the importance of categorising affected populations for effective action. In government discussions, the categorisation of affected groups is crucial for effective action. It's important to clearly identify the groups being targeted to ensure appropriate interventions.

Regarding HAPs, it was clarified that while they typically include temperature data, they should also factor in a *feels like* component, which is influenced by humidity, making it an essential element in heat-related decision-making.

WHAT WE LEARNT



- Environmental, social and governance factors together determine how communities experience heat stress. These 3 aspects need to be understood and addressed in conjunction.
- Heat's relationship with lives and livelihoods is multi-dimensional - its impacts are felt across time and space.

1.2

WHO IS AFFECTED BY HEAT AND HOW?

Format

Context setting by Dr. Anjali Karol Mohan (Integrated Design), followed by short oral presentations spanning research and practice

Facilitators

Ujjvala Krishna (ATREE)

Presenters

1. Abdul Shakeel (Basti Suraksha Manch)
2. Pooja Yadav (WRI India)
3. Arpita Chidanand and Meghana Myadam (Hyderabad Urban Lab)
4. Repaul Kanji (Green, Resilient, Risk-Informed Development Corps)
5. Nitesh Das (Jan Pahal)
6. Joel Shelton (INHAF - Habitat Forum)
7. Aishwarya Ayushmaan (Housing and Land Rights Network)
8. Jenny Mariadhas (Poovulagin Nanbargal)

DISCUSSION POINTS



- Context-sensitive urban planning
- The climate burdens of marginalised communities
- Gendered impacts of heat stress
- Proactive heat planning
- The urgency of climate education

The session opened with Dr. Anjali Mohan emphasising the inadequacy of centralised, Global North-inspired urban planning for tropical cities. Instead, she advocated for dynamic, decentralised, and context-specific approaches that integrate community voices. She highlighted the fragmentation of blue-green infrastructural networks in cities like Bangalore, where built environments has encroached on natural ecologies, exacerbating urban heat. Historical examples, like multifunctional temple courtyards, and the contributions of waste-pickers, were emphasised to include the value of inclusive planning.

Participants shared diverse perspectives on heat’s disproportionate impacts. Abdul linked climate challenges to structural injustices affecting marginalized communities, while underscoring the vulnerability of waste-pickers. Pooja detailed the harsh working conditions in Surat’s textile industry, stressing the need for architectural solutions. Arpita and Meghana discussed gendered heat impacts and the importance of housing tenure for vulnerable communities. Repaul emphasised Jodhpur’s resilience lessons, advocating for the integration of cultural heritage in Heat Action Plans. Joel critiqued infrastructure projects in cities like Bangalore and Chennai for neglecting

“How does heat stress affect different communities? Who gets affected, and how?”

commuter needs. Nitesh highlighted exploitative warehouse conditions under extreme heat, while Aishwarya drew attention to heat-related vulnerabilities faced by the homeless population in big cities. Jenny stressed the importance of climate education and litigation, using the 'boiling frog effect' to emphasise the urgency of proactive heat adaptation.

Dr. Mohan set the overall context of the session. She spoke about how city planning influenced by the Global North often applies uniform, centralised strategies that overlook the complexity of tropical cities, creating a gap between existing urban conditions and idealised models. This disconnect necessitates reimagining urban planning in response to rapid, unregulated urbanisation. Traditional top-down approaches fail to consider diverse landscapes and population dynamics. Instead, cities require dynamic, decentralised, and contextually-grounded planning that addresses the specific needs and characteristics of the area. A collaborative, bottom-up approach is essential, where urban planning incorporates the voices of local communities. This can ensure socially-just and inclusive climate adaptation, particularly in urban poor and vulnerable settlements. Leveraging ecosystem services, such as lakes and green spaces, can help enhance resilience in this context.

Dr. Mohan highlighted the fragmentation of the blue-green infrastructure networks in cities - the non-integration of natural features like lakes, rivers, and green spaces into urban planning - which is another critical issue. Historically, cities respected natural ecologies, with temples located near lakes and rivers supporting agriculture and livelihoods. Modern developmental projects, however, have led to the



Dr. Anjali Mohan setting the context for the session.



Repaul Kanji sharing his reflections on heat mitigation actions in Jodhpur.

encroachment of these resources, as shown in neighbourhoods around the Kalkere and Aradeshanahalli Kere in Bangalore. Slopes once used for farming are now levelled for buildings, contributing to the fragmentation of landscapes and a loss of open spaces that are crucial for mitigating urban heat.

The example of Bisilu Maramma temple near Lalbagh in Bangalore was given to demonstrate how traditional layouts, like open courtyards, served multiple community functions throughout the day, from socialising to religious activities. The often-overlooked role of waste-pickers and segregators needs recognition, particularly as more gentrified neighbourhoods emerge, making their contributions to urban systems increasingly vital.

After this initial input to set up the context for the session, participants from various organisations shared their perspectives on how heat affects different communities unequally.

Abdul offered insightful perspectives drawing from his own personal experiences. He emphasised how structural injustices - rooted in caste, religion, and community discrimination - interact with environmental challenges like heat. Marginalised communities bear a disproportionately higher climate burden compared to the middle and upper classes. Unless these deep-seated social inequalities are addressed, these groups will continue to face challenges. Shakeel highlighted that heatwaves, while always *present*, have become more *visible* due to worsening impacts. He drew attention to how waste pickers are especially vulnerable to heat and stressed the need for designing homes specifically suited to their needs, recognising the unique challenges they face.


Pooja Yadav
WRI India


Abdul Shakeel
Basti Suraksha Manch

Pooja discussed a study that they had recently embarked on, on the harsh conditions faced by workers in Surat's textile industry, where fabric dyeing and printing are the main processes. In this densely populated, landlocked area, even if outdoor temperatures are around 30°C, inside the factories they often rise to more than 35°C with 70% relative humidity because of poor design (for example, asbestos roofing) and limited ventilation, making it *feel* hotter than it is. Additionally, workers are exposed to severe conditions, with constant exposure to chemical fumes, steam, and odours in congested spaces. She emphasized the need for architectural changes and dehumidification solutions to improve working conditions.

Arpita and Meghana discussed the gendered impacts of heat. They discussed some of their findings on who uses public spaces, and who is able to escape extreme heat. They noted that marginalised communities often cannot upgrade their homes due to insecure tenure, which leaves them vulnerable to both heat and housing instability. Securing tenure for these communities should be a priority to ensure their housing security, which can also go a long way in heat stress mitigation. They mentioned how many communities have to prioritise basic survival over heat mitigation, only addressing heat-related issues when they become a crisis.



Arpita Chidanand and Meghana Myadam

Hyderabad Urban Lab



Repaul Kanji

GRRID Corps

Repaul discussed Jodhpur's historical journey from fragility to resilience, emphasising the importance of preserving the city's unique cultural heritage and traditional knowledge. By integrating these elements into HAPs through mutual learning, he mentioned how Jodhpur can maintain its distinct cultural identity rather than adopting standardised solutions. He advocated for a contextual approach, involving multiple stakeholders and encouraging participatory decision-making to create a locally tailored and effective plan for climate resilience.

Joel emphasised the importance of learning from people and the past to address climate justice. He noted that while cities like Chennai and Bangalore have seen an increase in infrastructure projects, including high-rise glass buildings, there is a need for better housing solutions. Public transport, meant to improve commuting, has actually exacerbated mobility issues due to ongoing metro construction. In many areas, bus stop sheds have been demolished, leaving only makeshift boards marking bus stops, removing crucial shade for commuters waiting in the heat. In Chennai, *Kathiri veyyil* (heatwaves) have been a long-standing issue. In response, several outdoor workers have adapted. Auto drivers, for example, often hang wet towels in their vehicles to reduce the impact of direct heat.



Joel Shelton

(INHAF - Habitat Forum)



Nitesh Das

(Jan Pahal)

Nitesh discussed the need for proactive planning to address heat stress in urban areas, focusing on preparedness rather than reactive responses. He highlighted the dire working conditions in labour-intensive warehouses of large corporations, particularly e-commerce companies like Amazon. At an Amazon warehouse in Haryana, he described how workers were forced to take an oath to meet productivity targets, which required them to skip toilet and water breaks. This policy has been heavily criticised for its detrimental impact on workers' health and well-being, especially under extreme heat conditions. He pointed out that this treatment of labour as a mere commodity, neglecting basic human rights, exacerbates the health risks for workers exposed to heat stress.

