Climate Centre for Cities

Heat Resilient Cities Framework



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About the Framework

Climate Centre for Cities (C-Cube) at National Institute of Urban Affairs (NIUA) is leading a national urban heat resilience initiative of Ministry of Housing and Urban Affairs (MoHUA), under AMRUT 2.0 Sector reforms, by supporting 12 cities of India to initiate interventions to address urban heat island effect and rising heat stress. C-Cube has developed the 'Heat Resilient Cities Framework' as a guide to action.

Urban resilience or heat resilient cities, is much talked about these days. When developing interventions or programs to address urban heat in the global south context, we need to define 'What is a heat resilient city?' that we wish to achieve and how. What program actions and interventions, as well as long-term structural change is required at city level or beyond a city for a cluster of cities in a state, to become heat resilient. Hence the need for a Heat Resilient Cities framing, in a global south context.

At its foundation, our Framework is guided by Principles of equity and justice, with the most vulnerable positioned as primary stakeholders. This means, addressing extreme heat stress experienced by vulnerable populations by improving their living and working conditions, and not just addressing geographical heat hotspots or a random implementation of projects anywhere in a city and in any time frame.

The Framework is an attempt to define both a city heat adaptation intervention plan and an urban heat resilience perspective.

- A **'City Intervention Plan'** (annual or short term), that responds to fluctuating temperatures and urban morphology, empowering cities to prioritise and implement targeted solutions that strengthen the ability of a city to plan for, and provide maximum relief in the event of heat waves and heat stress.
- A long-term **'Urban Heat Resilience Perspective'** for a city or a cluster of cities, which builds on the short-term adaptation measures to heat stress of a city in its particular climatic context, along with a reimagining of long-term structural adaptation measures in the core sectors of city/state administrative systems to ensure livability and better heat stress tolerance.

We hope this framework will serve as useful guidance for planning, implementation and policy-making at all levels - city, district, state and national. This will be useful for the upcoming 'climate cells', or similar entities at city and state level, and for practitioners and city officials to plan interventions as well as approaches to address urban heat stress in the coming decade.

Background

Urban heat stress is particularly serious in global south cities/urban context, given the nature of urbanisation witnessed in the last five decades. Urban heat, flooding and worsening air quality are indicators of an urban environmental crises in most cities. Global warming (coupled with humidity increase due to the heating atmosphere, that results in both wet-bulb effect and increasing night-time temperatures), is only an exacerbating factor of our dense, informal and unplanned urbanisation.

The increasing densification of our cities and their informal character, reduces the range of heat stress adaptation measures possible.

WMO's State of the Global Climate Report 2025 confirms that 2015-2025 have been the hottest 11-years on record, and that 2025 was the second or third hottest year on record, at about 1.43°C above the 1850-1900 average.[1] On 27th April 2026, all the 50 hottest cities in the world were in India. The urgency of moving beyond reactive heat mitigation to long-term risk reduction, cannot be overstated.

Heatwaves have been identified as disasters by National Disaster Management Authority (NDMA) in India. In the last decade, several Indian cities have shown promising success in initiating interventions to address heat stress. Ahmedabad was the first Indian city to initiate cooling interventions in public places as well as cool roofs for less privileged households and initiate parametric insurance[2]. Telengana scaled-up cool roof initiative across its state. Several NGOs working with informal workers, vendors and gig-workers have been active in advocating for policy measures for strengthening systemic interventions for reducing heat stress for workers.

The broader efforts should naturally ask - what is a heat-resilient city? A heat-resilient city is an urban ecosystem that fundamentally shifts from only reactive emergency responses to long-term structural transformation across its administrative, physical, economic, and social systems. It should integrate thermal mitigation as a core objective of all municipal infrastructure for passive cooling, improving 'shading' as a public good, and ensuring 'water systems' to cool surrounding neighborhoods. Simultaneously, defined by equity and social justice, a heat-resilient city should prioritise the thermal comfort and safety of its most vulnerable populations. It should treat cooling access not merely as a technical issue, but as a basic public service and energy justice right.

Additionally, a heat-resilient city should strengthen its public health infrastructure capable of managing prolonged heat stress.

Centering Equity and Justice

Heat exposure is shaped not only by the natural and built environment, but also by the place where people live, work, travel and spend their leisure time at. Human stress is determined by conditions in which people spend most of the day. This is a critical question: how can cities ensure that every neighborhood, street and public space is livable, inclusive and resilient to heat?

