

AHMEDABAD HEAT ACTION PLAN 2018

GUIDE TO EXTREME HEAT PLANNING IN AHMEDABAD, INDIA



EASY READ VERSION

AHMEDABAD HEAT ACTION PLAN 2018: EASY READ VERSION

I. INTRODUCTION

Extreme heat can lead to dangerous, even deadly, health consequences, including heat stress and heatstroke. A major heat wave hit the city of Ahmedabad in May 2010, associated with during which 1,344 additional deaths. (Azhar GS, Mavalankar D, 2014) occurred. Rising to the health challenges posed by climate change and more frequent, intense, and longer heat waves, the Ahmedabad Municipal Corporation (AMC) has worked to prepare health systems and residents against dangerous heat waves. The first Heat Action Plan (HAP or Plan) was prepared in 2013 by the AMC with help from national and international academic experts and lessons from global best practices on early warning systems and heat adaptation. Since 2013, the AMC has released updated versions of the Ahmedabad HAP annually.

II. PURPOSE

This Heat Action Plan aims to provide a framework for the implementation, coordination, and evaluation of extreme heat response activities in Ahmedabad that reduce the negative health impacts of exposure to extreme heat. The Plan's primary objective is to alert those populations most at risk of heat-related illness that extreme heat conditions either exist or are imminent, and to take appropriate precautions.

III. KEY STRATEGIES

- ***Building Public Awareness and Community Outreach*** to communicate the risks of heat waves and implement practices to prevent heat-related deaths and illnesses. Disseminating public messages on how to protect people against extreme heat through media outlets and orientation materials such as pamphlets and advertisements on heat stress prevention. New efforts being launched as part of this year's Plan include the use of modern media such as text messages, email, radio and mobile applications such as WhatsApp. Special efforts will be made to reach vulnerable populations through inter-personal communication from March to June annually.
- ***Initiating an Early Warning System and Inter-Agency Coordination*** to alert residents of predicted extreme temperatures. The AMC has created formal communication channels to alert government agencies, health officials and hospitals, emergency responders, local community groups, and media outlets of extreme temperatures forecasted by the Indian Meteorological Department's (IMD) Meteorological Centre located in Ahmedabad.
- ***Capacity Building Among Health Care Professionals*** to recognize and respond to heat-related illnesses, particularly during extreme heat events. Such trainings focus on primary medical officers, paramedical staff, and community health staff so that these experts can effectively prevent and manage heat-related cases and reduce mortality and morbidity.
- ***Reducing Heat Exposure and Promoting Adaptive Measures*** by launching new efforts including mapping of high-risk areas of the city, broadening outreach and communication on prevention methods, and increasing access to potable drinking water and cooling spaces on extreme heat days. The AMC also collaborates with non-governmental organizations to expand outreach and communication with the city's most vulnerable communities.

The 2018 Heat Action Plan is an updated version of the first comprehensive early warning system and preparedness plan for extreme heat events in India, launched in Ahmedabad in 2013. The Plan outlines immediate and longer-term actions to increase preparedness, information-sharing, and response coordination to reduce the health impacts of extreme heat on vulnerable populations.

IV. HEAT ACTION PLAN (HAP) IMPLEMENTATION

Implementation of the Heat Action Plan involves three main strategies. The first is the heat alert systems and inter-agency communication efforts led by the AMC Nodal Officer. The second is key action taken under the Heat Action Plan by key stakeholders. The third is efforts to keep temperatures lower, focused on vulnerable communities, though cool roof strategies.

A. Activating the Heat Action Plan

Successful implementation of the Heat Action Plan in Ahmedabad requires coordinated action amongst diverse stakeholders, including government departments, health care professionals and emergency medical personnel, health center and hospital staff, and community groups. Following the forecast of an extreme heat event, immediate communication to the public and all those addressed the response is critical to ensure the plan is activated.