Aishwarya highlighted the severe challenges faced by the homeless, particularly those in temporary shelters that worsen heat conditions. They discussed the urgent need for mitigation strategies to protect homeless individuals from the impacts of heatwaves in New Delhi. With around 3 lakh people, including babies, sleeping on the streets, the homeless are especially vulnerable to extreme heat, underscoring the importance of addressing their needs in climate resilience and urban planning efforts.



Aishwarya Ayushmaan |

(Housing and Land Rights Network)



Jenny Mariadhas |

(Poovulagin Nanbargal)

Jenny discussed the wide-ranging impacts of climate change, emphasising the need for education on heat and climate change for school and college students. She highlighted the importance of climate change litigation and preparedness, particularly as people continue to faint due to extreme heat. Additionally, she raised concerns about the lack of attention to heat's impact on biodiversity. Mariadhas used the '*boiling frog effect*' as a metaphor for how people adapt to gradual environmental changes instead of addressing them, often realising the dangers too late. This highlights the urgency of addressing climate change before its effects become irreversible. She also stressed that Environmental and Social Impact Assessments (ESIA) should include climate impact assessments. She gave an example of the Ennore region, where a lack of preparedness to heat has contributed to biodiversity loss, with fish moving to cooler waters, affecting the livelihoods of fisherfolk who rely on fishing as their primary source of income.

WHAT WE LEARNT



- Across contexts, there is a need to modify and adapt social security programmes to explicitly address provisions for climate-related health impacts, including heat stress.
- There is a need for intersectional preparedness and response approaches that address the overlapping vulnerabilities of different groups (e.g., based on caste, gender, class) and that can build heat resilience.

1.3

ADDRESSING NARRATIVES AND INDICATORS FOR HEAT STRESS IN INDIA

Format

Initial contribution by the facilitators, followed by a group activity

Facilitators

Sarita Fernandes and Ruhie Kumar (Heatwave Action Coalition)

DISCUSSION POINTS



- Rejecting harmful heat narratives and the need for inclusive, compassionate narratives
- Breaking out of the Global North climate discourse
- Heat as a threat *per se* and as a threat multiplier

The workshop session examined harmful narratives around heat stress, particularly their disproportionate impacts on vulnerable populations. Misrepresentations, such as blaming generational differences for decreased heat tolerance and systemic issues (like caste and class differences) exacerbate the heat burdens on vulnerable groups like women, who bear the brunt of domestic labour in extreme heat.

Dominant climate discourses shaped by the Global North often use inaccessible language that alienates affected communities. Instead, narratives should centre on lived experiences, using accessible, inclusive language and indicators - both qualitative and quantitative - that frame heat stress within broader social injustices. Heat often acts as a 'threat multiplier', worsening existing vulnerabilities.

Participants engaged in activities exploring heat stress in themes like low voter turnout and farmer suicides. Discussions revealed how heat deters rural and urban voters, particularly women and marginalised groups, due to long waiting times, poor infrastructure, and heat-induced illnesses. In agriculture, heatwaves exacerbate crop failures, livestock losses, and economic instability, contributing to farmer suicides amid inadequate institutional support. Heat also intensifies interpersonal violence and caste-based inequities, particularly around water and sanitation access.

The session emphasised reframing narratives to highlight systemic challenges and promote sustainable, inclusive responses.

“Why do heatwave narratives matter? Who does bad narratives (existing around heat) hurt?”

The workshop-based session discussed how existing narratives around heat stress are often harmful, especially when they misrepresent impacts on vulnerable populations. Incorrect narratives, such as the idea that our capacity to tolerate heat has decreased due to generational differences, disproportionately burden vulnerable groups like women and children, who bear the brunt of domestic unpaid labour in extreme heat. Additionally, moral policing around the use of cooling mechanisms like air conditioners is often classist and casteist, as it tends to criticise those outside the upper class for using cooling methods, despite such measures being essential for their well-being.

The dominant climate discourse, often shaped by the Global North, uses language like 'climate change', 'climate crisis', and 'global boiling', which can be inaccessible and alienating to those most affected by heat. This language creates an intellectual divide and assumes that impacted communities lack understanding of climate issues.

Instead, narratives should be grounded in the lived experiences of those affected by heat, focusing on their understanding and challenges. They should be inclusive, simple to understand, and compassionate, aiming to change perceptions by using accessible data and fostering empathy for those experiencing heat stress.

In their presentation, Sarita and Ruhie also stressed on the importance of indicators - which may be both qualitative and quantitative in nature, and the need to frame climate challenges in the larger context of social injustices that vulnerable communities face on an everyday basis. Here - heat stress due to climate change may not only be a threat per se but may also act as threat multipliers by aggravating existing risks and vulnerabilities.

Following this introduction, participants were grouped together to do an activity focused on four major themes: (1) low voter turnout, (2) farmer suicides, (3) gendered



Participants in discussion during the group session.



The group on heat and low voter turnout presenting their work.

violence and (4) poor exam performances among students. Participants were asked to frame heat stress in these 4 cases as an existing threat and as an aggravator and deliberate on the indicators that one may use to frame these narratives.

In rural areas, the challenges that contribute to low voter turnout include women facing difficulties due to long waiting times under the scorching sun, poor facilities, and lack of transparency in voting processes. Shade is often unavailable at polling stations, leading to discomfort. Additionally, the informal sector doesn't get holidays for voting, while polling booths may close late, adding to the pressure faced by poll workers. In urban areas, vulnerable groups such as women, senior citizens, and persons with disabilities (PWDs) avoid voting due to the high heat, with many citing heat-related illnesses like heat strokes as a reason for opting out. Heat is thus seen as an individual-level deterrent, but its large-scale impacts can aggregate to significant voter suppression. The discussions also highlighted broader impacts of heat on communities. Women face additional burdens as they must balance household responsibilities like cooking before heading to vote, often in the early hours to avoid the heat. Poll booth staff are disproportionately affected by poor infrastructure and lack of restroom facilities.

Regarding farmer suicides, heat acts as a key aggravator of an already fragile agricultural system. Heatwaves have contributed to crop failures, cattle deaths, and worsening economic conditions for farmers. Institutional failures, such as limited access to crop insurance, inadequate early warning systems (EWS) for extreme weather, and conditional incentives for irrigation, further push farmers into despair. The rising heat not only affects agricultural productivity but also increases tensions with moneylenders, whose irritation from the heat often translates into harsher interactions with farmers. The overall lack of sustainable coping mechanisms creates a feedback loop of reduced labour, lost livelihoods, and farmer suicides.

Heat-induced interpersonal violence also emerged as a significant concern, with increased irritability and aggression leading to conflicts, often directed toward women, children, and the elderly. Additionally, caste dynamics exacerbate access issues related to water and sanitation, further intensifying tensions in communities.

Lastly, heat stress was related to poor exam performances as a direct cause through the scheduling of entrance exams in March-June, a time where the ability of students to prepare may be affected by electricity cuts and sleeplessness induced by heat. Aggravating factors here were the poor infrastructure in crowded examination centres and the commute required to reach often far-flung exam centres in sweltering heat.

WHAT WE LEARNT



- Narratives around heat stress need to centre the impact on vulnerable communities. The choice of relevant indicators here is very important - qualitative and quantitative indicators are equally crucial here.
- Heat stress may aggravate existing socio-economic inequalities. The same goes for potential solutions and interventions. Thus, solution design needs to consider aspects around who benefits and how.

02

HOW DO WE RESPOND TO HEAT?

Section 2.1

Realities of heat response measures in India

Section 2.2

Towards solutioning: Nature-based, design-based and policy-based heat mitigation solutions

Section 2.3

The unintended consequences of heat mitigation interventions

Section 2.4

Mobilising resources for effective heat mitigation actions

Section 2.5

Piecing together a Heat Action Plan



2.1 REALITIES OF HEAT RESPONSE MEASURES IN INDIA

Format

Initial contribution by the facilitator, followed by a group activity

Facilitators

Prof. Aalok Khandekar (IIT Hyderabad)

DISCUSSION POINTS



- The concept of Thermal Governance
- The need for response strategies involving early warning systems, institutional capacity building and community-driven planning
- How heat exacerbates year-round vulnerabilities

“What is thermal governance?”

Prof. Khandekar introduced the concept of ‘thermal governance’, emphasising the rising frequency of extreme heat events in South Asia and the need for robust HAPs. While India’s first HAP in Ahmedabad set a benchmark, with 48 plans now in place in the country, challenges still persist. Key issues include limited resources, inadequate early warning systems, and a disconnect between national frameworks and local realities.