Heat is not only an environmental issue, but also a public health, and governance issue. It disproportionately affects outdoor workers, inhabitants of informal settlements, women, older persons, children, people with disabilities, individuals with chronic underlying diseases (cardiovascular, renal, respiratory, metabolic and mental illnesses), and low-income households. Combining early warning, early action, community participation and impactful interventions can create solutions that are both technically sound and socially just.[3]

The population that is most exposed to heat, includes workers in high indoor temperature and outdoor settings such as manufacturing units, street vending spaces, construction sites, gig work, traffic posts, outdoor security services, sanitation work, autorickshaw operations, and many more. National guidance and recent advisories on heat stress have underscored the need to prioritise informal and outdoor workers in heat action planning, and to improve access to shade, drinking water, rest areas, and safer work schedules in urban areas. The Urban Heat Island (UHI) effect

1 *State of Global Climate 2025; World Metrological Organization*
2 *Miller, H. (2023, April 26). Inclusive finance and extreme heat: How small loans and parametric insurance can help vulnerable populations manage through deadly heat waves. Center for Financial Inclusion.*
3 *United Nations. Early warnings for all.*

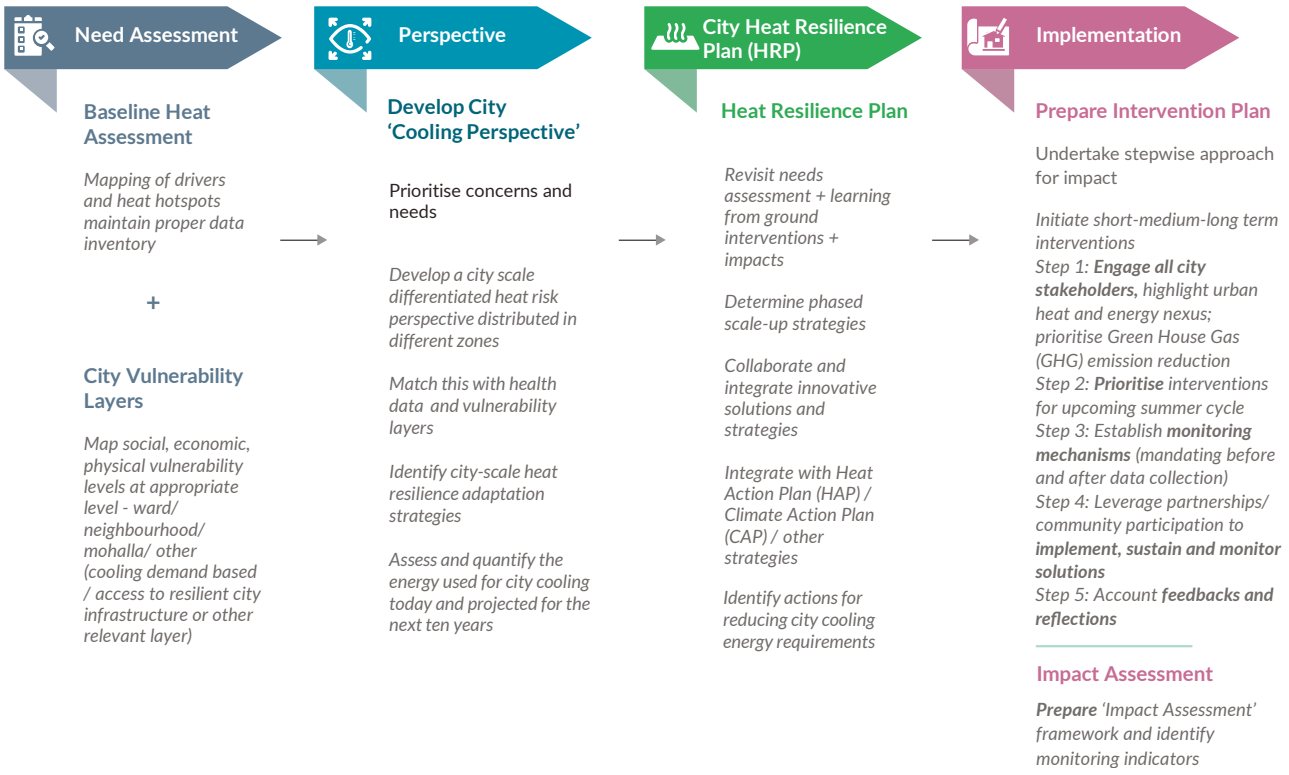
places informal settlements, tin or temporary shelters, and other precarious living environments at equal or greater risk. Prolonged heat exposure, not only intensifies physical stress, but also affects livelihoods, long-term health, and productivity in individuals.[4]