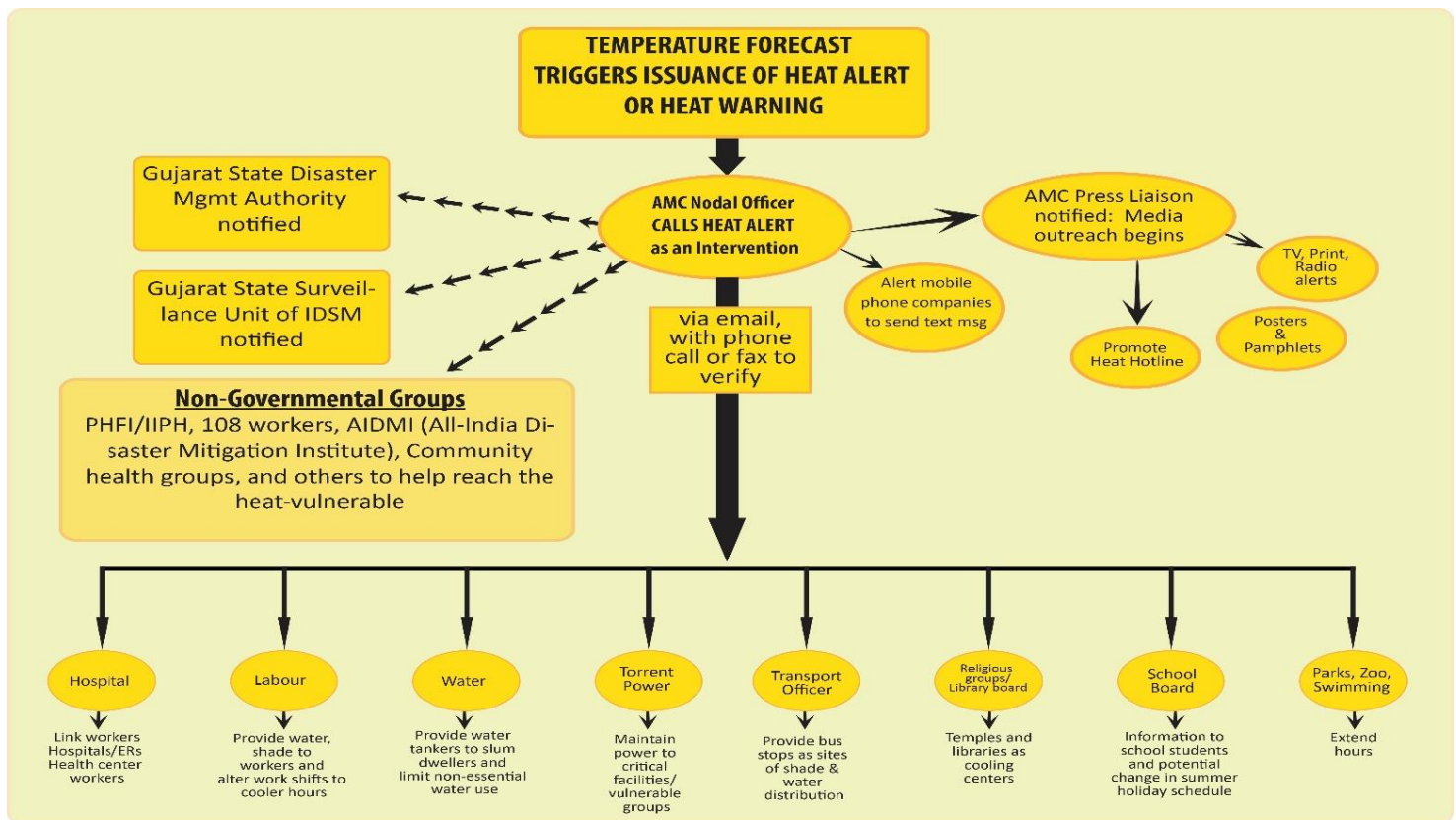
Color Signals for Heat Alert

The AMC will issue heat alerts, based on temperature thresholds determined by the AMC, as an additional means of communication by using the following color signal system:

Alert Category	Alert Name	Temperature Threshold (°C)
RED ALERT	Extreme Heat Alert Day	$\geq 45^{\circ}\text{C}$
ORANGE ALERT	Heat Alert Day	$43.1^{\circ}\text{C} - 44.9^{\circ}\text{C}$
YELLOW ALERT	Hot Day Advisory	$41.1^{\circ}\text{C} - 43^{\circ}\text{C}$
WHITE	No Alert	$\leq 41^{\circ}\text{C}$

The AMC has appointed an **AMC Nodal Officer** to head the coordination of stakeholders and ensure implementation of the Heat Action Plan. The appointed nodal officer is responsible for coordinating and communicating actions ahead of, and during, extreme heat events, and provides support staff for HAP functions through the Nodal Office as necessary.

Communication Plan for AMC Nodal Officer Activation of a Heat Alert



B. Key Actions to be taken under the Heat Action Plan

Phase 1: Pre-Heat Season (Annually from January through March)

AMC Nodal Officer:

- Convenes key agency leaders to respond to extreme heat events.
- Engage state and local agencies to facilitate internal communications.
- Organizes preventative training and outreach efforts for health workers, link workers, school children, and the local community with the Health Department.

AMC Health Department and Medical Professionals:

- Enhance targeted training programs, capacity building efforts, and communication on heat illness for medical staff at local hospitals and Urban Health Centres (UHCs). The trainings should include nursing staff, paramedics, field staff and line workers, and consider the susceptibility of particular wards to extreme heat.
- Require hospital admissions and emergency case records to be updated and track heat-related morbidity and mortality and update existing databases of heat-related morbidity and mortality.
- Train hospital staffs to improve expedience of recording of cause of death certificates. The training could also include recording information education & communication (IEC) efforts.
- Update simple means to track daily heat-related data and behavioral change impacts.

108 Emergency Service:

- Create displays on ambulances during local extreme heat events to build public awareness
- Identify areas of vulnerable populations, in part by utilizing the list of high-risk areas.

Phase 2: During the Heat Season (Annually from March through July)

AMC Nodal Officer:

- Activates a **heat alert** and the local response citywide when extreme heat events are forecast by notifying the key agency leaders, AMC Deputy Municipal Commissioners, and the Gujarat state agencies in accordance with the Communication Plan above.
- Monitors and increases the **heat alert** level when necessary to match the severity of the forecast and threshold established, and alerts the Municipal Commissioner to convene a special meeting with key agency leaders.
- Activates “cooling centers,” such as temples, public buildings, malls, during a **heat alert** and/or AMC-run temporary night shelters for those without access to water and/or electricity.
- Expands access to shaded areas for outdoor workers, slum communities, and other vulnerable populations. For example, confirms that night shelters stay open all day for migratory populations during a **heat alert**.
- Holds a frequent, possibly daily, conference call to discuss reports and breaking developments during a **heat alert**, and ensures that communication channels remain operational.
- Identifies and set up public displays of temperature and forecasts, such as LED electronic scrolling boards.
- Continues surveillance of temperature data and forecasts from IMD’s Meteorological Centre in Ahmedabad.
- Communicates the suspension of all non-essential uses of water (other than drinking, keeping cool) via the AMC Water Project’s protocol procedures during any water shortage.
- Increases efforts to distribute fresh drinking water to the public. For example, expands potable water access during a **heat alert** at religious spaces including temples and mosques, BRTS transit stations, pouch handouts to the poor, and high-risk areas (identified by the mapping of high-risk areas).
- Communicates the local utility protocol to prioritize maintaining power to critical facilities (such as hospitals and UHCs).
- Notifies the Steering Committee and relevant agencies when the **heat alert** is over.

Community Groups and Individuals:

- Keep cool and hydrated during the heat season by drinking water, staying out of the sun, and wearing light clothing.
- Check on vulnerable neighbors, particularly during a **heat alert**.
- Limit heavy work in direct sun or indoors if poorly ventilated, especially during a **heat alert**.