The session critiqued the focus on heat as a disaster, highlighting the need to account for ongoing community adaptations and avoid one-size-fits-all solutions. Participants advocated for inclusive, community-driven approaches to HAP development, emphasising local involvement, capacity building, and tailored resilience toolkits. Discussions also addressed gaps in compensation policies and the year-round impacts of heat on vulnerable populations.



Smruti Koppikar presenting her views as part of the open discussion.

Prof. Khandekar started the session with the idea of *'thermal governance'* which explores the increasing frequency of extreme heat events, especially across South Asia, and highlights the need for comprehensive HAPs. India's first HAP, the Ahmedabad Heat Action Plan, a pioneering model in Southeast Asia, has since expanded, with almost 50 such plans now in place across jurisdictions in the country. However, there remains an urgent need for a response-oriented strategy to address the challenges posed by rising temperatures, particularly for vulnerable groups. His presentation underscored the importance of enhancing early warning systems, scaling up local initiatives through accessible toolkits, and building institutional capacity to handle heat-related risks.

Despite these efforts, several constraints persist, such as limited resources and expertise. The lack of preparatory work at the local level means that everyday impacts of heat, which disproportionately affect vulnerable communities, are often overlooked. The focus on heat as a 'disaster' was critiqued, with participants pointing out that HAPs often fail to account for the complex, ongoing adaptations communities are already making. There is also a disconnect between the national HAP frameworks and local geographic realities, leading to one-size-fits-all solutions that lack specificity.

The presentation was followed by an open discussion among all participants. The discussion explored the need for more inclusive and community-driven approaches to developing HAPs. For example, the Ahmedabad HAP, often regarded as a blueprint for other cities, may not be adaptable to different regional contexts. Participants called for greater involvement of local communities in the planning process, capacity building, and the development of city-specific resilience toolkits. Additionally, they questioned the adequacy of existing compensation policies and the involvement of departments in managing heat-related hazards, noting that heat is not just a seasonal threat but can exacerbate other vulnerabilities year-round. Ultimately, the discussion pointed to the need for localised, community-centred HAPs that build from the ground up to address both the immediate and long-term impacts of extreme heat.

WHAT WE LEARNT



- HAPs represent a key milestone in the emerging government response to heat stress, but their scope and nature need to be expanded for them to guide consistent, long-term and effective action. HAPs need to be further strengthened particularly on the financial and budgeting aspects.
- The multi-dimensional nature of heat stress means that departmental convergence, both at the state and the national level, is key to action.

2.2

TOWARDS SOLUTIONING: NATURE-BASED, DESIGN-BASED AND POLICY-BASED HEAT MITIGATION SOLUTIONS

Format

Initial input by Prof. Deepak Malghan, followed by research and practice presentations

Facilitators

Dr. Manan Bhan (ATREE)

Presenters

1. Dr. Jagdish Krishnaswamy (Indian Institute for Human Settlements)
2. Sagar Kandal and Ankritya Diggavi (Winners of the Rising Heat Competition)
3. Vivek Gilani (cBalance) and Sowmya Sridhar (Hasiru Dala)
4. Dr. Rajashree Kotharkar (Visvesvaraya National Institute of Technology, Nagpur)
5. Mohammed Mazhar (Telangana Platform and Gig Workers Union)

Summarised by: Smruti Koppikar (Question of Cities)

DISCUSSION POINTS



- Spatial segregation of communities and the disproportionate effects of heat
- The need for different kinds of solutions for heat stress mitigation - involving research, policy, practice and advocacy.

The session began with Prof. Malghan discussing the spatial segregation of urban communities, where marginalized groups, particularly Dalits and Muslims, are disproportionately located near polluting industries with limited access to green spaces. This intra-ward disparity, particularly in Bangalore, exacerbates their vulnerability to extreme heat.

Dr. Krishnaswamy highlighted the role of blue-green infrastructure, such as vegetation and water bodies, in mitigating urban heat and emphasized using treated water as a cooling agent. He also discussed mapping land surface temperatures and stressed the importance of biodiversity conservation alongside infrastructure development.

Sagar and Ankritya presented 'Neralu', an inclusive heat shelter design emphasizing locally sourced materials and universal accessibility.

Vivek and Sowmya shared participatory solutions from the Fair Conditioning project, such as rooftop gardens and sustainable building

“What can successful interventions look like?”

materials like repurposed plastic panels.

Dr. Kotharkar critiqued existing Heat Action Plans (HAPs) for lacking integration with national policies and comprehensive frameworks. She emphasized local heatwave thresholds, traditional knowledge, and periodic evaluation.

Mazhar highlighted the challenges faced by gig workers during heatwaves, showcasing successful advocacy efforts for resting points in Hyderabad.

The session concluded with a call for ecologically integrated heat mitigation strategies, accountability in urban planning, and replacing ad-hoc responses with systematic Standard Operating Procedures (SOPs).

Prof. Malghan started off the session by leading a discussion on the spatial segregation of communities within urban neighbourhoods, where marginalised groups are often situated near polluting industries and have limited access to green spaces. This intra-ward variation, particularly in cities like Bangalore, highlights disparities in living conditions. As neighbourhoods become more diverse, the socio-economic characteristics, such as income tax-paying households, shift, affecting overall access to resources. Green spaces, while crucial for mitigating heat stress, are not equally accessible to all - his team's efforts highlighted how marginalised communities, especially Dalits and Muslims, tend to reside in areas with fewer green spaces, exacerbating their vulnerability to extreme heat.



Dr. Jagdish Krishnaswamy presenting his work on blue-green infrastructures in Bengaluru.

Dr. Krishnaswamy presented some of his team's results on the role of blue-green infrastructure (like vegetation and water bodies) in mitigating urban heat, with an explicit focus on the city of Bengaluru. He stressed how the city's historical green and blue spaces have evolved, but water management remains critical, as treated water is increasingly being used to support green infrastructure. He highlighted the process of converting blue water into grey and black water, and how treated water could be utilised as a cooling agent.

He described some of his team's efforts in mapping land surface temperatures (LST) in the city. LST temperatures in the city showed dramatic fluctuations across the city. A key caveat of his results, he stressed, was that absolute values of LST may not always be reliable. Rather, subtracting the city's temporal mean or average anomalies provides better insight into which areas are hotter or cooler. The cooling effect of infrastructure varies year to year, and the effectiveness of trees, for instance, depends on their height, distribution and spatial configuration. It is essential, in that sense, to combine the development of blue-green infrastructure in the city with a focus on biodiversity conservation. While blue-green infrastructure is essential in creating cooling spaces in cities, it alone cannot solve the problem. The challenge remains in determining the scale at which such infrastructure should be implemented to achieve significant impact in reducing urban heat.



Dr. Jagdish Krishnaswamy

(Indian Institute for Human Settlements)

Sagar and Ankritya, the winners of the Rising Heat Competition, presented their innovative design called '*Neralu*', meaning shade in Kannada, which aims to provide shelter from extreme heat in a manner which is inclusive and non-intrusive in public spaces. Their model emphasises the interconnectedness of all life forms, highlighting that heat affects everyone, including animals, for whom their design speaks to as well. The design incorporates elements that are both practical and accessible, using locally available materials and avoiding expensive resources.

Their concept addresses microclimates and heat management in everyday urban life and builds upon some of their own observations during their previous academic and professional experiences. In Ahmedabad, for example, they observed people using makeshift solutions like plastic sheets to shield themselves from the sun. This observation guided their approach to designing a low-cost, non-invasive shelter for a ward in Yeshwanthpur area, which can be built within a budget of INR 3 lakhs. Two operating principles of their structure are that it does not touch the ground and it utilises local materials, making it feasible and adaptable. Their work stresses that shade should be universally accessible, reflecting the belief that creating inclusive spaces for protection from heat is a necessity for all.


Sagar Kandal and Ankritya Diggavi
(Winners of the Rising Heat Competition)

Vivek started with a discussion on the philosophical underpinning of his work. He discussed how it is important to root ideas and interventions in the combined forces of science, ethics, and policy when addressing climate challenges. Drawing from Jasonoff's idea that *'science is not objective, it is political'*, he emphasised the need for researchers, practitioners and policymakers to blend the capabilities of science ('can do') with ethical considerations ('should do'). He argued that instead of merely measuring problems like heat, we must address them directly, focusing on solutions like *'fair cooling'*. He stressed the importance of *'praxis of humility'* - the need for patient and localised, appropriate solutions that can be maintained by communities. He warned against rushed or poorly planned solutions that can exacerbate existing issues.

