

NATIONAL FRAMEWORK FOR HEAT WAVE MANAGEMENT AND MITIGATION



GLOBAL TRENDS IN RISING TEMPERATURE AND HEAT WAVES

Impacts and Records in 2023

- **2023: Warmest Year on Record:** NASA reported Earth's average surface temperature in 2023 was approximately 2.1°F (1.2°C) above the 1951-1980 average, marking it the warmest year on record due to factors like El Niño and climate change.
- **Heat Waves in India:** February 2023 was India's hottest February since 1901, with widespread heat waves impacting multiple states. The Indian Meteorological Department highlighted an increase in both frequency and duration of heat waves, especially in northern India.
- **Long-Term Trends:** Data from 1961 to 2020 shows a significant rise in the occurrence and duration of heat waves across India, with some regions experiencing more than four events per season and durations extending beyond 8 days.

IMD ADVISORIES AND ALERTS ON HEAT WAVES

Criteria and Alert Systems in India

- **Heat Wave Criteria:** A heat wave is declared when temperatures exceed 40°C in plains and 30°C in hilly regions, with severity determined by departure from normal temperatures or absolute maximum temperatures.
- **Coastal Heat Wave Criteria:** For coastal areas, a heat wave is declared with a maximum temperature departure of 4.5°C or more from normal, provided the actual maximum temperature is 37°C or more.
- **IMD Alert System:** IMD employs a color-coded alert system (green, yellow, orange, red) to signify different levels of heat alerts, with red indicating extreme heat and a high likelihood of heat illnesses.
- **Heat Index and Wet Bulb Temperature:** IMD's Heat Index considers humidity's impact on perceived temperature, providing a 'feel-like' temperature. Wet bulb temperature measures the combined effect of heat and humidity on the body's ability to cool down.

HEAT WAVE-RELATED DEATHS IN INDIA

Data Sources and Trends

- **IMD Data:** Focuses on meteorological conditions, correlating fatalities directly with high temperature events. Provides immediate environmental triggers but may not capture socio-economic and health factors.
- **MoH&FW Data (2015-2019):** Reports a total of 3775 deaths, emphasizing the medical aspects of fatalities. Grounded in clinical reports and health outcomes, but may miss unrecorded deaths outside the health system.
- **NCRB Data (2011-2020):** Documents 11,571 heat stroke deaths based on police records, offering insights into geographical distribution but lacking detailed demographic breakdowns.
- **Trend Analysis:** Maximum deaths recorded in 2015, with a subsequent decrease attributed to improved heat wave monitoring. Highlights the need for closer

SALIENT IMPACTS OF HEAT WAVES ON VARIOUS SECTORS

Consequences Across Health, Urban, Rural, and Economic Spheres

- **Health Risks:** Heat waves elevate the risk of heat exhaustion, heatstroke, and worsen chronic health conditions, impacting vulnerable groups like the elderly and those with pre-existing conditions.
- **Urban Heat Islands:** Cities experience intensified heat effects due to the urban heat island effect, leading to higher temperatures and prolonged heat events.
- **Infrastructure Strain:** Increased demand for air conditioning strains power grids, while extreme heat damages roads and other infrastructure.
- **Agricultural Impact:** Heat waves adversely affect crop yields and livestock health, leading to food shortages and higher prices.
- **Water Scarcity:** Extreme heat exacerbates drought conditions, affecting

KEY PRINCIPLES FOR HEAT WAVE MANAGEMENT

Building Resilience in Indian Communities

- **Decentralization:** Emphasizes localized strategies tailored to the unique conditions of different regions, granting autonomy to local governments for implementing community-specific plans.
- **Participation:** Involves community members in decision-making, leveraging their insights and encouraging ownership for more organic and adaptive strategies.
- **Adaptation:** Combines traditional wisdom, established practices, and modern technologies for a well-rounded approach to heat wave mitigation.
- **Multi-sectoral Collaboration:** Requires the collective efforts of government bodies, the private sector, and civil society to ensure comprehensive and inclusive heat wave management.