Keeping inclusion at the centre, city administration must adopt a heat resilient city perspective that prioritises the most vulnerable communities. Such an approach should not only improve working and living conditions, but also support affordable cooling options, accessible health protection, livelihood continuity, and pathways for registering and addressing heat related grievances. The responses for mitigating adverse heat impacts should be grounded in local realities and should prioritise community-led interventions that reflect collective concerns. A Gender Equality, Disability, and Social Inclusion (GEDSI) informed approach, supported by participatory methods can be especially effective. Prioritising and scaling-up such interventions will have city-wide benefits that will reach to all citizens, reinforcing the need for decentralized solutions. The first line of response and adaptation should therefore include communication on heat stress ensuring access to early healthcare, both of which are central to Heat Action Plan (HAP) development in Indian cities, guided by NDMA[5]

Inclusion indicators or standers should be defined for disaggregated data. Guidance for the same may be taken from the National Urban Livelihood Mission (NULM) by cities, where vulnerability is defined in terms of residentional, occupational , social and economic dimensions.

A. City Intervention Plan

Urban heat stress has become a recurring annual challenge. Interventions cannot be adhoc and await the onset of summer and extreme heat. It is crucial for cities to recognize that while traditional HAPs have functioned as



4 *International Labour Organization. (2019). Working on a warmer planet: The impact of heat stress on labour productivity and decent work.*
5 *NDMA. Heat Wave Guidelines and Preparedness*

reactive responses to district level heatwave alerts, the real exacerbation of heat impacts stems from UHI effect. This phenomenon is intricately tied to micro-climatic variations dictated by city morphology, urban planning norms, architectural design, municipal service-delivery, and socio-demographic vulnerabilities. Hence, every city needs a city level 'Intervention Plan' for heat stress that may account for immediate actions for vulnerable community groups.

Developing a 'City Intervention Plan' for heat resilience may be standardised as a process of need assessment, city heat perspective building and a heat resilience planning – leading to a set of interventions that are ready to be implemented.

A 'City Heat Intervention Plan' should be developed for a set of interventions that could be implemented in one year or a couple of years, depending on the scale and type of interventions needed for the urban and peri-urban region. This will differ for coastal and flood plains cities where humidity is a major factor along with heat, for inland semi-arid cities, for desert and hill cities.

Heat Hotspots and Vulnerability Assessment

Identifying heat hot-spots in a city (land surface temperatures and humidity levels to identify areas most impacted by heat), and who is most affected by this, vulnerability mapping is the first step. The purpose of undertaking heat hotspots mapping will determine the level of detail, capacities, and financial resources required.

A simple layered approach is encouraged for cities to develop a contextually grounded strategy. The first step is to build a baseline understanding through a multi-layered spatial assessment using geospatial information on daytime and nighttime land surface temperature and humidity(particularly in dense settlements), vegetation cover, built-up area, population density, water body network, and other relevant indicators. This can help identify city and ward level heat hotspots and overlap them with spatial information of homes and workplaces of vulnerable communities.

The process can be followed by development of a city-wide 'heating or cooling perspective', which synthesises the spatial overlaps to define macro-level urban cooling targets, and set sector-specific thermal comfort goals. The long-term spatial vision transitions cities from isolated, emergency-response heat action plans toward systemic urban and equitable cooling, and targeted heat mitigation efforts.

City should not limit themselves to satellite based geographical datasets alone. They should include other pertinent information that support the identification and prioritisation of heat-exposed population, drawing on observed or studied information. Ground truthing of sample areas within a city, is required to eliminate misleading land surface temperature determined spatial hotspots, while also capturing air temperature and humidity in specific locations. This will ensure that even if land surface temperature through satellite data is not the highest, the air temperature and humidity may imply a higher heat stress and need for interventions in those specific locations.

As a thumb rule, the more detail one wants to get in the city level heat assessment mapping (called Level of Detail)[6], the more it will cost. Needless to say, vulnerability mapping is more critical than satellite and ground/buildings-based temperature and humidity assessments. And, vulnerability assessment should be done with the involvement of people most affected by heat stress. Vulnerability mapping in a city should not be a one time exercise. Cities need to do this at regular frequency of at least once in three years.