Drawing from their own work under the Fair Conditioning project, **Vivek and Sowmya** described some of the interventions they had designed and implemented across low-income housing settlements in Mumbai and Pune. These interventions had been developed through participatory design processes and extensive community involvement, starting with housing audits and listening workshops. A key focus was on solving multiple problems at once, such as using Multi-Layered Panels (MLP) made from repurposed plastic wrappers, an initiative led by women cooperatives. Another solution involved using wild grass from forests in Madhya Pradesh as a substitute for wood wool, promoting ecological sustainability.

Vivek and Sowmya highlighted the *'One-Stop Shops'* pilot installations set up in cities like Pune, Bangalore, and Chennai, among others, which feature these sustainable innovations. They shared video demonstrations of the MLP panels' functionality. Additionally, they presented the idea of rooftop gardens on tin-sheet roofs, which can help reduce temperatures by up to 8°C. This solution not only cools homes but also strengthens community bonds and provides a platform for women cooperatives to work together, blending ecological design with social empowerment.



Vivek Gilani

(cBalance)

Sowmya Sridhar

(Hasiru Dala)

Dr. Kotharkar discussed the limitations of existing HAPs, which tend to be crisis-based and focused on public health. She highlighted the challenges in mapping vulnerability, particularly due to the lack of a clear and universally applicable definition of heatwaves. This includes the absence of proper parameters for intensity, duration, frequency and local thresholds. She described how Indian cities are highly fragmented, with diverse variations in heatwave experiences, making it difficult to apply a blanket category for heatwaves.

Ground-level data, both diurnal and nocturnal, is necessary to accurately assess local heat impacts across different landscapes, considering the built environment and vegetation. Heat stress, referring to the total heat load a person is exposed to, and heat strain, which is the body's physiological response, play critical roles in assessing heat vulnerability. These indicators can be observed at two main points: the onset of summer (marked by heat-related illnesses) and towards the end of summer (marked by fatigue).

Kotharkar also pointed out that HAPs neglect key sectors such as the economy, energy, infrastructure, and water resource management. They are not integrated with national planning policies, and there is a lack of periodic monitoring and evaluation of HAPs. This oversight leads to a gap between heat management and heat planning. She emphasised the importance of a comprehensive framework, managed by organisations like the IMD, that includes monitoring, evaluation, and the incorporation of traditional knowledge.

During the Q&A, Kotharkar mentioned that climate change cannot be assessed over a short period but requires cumulative data gathered over many years. Regarding policy formulation, she stressed the importance of epidemiology, which examines the distribution and determinants of health and disease in a population, as a crucial criterion.



Dr. Rajashree Kotharkar

(VNIT Nagpur)

Mazhar highlighted the challenges faced by cab drivers and delivery workers, particularly during heat waves, where they often work under the sun without proper breaks, resting stops or access to water. He shared that the union in Hyderabad successfully advocated for the establishment of resting points for drivers after four years of effort in Hyderabad. He showed some snapshots of the infrastructure that had been created for cab drivers and gig workers by service delivery companies and authorities in some prominent spots in the city of Hyderabad. The union has also documented reports related to the impacts of heat waves on workers. Mazhar emphasised that the strength of drivers lies in their union, with driver power directly correlating to union power.



Mohammed Mazhar

(Telangana Platform and Gig Workers Union)

Smruti summarised the session by focusing on the importance of nature-based solutions for mitigating heat and the role of blue-green infrastructure. A deeply scientific approach was emphasised, alongside community-based individual adaptation strategies. The session underscored the need for integration across diverse fields, with the Convening providing an apt forum for this purpose.

The issue of heat was framed as a multidisciplinary challenge, with an urgent call for clear accountability, particularly from the government, in managing heat and protecting public health. Standard Operating Procedures (SOPs) for heat emergencies were identified as necessary, replacing current ad-hoc responses. She also criticised existing gaps in government regulations, which are exploited by corporations and industries, resulting in ill-thought, heat-aggravating construction, like glass-walled skyscrapers in tropical cities such as Mumbai. The adoption of a Western model of modernity, which equates progress with glass-fronted buildings, was challenged as unsustainable for local climates. Lastly, she emphasised that heat mitigation strategies must be ecologically-sound and deeply embedded within the urban landscape, ensuring they are not disconnected from the broader city ecology.



Smruti Koppikar

(Question of Cities)

WHAT WE LEARNT



- Making cooling technology and initiatives (at the city/ neighbourhood/household scale) accessible and relevant is critical for safeguarding the lives and livelihoods of urban citizens. The social relevance of the technology should integrate with it being scientifically robust, evidence-based and locally contextualised.
- Significant successes can be achieved through the power of collective action, persistent advocacy, and clearly defined demands.

2.3

THE UNINTENDED CONSEQUENCES OF HEAT MITIGATION INTERVENTIONS

Format

Initial contribution by the facilitator, followed by a group activity

Facilitators

Vivek Gilani (cBalance)

DISCUSSION POINTS



- The philosophical basis of action which is scientifically-robust and socially-relevant.
- The unintended consequences of ill-advised and poorly-planned interventions.

Vivek highlighted the unintended consequences of intervening for mitigating heat stress for vulnerable communities, emphasising the need for a critical examination of Western approaches. Drawing from Wendell Berry, he explained how solutions often reflect power dynamics, where marginalized communities often end up bearing the costs while others benefit and make decisions. He outlined four elements leading to flawed planning: administrative ordering of nature (the oversimplification of data), high modernist ideology (overconfidence in science), authoritarian state actions (elite-driven coercion), and passive civil society (limited grassroots inputs).

Vivek introduced ‘Technologies of Humility’, advocating for ethically grounded solutions that prioritize equity and consider both ‘can do’ and ‘should do’ science. Case studies illustrated harmful unintended outcomes, such as groundwater schemes benefiting large farmers over smallholders, and white roof paints in Ahmedabad disrupting bird habitats.

The session concluded with a group activity exploring several dimensions of unintended consequences, encouraging participants to consider equity and inclusivity in climate solutions.

“Can interventions maximise positive benefits and avoid unintended consequences?”

Vivek explored the unintended consequences of interventions aimed at heat stress mitigation, urging a critical examination of Western solutions. He referenced Wendell Berry’s notion that experts often ‘invent a problem’ and emphasised the power dynamics involved in the design of solutions. Gilani outlined three key groups in any

solution - those who pay, those who benefit and those who decide - pointing out that when the same people both benefit and make the decisions, those who pay (usually marginalised communities) bear the brunt of the costs. This imbalance in power creates irreducible tensions. Although an ideal balance may be impossible, it's crucial to critically assess and address these disparities.

Vivek discussed four elements that can lead to disastrous planning outcomes. The first element is the administrative ordering of nature, where people and problems are simplified into numbers and data sets, making solutions disconnected from the lived realities of communities. The second, high modernist ideology, involves overconfidence in science and technology, where solutions like bridges and tunnels intended to ease traffic instead create new traffic problems. The third element, authoritarian state, highlights how elites use coercion to enforce modernist designs, replacing one dislocated idea with another. Lastly, a passive civil society enables top-down solutions without meaningful input from the affected communities.

To critique planning, Gilani introduced the concept of *Technologies of Humility*, which acknowledges that science is inherently political, and decisions shaped by imperfect information can have significant negative impacts on communities. He advocated for considering both 'can do' science, which is presumed to be universal and impersonal, and 'should do' science, which is grounded in ethical and political analysis, focusing on the lived experiences of communities.

Vivek urged for a thoughtful approach to climate solutions that anticipates unintended outcomes and prioritises equity, especially for those who are most vulnerable to the consequences of climate change. The session included case studies that exemplified well-intentioned but hastily planned and executed solutions that had unintended, harmful consequences. For example, in India, larger farmers benefited



Participants discussing as part of the group activity on the dimensions of unintended consequences.

from state schemes to recharge groundwater, sidelining smaller farmers. In Australia, insulation projects led to worker deaths due to safety lapses, eroding trust in such initiatives. Other examples included Germany's heat pump revolution and the adverse effects of white roof paint in Ahmedabad, which ended up deterring and impacting seed productivity. He also referenced the green economy's reliance on materials like Lithium, creating new 'sacrifice zones', and pointed out the unintended result of extra Floor Space Index (FSI) incentives for green buildings leading to more construction and road congestion.