THE ROLE AND EVOLUTION OF HEAT ACTION PLANS

Adapting to the Growing Threat of Heat Waves

- **Essential Framework for Mitigation:** HAPs provide a coordinated approach involving governments, health agencies, and community organizations to prepare for, respond to, and recover from heat-related events through interventions like early warning systems and cooling centres.
- **Dynamic Tools for Preparedness:** Annual analysis of heatwave responses is crucial to evolve HAPs, adding progressive interventions and improving preparedness through early planning and resource allocation.
- **Targeted Interventions and Vulnerability:** Development of targeted interventions to protect vulnerable populations, with a focus on localized adaptation, swift implementation, and prioritizing the safety of heat-sensitive groups.
- **Ownership and Grassroots Impact:** Ensuring district administrations and municipalities embrace HAPs as their own, utilizing them as reference tools for localized adaptation and quick action.
- **Substantive Interventions & Funding:** HAPs should offer a catalogue of tangible, actionable interventions with a clear funding and implementation strategy to address heatwave challenges effectively.

FRAMEWORK COMPONENTS FOR HEAT WAVE MANAGEMENT

a. Early Warning Systems and Localized Forecasting

- **Local-Level Weather Network:** Collaboration with IMD to develop localized forecasting systems tailored to the climate and needs of diverse localities, ensuring forecasts are relevant and actionable.
- **Automatic Weather Stations (AWS):** Cities establishing localized AWS networks to supplement IMD advisories, providing hyperlocal weather information for targeted advisories and urban planning.
- **Multi-Channel Forecasting and Warning:** Utilizing SMS, local radio, and community loudspeakers to disseminate warnings broadly, ensuring information reaches all demographic groups and optimizes preparedness.

URBAN PLANNING AND INFRASTRUCTURE FOR HEAT WAVE MITIGATION

b. Greening, Cool Roofs, and Ventilated Housing

- **Urban Greening:** Incorporating parks, gardens, and rooftop gardens to naturally lower temperatures, enhance biodiversity, and provide natural cooling in urban areas.
- **Cool Roof Technologies:** Using reflective coatings and materials on roofs to reflect sunlight, reduce heat absorption, and lower urban temperatures.
- **Ventilated Housing:** Designing houses with optimized natural ventilation through strategic window and vent placement, and features like courtyards to enhance air circulation and reduce indoor temperatures.



HEALTH SYSTEM PREPAREDNESS FOR HEAT WAVES

c. Infrastructure, Training, and Public Awareness

- **Strengthening Health Infrastructure:** Equipping healthcare facilities to manage heat-related illnesses with adequate staffing, cooling devices, hydration facilities, and emergency services.
- **Training Medical Personnel:** Implementing comprehensive training programs for all healthcare workers to effectively identify, treat, and manage heat-induced health issues.
- **Public Awareness Campaigns:** Conducting campaigns on hydration, recognizing early signs of heat-related illnesses, and advisories to stay indoors during peak heat, utilizing various communication channels for broad reach.

COMMUNITY-LEVEL INTERVENTIONS FOR HEAT WAVE RESILIENCE

d. Cool Centres, Hydration, and Vulnerable Population Support

- **Establishing Community Cool Centres:** Designating cool centres or shaded spaces in public buildings to provide a safe environment with cooling systems, hydration, and access to heatwave information and medical attention.
- **Distributing Reusable Water Bottles:** Encouraging hydration by distributing reusable water bottles and establishing water refill points throughout the community to ensure easy access to clean water.
- **Engaging Community Health Workers:** Utilizing community health workers to monitor and support vulnerable populations, offering regular check-ins, information on heat safety, and assistance during extreme heat events.



PUBLIC AWARENESS AND CAPACITY BUILDING

e. Community Training and IEC Materials

- **Community Training on Heat Wave Preparedness:** Interactive sessions educating communities on recognizing heat wave signs, first aid for heat-related illnesses, and preventive measures, with a focus on engaging vulnerable groups.
- **IEC Materials in Local Languages:** Developing and disseminating accessible educational materials in local languages, using brochures, flyers, and posters to enhance community awareness and preparedness for heat waves.



MULTI-SECTORAL COLLABORATION FOR HEAT WAVE MITIGATION

Engagement with NGOs, CSOs, and Businesses

- **Engagement with NGOs and CSOs:** Leading outreach programs, organizing training initiatives, and monitoring the effectiveness of heat wave mitigation efforts through grassroots mobilization and expertise.
- **Collaboration with Businesses:** Altering working hours to avoid peak heat, implementing flexible work arrangements, providing hydration and cooling facilities, and enhancing workplace infrastructure for employee safety during heat waves.