The Framework places equal emphasis on outdoor and indoor heat stress for all categories of informal workers wherever they may be - domestic and home based, in workshop, kitchens, factories, etc.

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6 *CRDF-CEPT University. (n.d.). CARBSE develops a standardised methodology to assess urban heat island effects (UHIE) for Indian cities.*

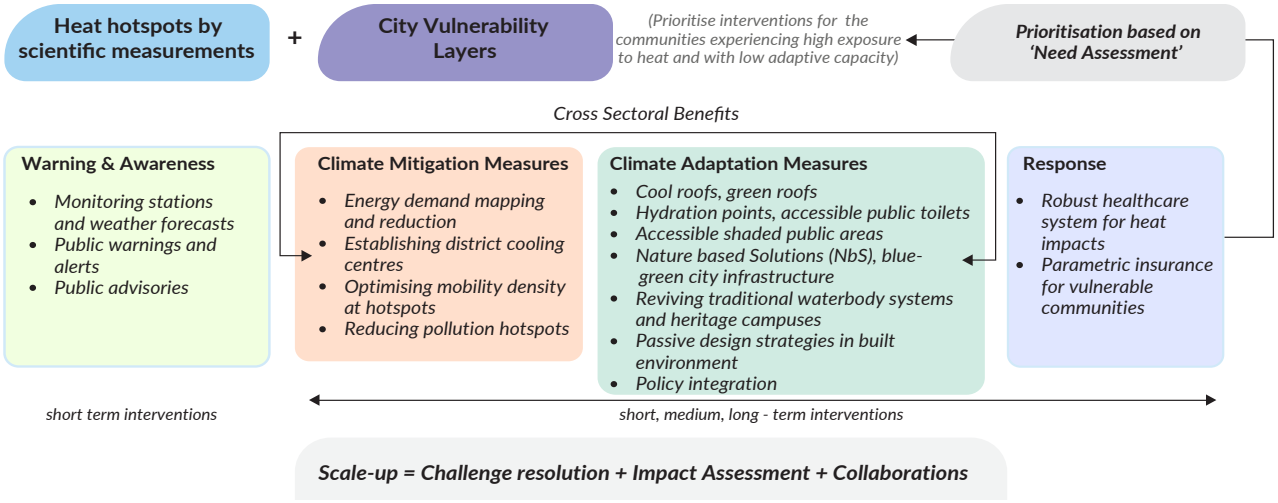
City-Wide Thermal Mapping and Cooling Perspective

Given the diverse climatic contexts and urban morphologies across Indian cities, ranging from hot-humid coastal zones to dry semi-arid regions and mountain terrains, heat stress adaptation requires tailored intervention strategies. Urban heat dynamics are significantly dictated by localised urbanisation patterns, industrial footprints, built environment typologies, energy consumption, and the extent of unplanned or informal settlements. Consequently, developing a context-specific, city-wide heat perspective grounded in systematic thermal and spatial mapping is essential.

Utilising a layered format of visual maps rather than purely narrative descriptions provides a more actionable framework for planners, practitioners, and citizens. A notable precedent for this approach is the "Urban Cooling Framework for Jaipur" developed by the Centre for Science and Environment (CSE)[7] , which successfully integrated spatial thermal analysis to assess baseline microclimates across the city covering its industrial, commercial and heritage areas. The framework quantified the current and the future cooling energy demand and identified a three tiered set of interventions (natural cooling, adaptive resilience learning from heritage, energy and technology integration) for an enabling thermal comfort of Jaipur city.

Heat Stress Solution Buckets

Urban Local Bodies (ULBs) may draw heat resilience actions from different sources and concerns, already reflected in national and state level documents. Borrowing from Ministry of Environment, Forest and Climate Change (MoEFCC) and NDMA programs, the ULBs are well-equipped to carry out mitigation, adaptation and response measures. To streamline planning, these measures are organised into indicative classification system while their application is not restricted to the categories. Subject to planning and design, these categories provide non-exhaustive list of solution-types where local interventions will typically combine multiple strategies to address local challenges through an integrated approach.



As emphasised in 'India Cooling Action Plan (ICAP)', reducing energy consumption requires mapping cooling demand and, strategically, lowering it through measures such as district cooling systems, passive cooling design, lowering transport related emissions, and improving pollution management, especially in identified hotspots[8]. However, urban poor have a high unmet energy demand for cooling. An equitable and integrated network of blue-green infrastructure can significantly influence energy consumption across different parts of the city. This should also be informed by district- and city-level energy demand patterns and the distribution of cooling systems.