The session concluded with a group activity where participants role-played different scenarios to explore the several dimensions of unintended consequences, including the imbalance of benefits, unforeseen uses, erosion of trust, environmental impacts, and societal shifts.

WHAT WE LEARNT



- Interventions may often mean well, but without a comprehensive understanding of how they might affect other systems, why previous efforts have failed and what has gone on before the design of those interventions, they may be doomed to fail.
- For any technical solutions to be effective, they need to be integrated with an understanding of how people may interact with, respond to and live with those technologies.

2.4

MOBILISING RESOURCES FOR EFFECTIVE HEAT MITIGATION ACTIONS

Format

Panel discussion

Moderator

Prof. Deepak Malghan (IIM Bangalore)

Panelists

1. Ishwar Singh (Mariwala Health Initiative)
2. PS Narayan (Wipro Foundation)
3. Fahad Marzook (Kerala State Disaster Management Authority)

DISCUSSION POINTS



- The challenges and support required for heat adaptation in rural environments
- The role of corporations in building heat resilience
- Policy processes and interventions for heat stress adaptation

“What are the research, practice, and policy resources we require to adequately respond?”

Ishwar Singh shared findings on the mental health impacts of extreme heat on marginalised rural workers in Rajasthan. Vulnerable groups, including women, Dalits and miners, face heightened psychological stress due to intergenerational poverty, caste-based discrimination, and unsafe working conditions. Despite schemes like MGNREGA, inequities in wages, lack of shade, and social exclusion worsen their plight. Ishwar called for intersectional approaches, targeted community support, and adaptations to social security programs to address these challenges.

PS Narayan stressed corporate responsibility in reducing heat risks, urging ESG and CSR policies to focus on affordable climate adaptation projects. He highlighted the inequities of AI cooling technologies and called for research to address diverse heat impacts beyond the current singular focus on sports medicine.

Fahad Marzook emphasised Kerala’s localized approach to heat management, addressing gaps in heat-related data and the inefficacy of existing Heat Action Plans (HAPs). Kerala’s HAP, developed by the Kerala State Disaster Management Authority (KSDMA), integrates factors like heat index, UV radiation, and humidity while prioritizing practical implementation. Collaborations with the state’s Health Department has enabled the establishment of a surveillance system for heat-related illnesses, alongside public awareness campaigns to foster heat resilience at the village level. Fahad highlighted challenges in securing CSR support for climate adaptation and the environmental inequities of energy-intensive technologies like AI. He also criticised stereotypes among privileged communities, which dismiss heat issues affecting outdoor workers.



Ishwar Singh presenting his work with communities in Rajasthan.

Ishwar's contribution began with a song. He sang a few verses from a song that is often sung by labourers in Rajasthan. He described his research over the last few months, which has focused on the impact of climate change and extreme heat on the mental health of marginalised workers in Rajasthan. The research aimed to understand how climate change affects people on the margins, as most research and policies are typically designed for the Global North or for privileged groups in the country.

The study explored how different vulnerable groups, including women, youth, persons with chronic work-induced illnesses (such as silicosis), Dalits, Adivasis, OBCs and Muslims, are affected by extreme heat. Workers reported experiencing a range of psychological and physical effects from prolonged exposure to heat, including irritability, anger, poor impulse control, tension, despair and violence, either towards themselves or others. The extreme heat caused significant psychological and physiological stress, leading to lower productivity and a sense of hopelessness.

The research highlighted the intersection of caste, class, gender and lack of access to education and employment opportunities, which compounded the vulnerability of these workers. Many are forced into long hours of manual labour due to intergenerational poverty and lack of alternative opportunities. For instance, mining workers, despite knowing the risks of silicosis, continue working in extreme heat due to livelihood pressures. Discussions with rural women labourers also revealed that social, economic, and political discrimination - based on caste, class and gender - negatively impacts their mental health. Despite being involved in labour-intensive work under government schemes like the MGNREGA, women face unequal wages, lack of recognition for their contributions and harsh working conditions with no provisions for rest or shade.

He concluded with several key suggestions for addressing these issues like identifying and targeting vulnerable communities, evaluating existing plans and policies, adapting current social security programs to account for climate-related health impacts

and strengthening community preparedness and resilience.

PS Narayan from Wipro Foundation discussed the role of corporations in addressing climate adaptation, particularly through ESG (Environmental, Social, and Governance) practices. He emphasised the need for corporations to focus on reducing heat risks, with tangible funding for affordable projects, and highlighted the intersectionality of vulnerabilities, such as those faced by construction workers exposed to extreme heat.

Narayan raised concerns about the inequities in AI-driven cooling technologies, which consume excessive energy, and the overconsumption that exacerbates environmental problems. He noted that while CSR efforts typically target education, environment and livelihoods, heat adaptation remains largely overlooked. He stressed that corporations need to lower the demand for cooling and focus more on climate adaptation, suggesting that CSR laws should be revised to encourage action on heat and climate change. He also pointed out the trade-offs in designing HAPs and the importance of sensitizing departments to address these challenges effectively. He ended with a fascinating anecdote: most research on heat and its physiological impacts is focused on sports medicine, mainly addressing stamina and stress. This underscores the need for broader research to understand the full spectrum of health risks posed by extreme heat.

Fahad Marzook began by discussing the critical issue of data management, highlighting the lack of heat-related data in Kerala. He emphasized the necessity for a state-specific approach to heat management, as previous HAPs often lacked effective government ownership and were not properly implemented. In response, Kerala's disaster management team decided to develop a localised action plan tailored to the region's unique needs. This plan was developed in the local language (Malayalam). It addressed key factors such as heat index, UV radiation, and humidity. The KSDMA, as the nodal agency for this HAP, prioritised extreme heat events across seasons and aimed for a



Fahad Marzook presenting KSDMA's approach towards building heat resilience in Kerala.



Ishwar Singh answering a question during the panel discussion.

practical, implementable plan rather than just a theoretical document.

The plan included consultations with various departments, including the State Health Department, to set up a surveillance system for heat-related illnesses. Public awareness efforts through media campaigns and policy amendments were also integral parts of the HAP, with the overarching goal of making every village in Kerala heat resilient. Fahad also pointed out the challenges in securing support from Corporate Social Responsibility (CSR) programs, which often overlook climate change adaptation.

Additionally, the environmental impact of technologies like Artificial Intelligence (AI), which require substantial energy and water for cooling, was raised as an equity issue. He stressed the need for accessible heat data for communities, as some wealthier, gated communities dismissed the heat problem due to caste-based stereotypes, assuming that outdoor workers had already adapted to the heat.

WHAT WE LEARNT



- While governments have a responsibility towards heat stress mitigation, as part of larger efforts towards climate change adaptation, the role of other actors in the ecosystem cannot be discounted.
- Heat is a risk whose multi-dimensional impacts on the lives and livelihoods of vulnerable local communities (like mental health) are only beginning to be identified and understood.

2.5

PIECING TOGETHER A HEAT ACTION PLAN

Format

Panel discussion

Moderator

Dr. Manan Bhan (ATREE)

Panelists

1. Meera K (Citizen Matters)
2. Tammanna Dalal (Sustainable Futures Collaborative)
3. Abhijant Tiwari (NRDC India)
4. Shravan Prabhu (Council on Energy, Environment and Water)

DISCUSSION POINTS



- Multisectoral heat challenges
- The need for decentralised community-centred HAPs
- Integrating top-down and bottom-up strategies for action

“What is the present and future of heat action plans in India?”

The panel discussion explored the evolution and challenges of Heat Action Plans (HAPs) in India, emphasising the importance of inclusive, context-sensitive approaches to address heat-related issues. Panellists highlighted the multisectoral nature of heat, linking it to urban systems like energy and water, and socio-political events such as elections and export bans. They stressed the need for HAPs to incorporate broader implications, particularly in rural areas where heat affects agriculture and livestock. Current plans often largely focus on urban contexts, neglecting rural vulnerabilities.

A key point was the lack of visibility of heat as an issue, which complicates consistent policy attention. Panellists noted that existing HAPs lack economic incentives for green infrastructure or penalties for heat-emitting construction. They advocated decentralising HAPs to ward levels to tailor solutions to local realities. Effective HAP implementation, they suggested, requires enduring relationships with nodal agencies and realistic expectations of implementing bodies like municipal corporations.