FINANCING MECHANISMS FOR HEAT WAVE MITIGATION

Strategies for Sustained Investment

- **National and State Disaster Mitigation Funds:** Utilizing NDMF and SDMFs for financing preparedness, response, recovery initiatives, urban greening projects, and enhancing meteorological services for heat wave mitigation.
- **Local Government Allocations:** Dedicating a portion of municipal budgets to localized heat wave mitigation strategies, including cooling centres, urban green spaces, and awareness campaigns.
- **Public-Private Partnerships (PPPs):** Leveraging private sector resources and expertise through PPPs for community resilience projects, infrastructure upgrades, and innovative urban planning initiatives.
- **Grants and Donor Funding:** Securing support from international agencies and philanthropies for a range of activities, from R&D to community-based adaptation

SCALING AND REPLICABILITY OF HEAT WAVE MITIGATION STRATEGIES

A Phased and Collaborative Approach

- **Phased Pilot Deployment:** Starting with pilot cities selected based on heat severity, vulnerability, and local government interest, allowing customization of cooling interventions and refining the model based on feedback.
- **Knowledge-Sharing Platform:** Creating an online platform for cities to share strategies, implementation guides, and learn from each other's experiences, fostering a peer-to-peer learning network.
- **Local-level Adaptation:** Providing foundational principles while emphasizing local knowledge and adaptation, with a modular design that offers consistency and customization.
- **Targeting Replication:** Using a vulnerability index to identify cities with the greatest need for the framework, coupled with proactive outreach and potential seed grants to encourage adoption.



MONITORING AND EVALUATION OF HEAT WAVE MITIGATION

Measurable Indicators and Data Collection

- **Process Indicators:** Tracking the establishment of cooling centres, heat mapping coverage, and outreach to vulnerable populations to assess the implementation and reach of interventions.
- **Outcome Indicators:** Measuring health impacts like reductions in heat-related illnesses and deaths, behavioral changes in public awareness and habits, and resilience indicators such as economic stability and school closures.
- **Data Collection Methods:** Utilizing health statistics, meteorological data, and surveys to gather comprehensive information on intervention outcomes and public response.
- **Annual Reviews and Adaptability:** Conducting review sessions with implementers to analyze results, adapt strategies based on feedback, and consider evolving risk factors such as urban development and demographics.



ENABLING MECHANISMS FOR HEAT WAVE MITIGATION

Supporting Effective Implementation

- **Appointing a Heat Officer:** A dedicated role leading the development, coordination, and implementation of Heat Action Plans, focusing on protecting vulnerable populations and enhancing urban resilience.
- **Organizing Technical Assistance:** Providing expert advice to assist cities, especially those with limited resources, in adapting the framework and interpreting data for effective heat wave mitigation.
- **Funding Guidance:** Facilitating access to diverse funding sources for cities and districts to support the implementation of interventions outlined in the Heat Action Plan.

ROLE OF NDMA, SDMAS, AND DDMAS IN HEAT WAVE MANAGEMENT

Supporting Localized Heat Action Plans

- **National Disaster Management Authority (NDMA):** Establishes guidelines, provides capacity building, recommends funding, and coordinates inter-agency collaboration at a national level.
- **State Disaster Management Authorities (SDMAS):** Adapts NDMA guidelines for state-level plans, engages with districts for localized HAPs, monitors heat wave trends, and aids in resource allocation.
- **District Disaster Management Authorities (DDMAS):** Leads the creation and implementation of district-specific HAPs, conducts community outreach, coordinates with various agencies, and manages emergency responses.
- **Supportive Role in Local HAPs:** Disaster management authorities at all levels provide a strategic framework, expertise, resources, and encourage coordination to

CONCLUSION: UNIFIED APPROACH TO HEAT WAVE MITIGATION

Local Actions and Nationwide Support

- **Comprehensive Strategy:** Integrating local initiatives with national support to address the multifaceted challenges of heat waves, tailored to the diverse needs of communities across India.
- **Proactive and Adaptive:** Focusing on prevention, preparedness, and adaptive responses to evolving heat wave risks, ensuring robust resilience mechanisms are in place.
- **Inclusive Participation:** Engaging all stakeholders, from local communities to national authorities, in a collective effort to combat heat wave impacts, valuing traditional knowledge alongside scientific advancements.
- **Synergy of Knowledge:** Merging traditional practices with modern technologies to create contextually relevant and effective heat wave mitigation strategies that