7 *City Cooling Perspective of CSE for Jaipur city: https://cdn.cseindia.org/attachments/0.12014000_1772509813_urban-cooling-framework-jaipur-poster.pdf*

8 *Ministry of Environment, Forest and Climate Change. (2019). India cooling action plan.*

As highlighted by NDMA, early warning systems, and public awareness are of central importance for municipal bodies. This requires a structured system for scientific data-gathering, information-processing, alert-generation, and communication through general advisories as well as targeted Standard Operating Procedures (SOPs) for vulnerable neighborhoods and communities.[9] Climate adaptation measures are not isolated and often generate co-benefits that may already align with other ULB initiatives.

In several cities, hotspot identification, and cool roof interventions have already been introduced. For heat vulnerable workplaces and informal settlements, hydration points, shaded areas, cooling pods, and accessible public toilets can be particularly useful while reinventing blue-green infrastructure, revising policies for heat-resilient built-up areas, greening initiatives, special pilots for vulnerable communities, public shelters along transport network and others deserve long-term attention. Re-assessing benefits of traditional water-bodies, green areas in heritage precincts and city-centres may also contribute to reducing urban heat island effects.

Built environment plays a significant role in the urban heat island effect and is influenced by cooling systems, built typology, and construction materials. Lowering heat-gain, and improving heat release in densely built environments should be documented for scaling-up such interventions. Building bye-laws can be strengthened and incentives should be introduced to promote heat-resilience, passive cooling and choice of construction materials over the long-term. Collaboration with research institutions, real estate and private stakeholders may aid re-inventing-built environment, in public as well as private urban areas.

Special attention should also be given to vulnerable communities through collaboration with financial and insurance institutions on instruments such as parametric insurance, where appropriate. Emerging examples in India indicate that parametric products linked to climate triggers such as extreme heat can support quicker payouts and help protect livelihoods. However, such approaches require robust data systems, clear trigger thresholds, strong governance, and careful assessment of suitability for local contexts.[10]

Overall, the combined effect of these solutions should be to improve the accessibility and usability of public infrastructure so that they remain functional throughout the summer for use by people of all ages, abilities, and income groups.

Core Principles of a City Intervention Plan

- **Early information linked to early action:**
  Early warning systems are meaningful only when they are communicated to the ones most in need, and trigger timely responses across population for reducing heat exposure, providing emergency healthcare, and ensuring refuge at worksites, schools, and informal neighborhoods.

- **Decentralized and locally tailored solutions:**
  Cities and neighborhoods differ significantly in exposure, built form, access to services, and socio-economic vulnerability. One-size-fits-all heat responses are therefore unlikely to be effective. There is a need to plan and design contextual solutions with an understanding of crucial parameters that could be adapted to similar concerns or areas.

- **Prioritise low-cost, high coverage interventions first:**
  Shade, drinking water, alerts, cool surfaces, and basic public cooling support can offer protection to more people quickly than expensive and solutions that take longer duration to be implemented. However, long-term strategies should be initiated in a phased manner for permanent resilience while building city level perspective.