The discussion underscored the importance of combining top-down policies with bottom-up community solutions, integrating HAPs with broader climate action plans. Panellists also called for addressing timing issues, such as elections and exams during peak summer, adjusting work hours, and prioritising financial and indicator-based evaluations to ensure impactful, long-term implementation.



Tamanna Dalal (2nd from left) answering a question during the panel discussion.

The panel discussion focused on the development and challenges of HAPs and the importance of the process involved in their creation. The panellists addressed several key questions around the historical context, implementation, and future direction of HAPs, especially in light of India’s multisectoral challenges related to heatwaves.

The discussion began by examining whether the historical background of HAPs had been adequately incorporated. The panel noted that heat is a multisectoral issue with significant ties to other urban infrastructural systems (like energy and water) as well as other socio-political aspects (like heat-related deaths during the recent Lok Sabha elections or India’s wheat export ban). The panellists emphasised that the history of HAPs in India often overlooks these wider implications, and future HAPs, especially state-level plans, need to consider rural areas more explicitly due to their impact on agriculture and animal husbandry.

The question of whether HAPs are driven by individuals or organisations led to a discussion on the importance of developing long-standing relationships with nodal agencies to influence the implementation of these plans. Panellists agreed that the implementation of HAPs is not always as robust as expected, and expectations of implementing agencies (like Municipal Corporations in urban areas) may be unrealistic. In some cases, there may be a primary focus on undertaking technical assessments of preparedness and response capacities, often at the expense of a clear understanding and appreciation of on-ground contexts and realities.

One key issue raised was that heat’s impacts are often invisible, unless one is directly affected by it. This makes it challenging to garner consistent attention from decisionmakers. The panel noted that current HAPs often fail to address this invisibility and lack economic incentives for creating greener spaces or penalties for thermally-inefficient construction. Even at the level of a city, panellists emphasised that a one-size-fits-all approach is not effective. There is now a growing emphasis on decentralising

HAPs to the level of the ward, the smallest urban administrative unit, to respond to the specific needs and realities of the lives and livelihoods of urban citizens.

The panel also highlighted several critical gaps in existing HAPs, such as the lack of inclusion of rural communities and the tendency for HAPs to be predominantly urban-centric. Rural areas, which face heat-related challenges also in the agriculture and animal husbandry sectors, often remain underrepresented in these plans. Furthermore, there is a need to connect climate action plans with HAPs for a more integrated approach, as the current separation may hinder more comprehensive solutions.

Discussions also delved into the process of planning, implementing and evaluating HAPs. Panellists agreed that the approach should ideally be a combination of top-down and bottom-up strategies to balance policy directives with community-based solutions. The challenge of evaluating HAPs over time and identifying effective indicators was raised. Even financial considerations have not received adequate attention, even though it remains a big determinant of the scope and extent of implementation of a typical HAP. A particularly interesting discussion centred on the timing of events such as elections and exams, which often fall during peak summer months, exacerbating the heat-related health risks. The panellists considered whether HAPs could help address this issue by advocating for changes to these schedules to protect public health. Similarly, they discussed how work hours could be adjusted to improve heat adaptability, with a focus on creating strategies that promote resilience.

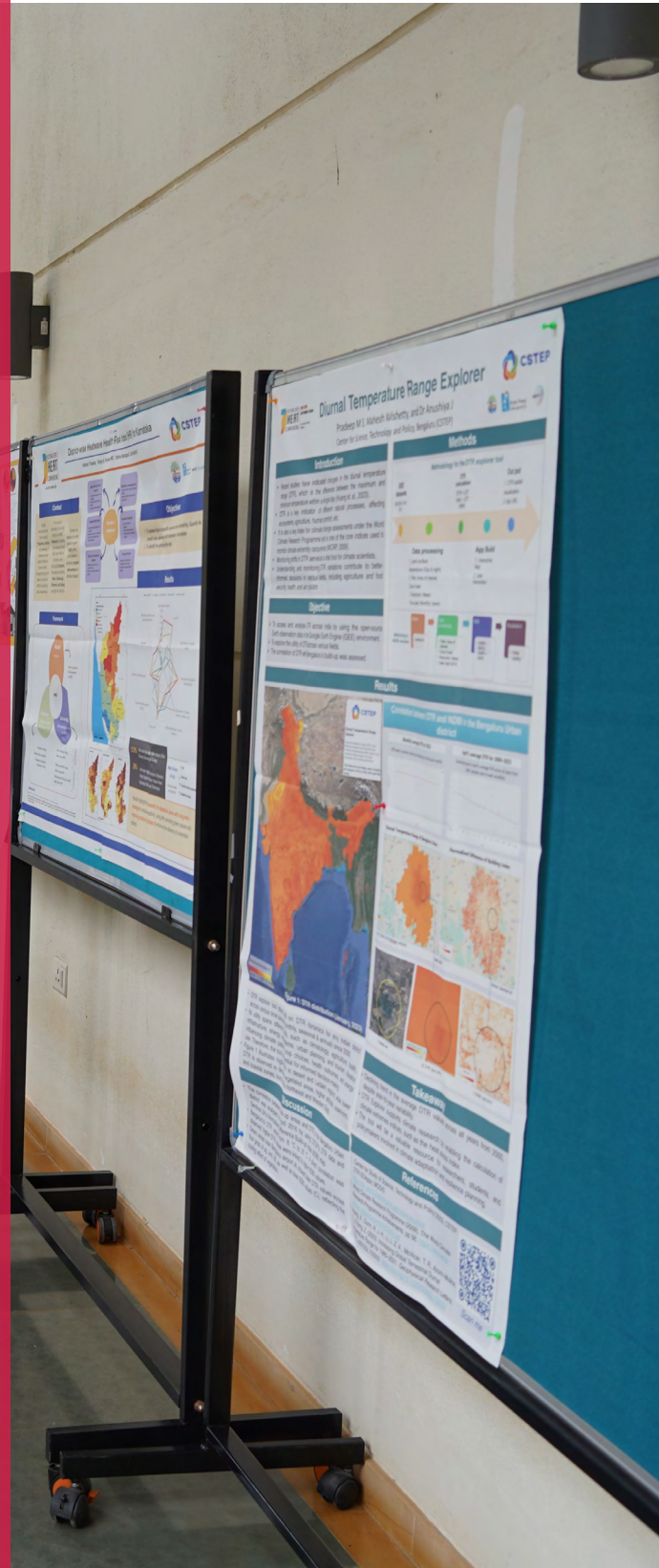
WHAT WE LEARNT



- The need to listen to communities and combine top-down HAPs with bottom-up actions.
- For HAPs to be successful, they need to have a reliable understanding of on-ground contexts, capabilities and impacts.
- While there is a tendency for agencies to react, there is a growing focus and attention being given to preparedness and planning. However, there is a long way to go.

03

**WHERE DO
WE GO FROM
HERE?**



The Rising Heat Convening provided a diversity of grounded perspectives, insightful ideas and discussions from participants on the urgent challenges of heat stress mitigation in India. There are some particular aspects to be noted that need further deliberations, that can spur collaborations and that can drive actions, to achieve the common goal of heat resilient communities in urban and rural settings across the country. These aspects are given below.

Heat presents a unique challenge: It acts as a threat of its own among multiple stressors affecting a certain community, and can also exacerbate existing inequalities and social justice challenges. Collectives working on heat stress mitigation, may not be working solely on heat stress mitigation alone. Rather, heat stress mitigation may only be one of the stressors affecting the communities they work with. This means that such collectives, and the actions they undertake or the causes they support, need to be supported more broadly, and not only from a prism of heat. This is an important point to recognise and address from a research, policy, practice and financing standpoint.

Heat stress mitigation needs multidimensional expertise: The need to form coalitions and collaborations that are interdisciplinary in nature and integrate expertise across research, advocacy, organising, implementation, policy action and impact monitoring. These groups can promote knowledge dissemination, can make spaces for sharing of experiences, challenges and setbacks, and can combine forces for exponential on-ground impact.

Public and private sector funding needs to be ramped up urgently: While public financing is slowly mobilizing with the declaration of heat as a state-level disaster (for example, most recently in the state of Tamil Nadu), there is ample space for other funding organisations (foundations, philanthropies) to step up and bridge funding gaps. For that to happen, they need to recognise the urgent challenge of heat stress and commit patient funding to address this challenge. CSR funds also have a role to play in providing hard and soft infrastructures. Currently, private sector funding for climate adaptation in general, and heat stress in particular, remains far below its full potential.