Phase 3: Post-Heat Season (Annually in July through September)

AMC Nodal Officer:

- Organizes an annual Heat Action Plan evaluation meeting with key agency leaders and relevant stakeholders.
- Evaluates the Heat Action Plan process based on performance and revises accordingly.
- Evaluates the reach and impact of the Plan and revise accordingly.
- Posts the revised Plan to the AMC website ahead of the 2016 heat season for stakeholders.
- Builds on the “Green Cover” activity to establish tree-plantation campaign in hotspot areas such as roadsides and during plantation festival in June. Incorporates student volunteers or incentivize builders to plant trees to help effect this effort.
- Explores establishing cooling center facilities in high-risk areas around city.

New Activities for the Ahmedabad HAP 2018

- A. **Cool roofs:**
 - a. Promote the use of reflective paint or “Chuna” (Lime) with the help of real estate officers
 - b. Distribute gunny bags
- B. **Access to cool drinking water:**
 - a. Provide drinking water through water distribution unit such as “piyau”
 - b. Promote the use of WHO ORS and cold drinks, such as lime water, coconut water, buttermilk, but not sodas.
 - c. Make it mandatory for builders to provide drinking water at construction sites
- C. **Engage religious groups:**

Spread awareness and alerts through places of religious importance and with religious leaders
- D. **Digital media campaigns:** Raise awareness through digital media on heat preparedness and alerts
 - a. Ads in between movies (at cinema halls)
 - b. Regional television channels
 - c. Radio announcements
- E. **Advertisement and promotion through IEC:**
 - a. Street plays in low income communities
 - b. Hoards, billboards, as and other advertisement modes
- F. **Medical professional training:**
 - a. Expanded training of doctors and associate staff
 - b. Increased training of NGOs and Asha workers

C. Cool roof options to keep temperatures lower

Cool roofs, with their specific characteristics, reflect and emit heat, and are a key strategy in implementing the Ahmedabad Heat Action Plan. Depending on the setting, cool roofs can help keep indoor temperatures lower by 2 to 5°C (3.6 - 9°F) as compared to traditional roofs, offering simple and effective protection from extreme heat especially for the vulnerable communities in low-income housing. Additionally, cool roofs may help save energy, bring down cooling costs, and lead to curbing energy demand, air pollution and climate change in the long run. (NRDC, IIPHG, 2016). The following six cool roofing options are available for people to adopt:

1. White paint

The colour white reflects heat. Based on this same concept, the roofs of the households are painted white to bring down indoor temperatures of homes and help in protect the health of residents. There are two basic paint options: lime-base white paints and solar reflective paints.

a. Lime-based white paints: This is a low-cost option. Application of up to three layers of lime paint can help to keep indoor temperatures lower.



Photo: NRDC-IIPHG.

b. Solar reflective paints: A relatively costlier option than the lime-based paint. Solar reflective paints are designed to have a high Solar Reflective Index (SRI) - a measure of the constructed surface's ability to stay cool in the sun by reflecting incoming solar radiation.



Photo: Excel coatings, Tamil Nadu, India.

2. China mosaic tile

One way to keep a surface cooler is to replace the top layer with white gravel or reflective marble chips to increase its solar reflectance. For example, the Shardaben Hospital replaced its black tar roof with a reflective china mosaic tile to keep temperatures lower for patients and new-borns.



Photo: AMC-IIPHG-NRDC.

2. Rooftop garden or green roofs

A green roof, or rooftop garden, is a vegetative layer grown on a rooftop. Green roofs shade the buildings below from direct sunlight and reduce both surface temperatures and surrounding air temperatures. (Akbari, H., 2005 (reducing urban heat islands)).



Photo: Time to Lose (40 green roofs).

3. Affordable cool sheds

- a. *Use of gunny (jute) bags:* This roof evaporation technique consists of laying a thin uniform layer of organic material lining (double layers of empty jute bags) on the roof in close contact. Placing gunny bags soaked with water on roofs can help to keep indoor temperatures cooler.



Photo: Ramesh Shanmugam.

- b. *Use of green netting:* Green netting (shade cloth) absorbs incident solar radiation. This absorption raises the temperature of the shade cloth – and the shade helps keep lower temperatures it provides lowers the temperature of the area below.