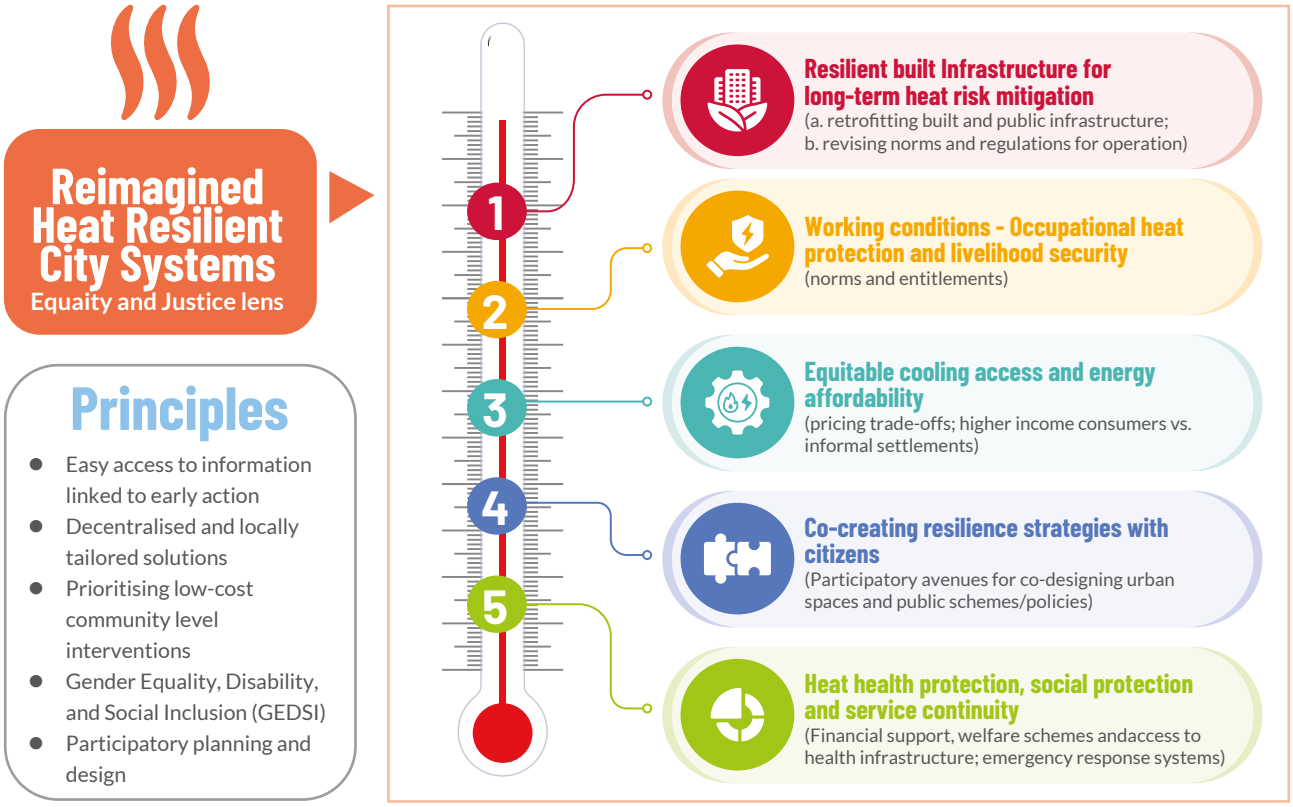
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9 *United Nations Development Programme. Early warning systems.*
10 *Action on Disaster Relief and Assistance. (2025). Parametric insurance solutions for all, issue no. 218, March 2025.*

- **Gender-just and care-sensitive design:**
  Heat affects care-givers, pregnant women, elderly, people with physical and mental health conditions, and households differently. Planning must account for unequal exposure, safety concerns, and communities with reduced adaptive capacity.

- **Participatory and inclusive planning:**
  Outdoor workers, women workers, tenants, informal settlers, people with disability should shape the response rather than only being at the receiving end. It's important to regularly engage with stakeholders while strategising the solutions against heat.

B. Urban Heat Resilience Perspective (UHRP)



A long term '**Urban Heat Resilience Perspective**' for a city or a cluster of cities is required, if we believe that urban heat stress response that goes beyond the measures at city level, to larger structural heat stress adaptation measures that may be beyond the remit of a city administrative mechanism to address.

Secondly, a re-imagining of a long-term structural adaptation measures in the core sectors of the city/state administrative systems, to incorporate heat stress adaptation – is required. A re-imagined heat resilient city will require a paradigm shift in the way existing infrastructure and services are currently delivered by different departments of a municipality and state level institutions.

- **Re-imagined built infrastructure**
  All the urban built Infrastructure - Housing, Mobility, Water and Sanitation, Industrial and Commercial, etc. Will need to integrate heat stress mitigation in its principles and outcomes.

Building norms and construction activities are already mandated to follow urban cooling principles under the URDPFI guidelines but implementation is not there. Unless this is done, need for active cooling will keep increasing, leading to more CO^2 emissions and more heat stress.

Urban mobility and transport sector will need to adopt measures to make walkability and shading along roads and addressing urban heat stress through street design and greening – as a core objective. The focus will have to be on mobility and heat stress faced by vulnerable urban dwellers, their preferred means of transport, the high concentration public areas with high footfalls. Instead of only focusing on mass transportation as a mobility measure, building more metro rail lines, road widening and flyovers with little consideration for urban greening.