Evidence generation still remains a top priority: There are key research gaps in understanding and responding to heat stress better. These gaps include, but are not limited to, accounting for impacts among vulnerable communities from a variety of perspectives (the social, economic, physical, mental and psychological effects of heat stress on individuals and communities) and the efficacy of proposed solutions (for example, the ecological soundness of blue-green infrastructures for heat mitigation). Future research agendas of think-tanks and academic institutions can be mapped to these gaps.

Policies need to be proactive in nature: Similarly, there are several policy implementation gaps, including the operationalisation of HAPs, and the viability of other initiatives like changed working hours for outdoor workers, declaration of heat as a state and national-level disasters. While some models do exist across the country and came up during conversations, coordinated action with a clear long-term perspective remains conspicuously lacking.

A key role for bridging organisations: There is significant space for initiatives that bridge the gap between collectives doing robust on-ground work in community mobilization and impact accounting, and those that are engaging with state and national-level policies and action plans. Bridging this gap would enable a two-way flow of knowledge and information, while driving shifts in attitude, behaviours and actions on both sides of the spectrum.



04

**HEAT CALL
TO ACTION**



Heat stress is a systemic issue that demands urgent and collective action. The Rising Heat Convening has sparked critical conversations on the urgent need to address heat stress in India. We must commit to taking action now to create the space for inclusive, equitable, and community-driven solutions to emerge, that can effectively tackle the multidimensional impacts of heat stress in India.

This Call to Action envisions a future for vulnerable urban and rural communities in India that is safe from the negative impacts of heat stress.

A future where...

...communities are able to live healthy and productive lives with dignity.

...communities have equitable access to locally-contextualised cooling technologies.

...communities are able to pursue livelihoods that account for workplace impacts of heat stress.

...communities are able to minimize, with adequate support, the loss of lives and livelihoods from heat-related disasters, with a long-term reduction of heat risks.

...communities have access to adequate means of mitigation and long-term adaptation, including finance and technology, with the knowledge, capacity and skills needed to use them.

We outline 3 urgent actions under the Heat Call to Action:

1. **Promote and strengthen cooperation among the governments and civil society at all levels, and take actions at national, state, city and local scales to build heat resilience.**
 - a. Recognise that urban and rural areas are both hotspots of heat stress in the country, with significant implications for human wellbeing and sustainable development.
 - b. Organise frequent science-policy-practice-advocacy forums for sharing common concerns, forging action pathways and exchanging knowledge for evidence-based actions.
 - c. Strengthen evidence-based regional networks that support knowledge transfer across research, policy and practice.
 - d. Promote heat action champions and leaders, and encourage networks and alliances.
2. **Recognise and address the uniqueness of heat-related risks in decision-making institutions and processes, both across policy and in the private sector.**
 - a. Acknowledge that the challenges faced due to heat stress are urgent, and need concerted efforts at all scales.
 - b. Respect the distinct nature of heat-related threats, and its disproportionate impacts on vulnerable communities.
 - c. Promote and disseminate resilience actions currently undertaken by some individuals and communities.
 - d. Promote heat adaptation actions that are locally-led, context-specific, account for local realities and developed in conjunction with the communities that would benefit from them.

3. **Take concerted actions that focus on transformative adaptation, tackling heat-related vulnerabilities and inclusive, climate-proof development.**
 - a. Support heat -specific policies and development pathways that are gender and socially-inclusive.
 - b. Address adaptation issues for local communities as it is cross-cutting with several human wellbeing and sustainable development priorities.
 - c. Promote regional data and information sharing, and science and knowledge cooperation to fill data gaps and develop actionable knowledge, which is both qualitative and quantitative in nature.

APPENDIX 1 / PARTICIPANT LIST

S. No.	Name	Affiliation
1	Aalok Khandekar	IIT Hyderabad
2	Abdul Shakeel	Basti Suraksha Manch
3	Abhimanyu Singhal	Architecture for Dialogue
4	Abhiyant Tiwari	NRDC India
5	Aboleer Muranjan	Aga Khan Development Network
6	Aishwarya Ayushmaan	Housing Land Rights Network
7	Amrutha Kolangad	Kerala State Disaster Management Authority
8	Anagha S	ATREE
9	Anant Maringanti	Hyderabad Urban Lab
10	Aniket Gawade	Wipro Foundation
11	Anita Arjundas	ATREE
12	Anjali Mohan	Integrated Design
13	Ankriya Diggavi	Rising Heat Competition Winner
14	Apoorva	Azim Premji University
15	Apurva Deotak	Wipro Foundation
16	Arpita Chidanand	Hyderabad Urban Lab
17	Arundhati Hakhu	Jana Urban Space
18	Ashwini Bhat	Wipro Foundation
19	Bharat Nataraj	Jan Sahas
20	Chetan Sahasrabuddhe	Dr. B. N. College of Architecture
21	Chiku Agarwal	Jhatkaa
22	Deepak Malghan	IIM Bangalore
23	Dinni Lingaraj	Wipro Foundation
24	Divyanshi Vyas	Indian Institute for Human Settlements
25	Fahad Marzook	Kerala State Disaster Management Authority
26	Harini Nagenda	Azim Premji University
27	Ishwar Singh	Mariwala Health Initiative
28	Jagdish Krishnaswamy	Indian Institute for Human Settlements
29	Jashvitha Dhagey	Question of Cities
30	Jency Anna Abraham	HT Parekh Foundation
31	Jenny Mariadhas	Poovulagin Nanbargal
32	Joel Shelton	INHAF - Habitat Forum
33	Justin Andrews	Integrated Design
34	Kevin Thakkar	Dasra
35	Kranthi V	Institute for Public Health
36	Malvika	The Hindu
37	Dr. Manan Bhan	ATREE
38	Meera K	Oorvani Foundation
39	Meghana Myadam	Hyderabad Urban Lab
40	Mohd Abdul Mazhar Afsar	Telangana Gig and Platform Workers Union
41	Nakul Heble	Wipro Foundation
42	Neeth Fernandes	Association for Promotion of Social Action (APSA)
43	Niharika Gowda	ATREE
44	Nitesh Das	Jan Pahal
45	Niyati	Azim Premji University
46	Palak Shah	Mahila Housing Trust
47	Parama Roy	Okapi
48	Pooja Yadav	WRI India

S. No.	Name	Affiliation
49	Pradeep MS	Center for Study of Science, Technology and Policy (CSTEP)
50	Pratyush P	-
51	Praveen Beechagondahalli	Wipro Foundation
52	Priyadarshini Rajamani	M.S. Swaminathan Research Foundation
53	PS Narayan	Wipro Foundation
54	Radhica Kanniganti	Wipro Foundation
55	Rajashree Kotharkar	VNIT Nagpur
56	Repaul Kanji	Green, Resilient, Risk-Informed Development (GR-RID) Corps
57	Roshni R Krishnan	Sustera Foundation
58	Ruhie Kumar	Heatwave Action Coalition
59	Rutu Bhanushali	ATREE
60	Saba Dave	Mariwala Health Initiative
61	Sagar Kandal	Rising Heat Competition Winner
62	Sarita Fernandes	Heatwave Action Coalition
63	Selomi Garnaik	Greenpeace India
64	Sheikh Akbar Ali	Basti Suraksha Manch
65	Shivani Das	HeatWatch
66	Shravan Prabhu	Council on Energy, Environment and Water (CEEW)
67	Siji Chacko	Jan Sahas
68	Smruti Koppikar	Question of Cities
69	Souparna V	Sustera Foundation
70	Sowmya Sridhar	Hasirudala
71	Swastik Harish	Swastik Harish and Associates
72	Sweety Thomas	HT Parekh Foundation
73	Tamanna Dalal	Sustainable Futures Collaborative
74	Tanmay Gound	Confederation of Risk Reduction Professionals (CRRP) India
75	Ujjvala Krishna	ATREE
76	Ushashree	ATREE
77	Vaidyanathan R	OpenCity
78	Vidhatri Thakkar	Center for Study of Science, Technology and Policy (CSTEP)
79	Vivek	Fridays for Future India
80	Vivek Gilani	cBalance

APPENDIX 2 / THE RISING HEAT COMPETITION

In the run up to the Rising Heat Convening, participants from various disciplines including art, architecture, law, natural and social sciences were invited to participate in a competition to design a 25-square-metre heat shelter for vulnerable outdoor workers like gig workers, haulers, pourakarmikas, and coolies in Bangalore. Participants were also free to retrofit existing structures. The site location (in Bangalore North) was also provided so that participants could visualise the spatial context.