Photo: Jeevan Enterprises-netting service

4. Solar photovoltaic roofing panels

Adding ultra-thin, solar photovoltaic panels to a flat roof can store energy for use in the home, and send excess capacity back to the local power grid. When placed over a cool roof laminate of polyvinyl chloride (PVC), the devices can continue to help keep temperatures lower in buildings during the hot summer weather.



Photo: Rutger Middendorp, Netherlands.

5. Modular Roofing System (Mod Roof)

The modular roofing system is a water- proof roof, made of paper waste and coconut husk. It also provides for a cheaper and environment friendly alternative to Reinforced Cement Concrete (RCC) roofs. They are also easily dismountable, and can be reinstalled after adding additional floors, or at new locations. Thus, this roof could also prove to be a boon for slum dwellers with uncertain land tenures owing to its flexibility for reinstallation.

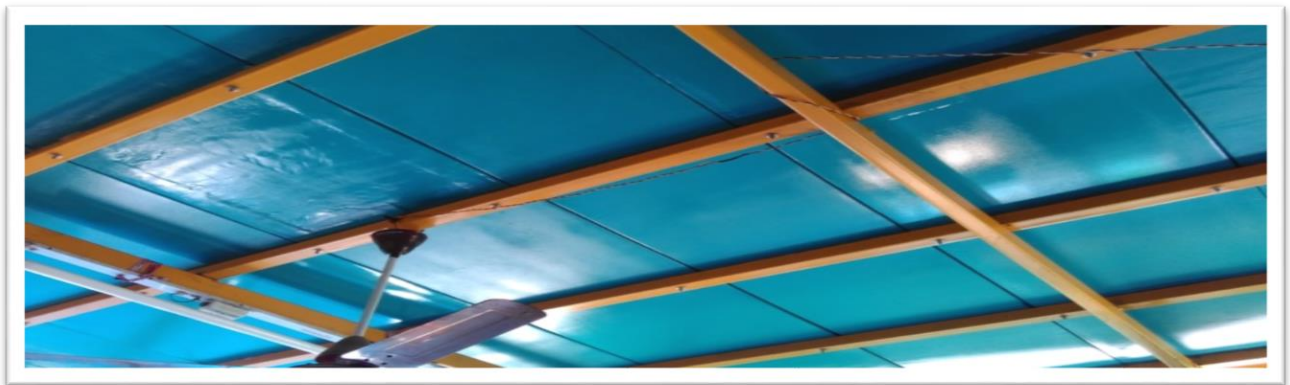


Photo: Mahila Housing Trust (MHT), Ahmedabad.

Partnering Organizations

Ahmedabad Municipal Corporation

The Ahmedabad Municipal Corporation (AMC) is the municipal governing body of Ahmedabad, responsible for the city's civic infrastructure and administration. Led by its mayor and commissioner, AMC has pioneered the development of heat vulnerability reduction strategies and an early warning system for extreme heat events to protect its residents. <http://www.egovamc.com/>

India Meteorological Department

The India Meteorological Department (IMD), of the Ministry of Earth Sciences, Government of India, is the national meteorological service, responsible for meteorological observations, weather forecast, providing warnings against severe weather phenomenon and provide meteorological statistics required for agriculture, water resource management, industries and other nation-building activities. Led by the Director General, the IMD plays a key role in providing 5 day forecasts to cities and states that are implementing the Heat Action Plan in India. <http://www.imd.gov.in/>

Indian Institute of Public Health, Gandhinagar

The Indian Institute of Public Health, Gandhinagar (IIPH) is a leader on public health education, advocacy and research on public health. IIPH pushes the mandate of equity in public health, applying strategy, resources and networks to the issues and practice of public health in India. IIPH's programs aim to make education and research activities relevant to India in content and context. <http://www.iiphg.edu.in/>

Public Health Foundation of India

The Public Health Foundation of India (PHFI) is a public-private partnership structured as an independent foundation. PHFI is the hub of teaching, research, sharing knowledge and experiences in areas at the cutting-edge of public health in India. PHFI has launched four institutes of public health, including IIPH-Gandhinagar. <http://www.phfi.org>