All the water supply, storm-water, and waste-water management of a city will need to be integrated to address not only the drinking water requirements of the residents, but also urban cooling. This will require a re-imagining of the urban water management - both infrastructure design and institutional management systems. Decentralised systems of water supply, storm-water, waste-water, groundwater and surface-water (lakes and water bodies) will be required to be accounted, one is to address both water security and heat stress mitigation by re-use of treated water for cooling actions, locally. Urban cooling should become a central objective, surpassing the focus on merely Non-Revenue Water (NRW) reduction or waste water treatment to meet reuse and disposal standards.

Care may be taken to choose development of existing or new blue-green infrastructure projects that are located close to dense unplanned and informal settlements, so that they serve an equity and justice objective of urban cooling.

- **Reimagining working conditions and occupational heat protection**

  Employment in India is overwhelmingly informal: 90 per cent of all workers are employed under informal arrangements nationally; in urban areas and in Delhi, the proportion is 80 per cent. All domestic workers, home-based workers and street vendors in all of the geographic areas are informal. Among waste pickers, a substantial share of workers is employed under formal arrangements — but even so, three quarters or more are informal.[11] Gig workers are emerging as a major informal employment in urban areas that are out on the streets most of the time.

  Addressing thermal comfort of the majority of urban poor – the daily wage workers, construction workers, gig workers, house helps, workers in factories and all indoor and outdoor workers – should be prioritised in the interventions and also in the social safety and security provisions.

  Norms for outdoor work, timings of work and payment in-lieu of stoppages of work, etc. will need to be configured into the labour codes and social welfare norms. These are beyond the remit of municipalities to undertake and need to be factored at state level.

  Clarifying employer duty-bearers is one way of introducing effective measures. Many protective measures rely on a designated employer for implementation. For street vendors, waste pickers, home-based workers, such an employer often does not exist. Acknowledging this nuance could significantly strengthen state-level labor code language, allowing it to target alternate duty-bearers like local bodies, aggregators, or worker associations. Primary accountability for informal workers' welfare and heat stress adaptation will rest with Urban Local Bodies (ULBs).

- **Reimagining equitable cooling access and energy affordability**

  The demand for active cooling will increase as our built-up areas, the nature of construction works, material used and the increasing urban densification forces people to rely on active cooling. Reports show that Air Conditioners

11 *WIEGO; Informal Workers in India – a statistical profile; https://www.wiego.org/wp-content/uploads/2020/10/WIEGO_Statistical_Brief_N24_India.pdf*

accounts for more than 40% annual electricity demand for Delhi, rising to 50-60% during summer.[12]

Reimagining urban cooling demand and access to active cooling at affordable price for less privileged and low-income settlements, becomes a major challenge in the years to come.

Policies and pricing mechanisms will need to be tailored to address this. Challenges for insuring cooling access justice are affordability, electricity reliability, rental housing constrains, informal settlements, tenants, and shared accommodation, which often force reliance on active cooling. Cooling access should not just be seen as a technical fix, but as a public service, a housing-right question and energy justice.

- **Reimagined health systems strengthening**
  Health systems and infrastructure strengthening will be required to meet the increasing morbidity and health risk implications of heat stress. Our public health system is already overburdened in normal times. What is required is heat-health surveillance, occupational exposure data, tracking of heat-related morbidity and mortality, and community-reported conditions, all disaggregated by social groups and neighborhoods.

  Strengthening city, district, and state-level health systems alongwith monitoring and treatment facilities in hospitals at the district level, city level, and within cities at the ward level should become a core part of health systems strengthening to address urban heat resilience. Currently, existing interventions are implemented as short-term administrative responses during summer when prolonged heatwaves set in, while the monitoring of heat-wave deaths remains poor.

  Considering the increasing duration and intensity of heatwaves lasting 6–9 months a year in some places, health sector strengthening is required to provide both preventive and curative heat-stress management. This necessitates expanding healthcare infrastructure to accommodate more patients, alongside recruiting and training more doctors and paramedics at all levels of the health system. Well documented cases of heat related ailments and related data inventories in cities may also inform intervention planning and design in the long run.

- **Co-creating heat resilience strategies with people's engagement** must form the core of both short- and long-term urban heat resilience planning, embedded into statutory city Master Plans as well as zonal and ward-level frameworks. To move beyond generic consultation, cities must institutionalise a clear process for decentralized engagement, defining who participates, at what stage, and with dedicated roles and resources.

  This requires active involvement from informal settlement residents, worker collectives, women's groups, Resident Welfare Associations (RWAs), people groups, and Civil Society Organisations (CSOs) across four key operational phases: risk mapping, solution design, implementation, and long-term monitoring. Crucially, while digital platforms streamline governance, direct in-person participation remains fundamental to capturing ground truths, lived experiences, and neighborhood-specific vulnerabilities.

Policy Convergence Across Scales

Urban heat resilience is already a part of administrative action at the national, state, and district levels. At the city level, the objective should be to respond to contextual challenges while integrating the opportunities and informing policy directions available at different tiers of governance.

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12 *AC Cooling a Necessity and Emergency; https://indianexpress.com/article/opinion/columns/best-of-both-sides-ac-cooling-a-necessity-and-emergency-10077090/*

At the national level, NDMA, in collaboration with IMD, issues heatwave advisories and guidance on preparedness through the preparation of Heat Action Plans (HAP), stronger and targeted early warning systems, and the integration of heat resilience into development planning.[13] The current definition of heatwave is based only on dry bulb temperature readings in too few IMD stations to be able to actually capture heat stress (temperature + humidity) in areas that informal sector people live and work in. Both the definition and data capture need attention. Simplistic assumptions of urban heat island and their solutions, will not work. As shown for Delhi, the greenest mega city of India, is facing heat-humidity stress. It cannot be all blamed on climate change or diminishing green-blue infrastructure, but is a result of high density urbanization, vehicular emissions as well as solid and industrial waste burning deposited unevenly in urban morphology.[14]

At the state level, standards enforcement, heat-health data management, and coordination with health systems can significantly improve heat resilience in cities. State Disaster Mitigation Fund (SDMF), Corporate Social Responsibility (CSR) collaborations, state HAPs, and existing early warning systems can also be channeled by cities.

At the district level, preparedness, response, and recovery Standard Operating Procedures (SOPs) may already exist and may require only focused revisions to address city-specific resilience challenges. Data on heat-related illnesses and deaths can further help cities build a stronger case for action and set clearer priorities for resilience investments.

Moving forward, the mandate for urban centers is to evolve beyond generic HAPs and to cultivate a multi-layered, localised perspective that addresses specific urban vulnerabilities. Through Disaster Management (Amendment) Act, 2025, urban centres can now institutionalise planning for heat stress through Urban Disaster Management Authority (UDMA) in all cities with municipal corporations. This also mandates the creation of a National Disaster Database, which includes risk assessments, mitigation plans, and real-time data on disasters while facilitating the opportunity for creating heat resilience plan and prioritised interventions.[15] Several cities like Chennai, Bengaluru and Visakhapatnam are already mobilising to establish the authorities which can lead the development of Heat Resilience Plans (HRPs) and implement prioritised solutions.

The Urban Heat Resilience Perspective (UHRP) should not be seen as a separate document. It should be seen as an extension of existing 'Heat Action Plan' or 'Climate Action Plan' of a city. The UHRP may become a critical input in designing low carbon built forms for Indian cities, in its next phase of evolution.[16]

To achieve lasting impact, urban heat resilience strategies must find impactful interlinks between short-term, reactive measures (such as early warning systems and basic risk relief) to more systemic, structural transformations. A holistic effort requires the simultaneous deployment of physical and spatial interventions alongside operational and service-level enhancements. These solutions must be underpinned by enabling governance structures, robust institutional frameworks, and dedicated financing and investment mechanisms. Ultimately, heat resilience must be systematically integrated across all core urban sectors, including built and unbuilt physical city infrastructure, mobility networks, water and sanitation, energy demand and supply networks, and public health systems.

The 'Heat Resilient Cities Framework' will hopefully help address city, simultaneously informing state and national level policy and program development to address growing heat stress challenges.

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13 *National Disaster Management Authority. Heat wave. https://ndma.gov.in/heat-wave*

14 *Dutta, S. (2026, May 5). Heat in the Indian cities: A reality more complex than tree cover. Kafila – Collective Explorations Since 2006. https://kafila.online/2026/05/05/heat-in-the-indian-cities-a-reality-more-complex-than-tree-cover-soumya-dutta/*

15 *Press Information Bureau, Government of India. (2025, March 12). Measures taken for disaster management and use of AI in forecasting and early warning systems [Press release].*

16 *Designing Low Carbon Built Forms for India- Ashok Lall and Girisha Sethi- My Liveable City Jan- Jun 2026*



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