The considerations to design the shelter were:

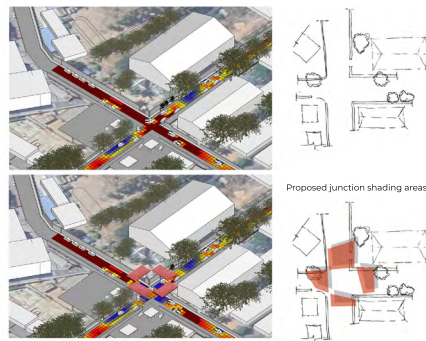
- **Functionality:** Shade and cooling, ventilation, rest and hydration, modular design, temporary and site adaptability.
- **Sustainability:** Locally available materials, low environmental impact and durability.
- **Affordability and maintenance:** Cost-effective, low maintenance and scalability.

More than 100 teams registered and more than 20 entries were received. The entries were judged by a panel of 3 judges: Sunayana Ganguly (Azim Premji University), Chitra Vishwanath (BIOME Environmental Solutions) and Swastik Harish (Swastik Harish & Associates). The winning entry was invited to present their design at the Convening.



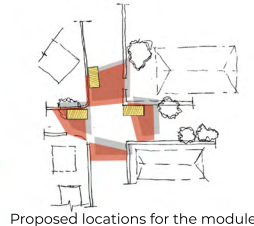
THE SITE; THE NEED FOR MICROCLIMATE IMPROVEMENT :

The two images below show a comparable differences in the heat signatures of the site when a large shading structure is applied to the entire junction.



This difference is of huge significance - if the temperature of the surroundings are reduced by a large degree, it takes lesser energy and resources towards fabricating the actual heat shelter itself.

The materials for this large urban junction shading are sourced on site - HDPE bags that are used to transport perishable goods for the market.



NATURE AND NEEDS

Situated near a highly active transport hub, the site houses a large majority of industrial workshops, a teeming marketplace and several travellers.



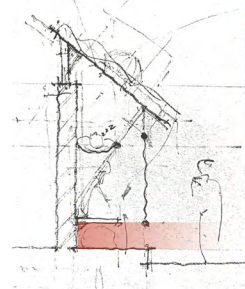
MATERIALS

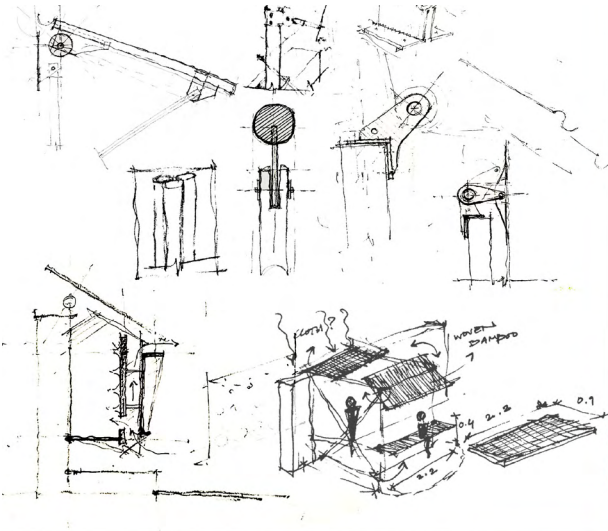
Locally sourced, the materials contended for this module are : bamboo sections, wooden poles, scrap metal pieces and HDPE bags.



THE GESTURE OF LIBERATION

In such a context, is it possible to envision a shelter freed from the ground? One that is unsupported by the earth, and making judicious use of the space available to it?

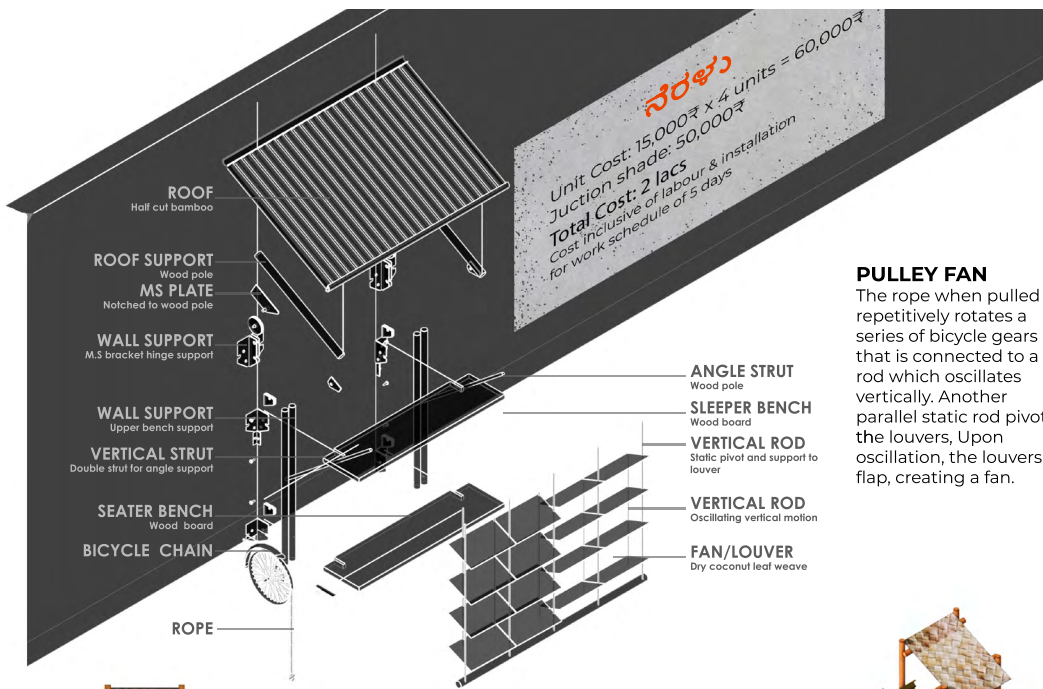




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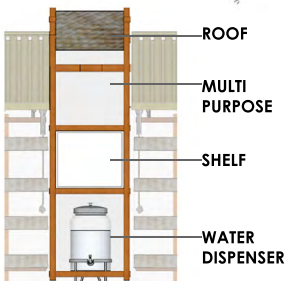
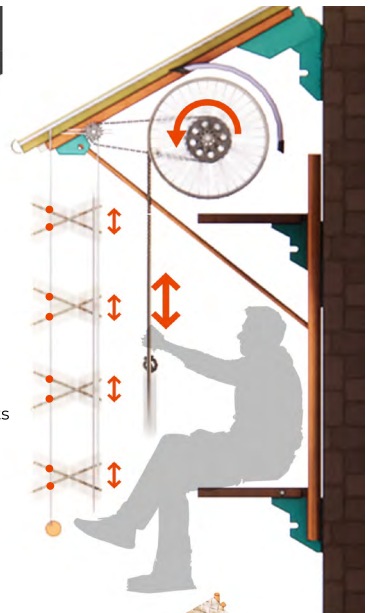
Achieving a design solution that does not interfere with the ground conveys more than just a means of convenience - the footpath is entirely public, defiant of ownership.

The design is a host for a variety of interchangeable materials and functions, with its visible permeability and flexibility of construction, which can adapt to different scenarios.



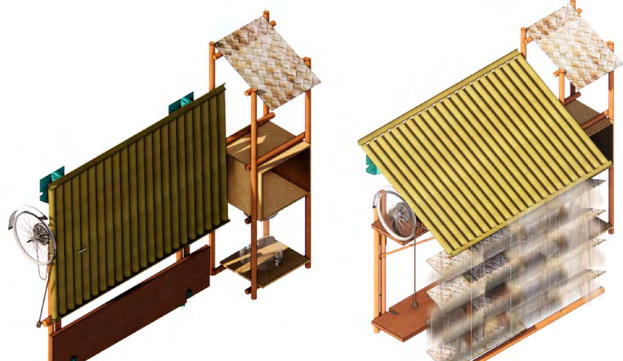
PULLEY FAN

The rope when pulled repetitively rotates a series of bicycle gears that is connected to a rod which oscillates vertically. Another parallel static rod pivots the louvers. Upon oscillation, the louvers flap, creating a fan.



UTILITY TOWER

A service bank between two consecutive units that can share utilities. Provision for future implementation of battery, water purifier, motor, safe locks etc depending on the context.



For more information about the Rising Heat Convening,
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