Natural Resources Defense Council

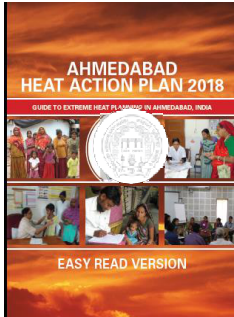
The Natural Resources Defense Council (NRDC) is one of the most effective environmental groups, combining 1.3 million members and online activists with the expertise of more than 350 scientists and other professionals. NRDC is a leader in public health research, policy, and advocacy- including building resilience in local communities and fighting climate change. In 2009, we launched our India Initiative focused on climate change and clean energy with projects on climate change preparedness and adaptation and energy efficiency. With our partners, we advocate for increased policy development and implementation to protect communities from environmental threats. <http://www.nrdc.org>

Mount Sinai School of Medicine

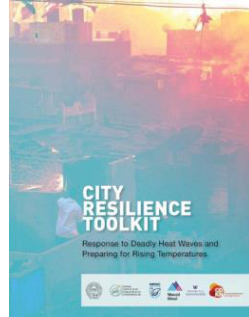
The Mount Sinai School of Medicine is internationally recognized as a leader in groundbreaking clinical and basic science research and is known for its innovative approach to medical education. With a faculty of more than 3,400 in 38 clinical and basic science departments and centers, Mount Sinai is a top-ranked medical school based in New York City. <http://www.mssm.edu/>

ONLINE RESOURCES

Heat Action Plan and Research Materials are available at:
<http://www.nrdc.org/international/india/extreme-heat-preparedness>



Ahmedabad's Heat Action Plan



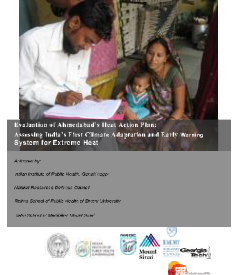
City Resilience Toolkit: Response to Deadly Heat Waves and Preparing for Rising Temperatures



Inside Story: Addressing heatrelated health risks in urban India: Ahmedabad's HeatAction Plan

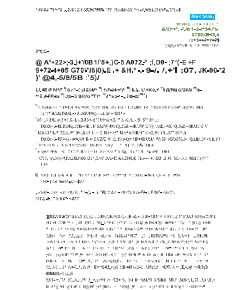


Expert Committee Recommendations for a HeatAction Plan based on the Ahmedabad Experience



Evaluation of Ahmedabad's Heat Action Plan: Assessing India's First Climate Adaptation and Early Warning System for Extreme Heat

CUTTING EDGE SCIENTIFIC RESEARCH AND JOURNAL ARTICLES



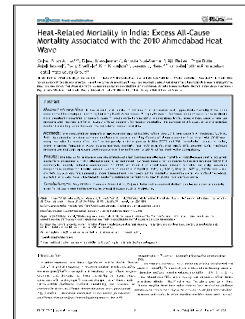
International Journal of Environmental Research and Public Health: A Cross-Sectional, Randomized Cluster Sample Survey of Household Vulnerability to Extreme Heat among Slum Dwellers in Ahmedabad, India (June 2013)



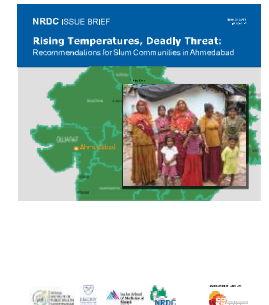
International Journal of Environmental Research and Public Health: Development and Implementation of South Asia's First Heat-Health Action Plan in Ahmedabad (Gujarat, India) (January 2014)



Journal of Environmental and Public Health: Neonates in Ahmedabad, India, during the 2010 Heat Wave: A Climate Change Adaptation Study (January 2014)



PlosOne: Heat-Related Mortality in India: Excess All-Cause Mortality Associated with the 2010 Ahmedabad Heat Wave (March 2014)



Rising Temperatures, Deadly Threat: Series of Four Issue Briefs of Recommendations for Heat Adaptation in Ahmedabad

Project partners:

