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India's Escalating Heatwave Crisis: Analysis of Heat Action Plan of 3 States

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As India grapples with record-breaking temperatures and frequent heatwaves, this blog analyzes the Heat Action Plans (HAPs) of Bihar, Uttar Pradesh, and Rajasthan — the most affected states in 2024. It examines how well these plans are tailored to local needs, highlighting key strengths in early warning systems and health preparedness, while also uncovering critical gaps in vulnerability mapping, localized thresholds and real-time monitoring. The analysis highlights the urgent need for reforms to make heat governance both at the state and national levels more adaptive, accountable, and inclusive amid the intensifying climate crisis.

Introduction

On February 25, 2025, Goa and Maharashtra recorded India's first heatwave of the year, marking the first time a heatwave has occurred during the winter season (January–February) as defined by the India Meteorological Department (IMD).1 This unusual event sent a reminder across the country that India has been witnessing an intense and prolonged period of hot temperatures year on year, which have intensified even more in recent years, and 2024 was recorded as the hottest year on record.2 Between 2000 and 2020, a staggering 17,767 lives were lost not to war or natural calamities but to the searing grip of heatwaves.3 These deaths were reported by the National Disaster Management Authority (NDMA) through state-reported disaster mortality. Behind each life lost due to the intensifying climate crisis lies an invisible emergency that's claiming lives, often without warning or accountability.

In 2010, Ahmedabad in Gujarat experienced a devastating heat wave, taking a toll on many people. Following this event, the city took a pioneering step by developing a comprehensive HAP in 2013 to reduce the impact of heatwaves on vulnerable populations.4 This initiative marked Ahmedabad as the first city in South Asia to formally launch a strategy specifically aimed at mitigating the impacts of extreme heat.5 The implementation of the HAP established Ahmedabad as a model for urban climate resilience across India, which was later adopted by other states and cities.6 After Ahmedabad, NDMA issued the National Guidelines for 'Preparation of Action Plan – Prevention and Management of Heat Wave' 2016 to provide a framework for implementation, coordination, and evaluation of extreme heat wave-related activities in India.7

Analyzing the Heat Wave Action Plan of 3 States

As the climate crisis intensifies, India's typically harsh summers are now marked by longer, more frequent, and increasingly severe heat waves. In response to this growing threat, there

has been an urgent push for states across the country to adopt and implement HAP—a plan to provide a framework to reduce the negative impact of heatwaves on health and livelihood.[8] As of now, 23 states and over 140 cities across India have formulated and adopted their HAPs. However, unless a HAP is customized to reflect the specific climatic conditions, geographic features, demographic vulnerabilities, and institutional capacities of a region, it risks becoming a generic document, more symbolic than action-oriented. Local adaptation is essential to ensure the plan is practical on the ground.

The focus of this blog is to understand how effectively states are customizing their HAPs by analysing the HAPs of three states that were most affected by prolonged heat waves in 2024. The states have been selected based on the data of IMD's Annual Climate Summary 2024, which includes analysis of the number of recorded heat wave days across all Indian states between March and June 2024.[9] Based on this data, Bihar reported the highest number of heatwave days, followed by Uttar Pradesh and Rajasthan.

To assess the level of customization in the HAPs of selected states as per regional requirements, we identified and mapped 10 key parameters based on the common focus areas from the National Guidelines for Preparation of Action Plan- Prevention and management of Heat wave, 2019. The analysis based on the selected parameters is below:

Parameters of States' Heat Wave Preparedness and Response Matrix

S.No	Buckets	Parameters	Rajasthan [10]	Uttar Pradesh [11]	Bihar [12]
1	**Early Warning System**	Coordination with IMD	✅	✅	✅
		Communication Mechanism (multi-channel, digital, etc.)	✅	✅	✅
2	**Legal Status**	Declaring Heatwave as State-Specific Disaster	✅	✅	❌

S.No	Buckets	Parameters	Rajasthan	Uttar Pradesh	Bihar
3	**Risk Assessment**	Defining Localised Threshold Mapping	✗	✓*	✗
4	**Vulnerability Assessment**	Detailed Mapping of Exposure & Sensitivity	✓	✗	✗
5	**Institutional Coordination**	SoP for Inter-Departmental Coordination	✓	✓	✓
6	**Health System Preparedness**	Protocols and Infrastructure for Heat Illness	✓	✓	✓
7	**Targeted Populations**	Identify at-risk/ vulnerable population	✓	✓	✓
8	**Capacity Building & Training**	Training and Capacity Building of Health/Field Staff	✓	✓	✗
9	**Financial Integration**	Resource Mapping/ Budget Allocation	✗	✓	✗
10	**Accountability Mechanism**	Real-Time Monitoring dashboards	✗	✗	✗

* Uttar Pradesh is still in the process and has formed a committee of experts to map the local threshold of major cities in Uttar Pradesh. The committee has initiated analysis by setting a threshold for Agra.

While analysing the HAPs, it was found that all three states have made notable strides in strengthening their HAPs by incorporating multi-channel early warning systems. It was interesting to note that these plans not only outline the technical coordination with the IMD but also integrate the roles of Non-Government Organizations (NGOs), disseminating alerts and raising community awareness. Each plan includes a dedicated chapter detailing the roles and responsibilities of various departments, ensuring timely and coordinated action during heatwave events. Moreover, health infrastructure preparedness, inter-departmental coordination, public awareness campaigns, and targeted outreach to vulnerable populations emerge as consistent strengths across the three states.

However, the HAPs of these 3 states showed uneven progress and gaps on 3 major parameters listed below-

- **Vulnerability Mapping:** Heatwaves affect communities in different ways, making it essential to identify both the vulnerable groups and the areas most at risk.[13] Identifying the vulnerable population helps in designing appropriate strategies and interventions at the community level. Such mapping is crucial for understanding and addressing the complex impacts of heat stress on marginalized populations. Recognizing this, the NDMA has issued Standard Operating Procedures (SOPs) for developing Climate Adaptive and Inclusive HAPs that prioritize vulnerable communities through comprehensive household surveys.[14] While all three identified states have undertaken vulnerability mapping, the HAPs identify broad categories of vulnerable groups, however, a detailed vulnerability mapping based on exposure, sensitivity, and adaptive capacity is missing in two states. Only Rajasthan has undertaken this critical exercise; the other two, Uttar Pradesh and Bihar, have overlooked this important step despite NDMA's explicit guidance to incorporate socio-demographic and health vulnerability data into their planning frameworks.

- **Developing Localized Thresholds for Rising Temperatures:** The extreme heat (heatwave) temperature cut-offs of a particular place are known as Thresholds. Like Uttar Pradesh, which has mentioned in its HAP about creating a local threshold for major cities, Rajasthan and Bihar have not mentioned it; rather their early warning systems depend on the national threshold defined by IMD which declares a heatwave only after two consecutive days of high temperatures — over 40°C in plains, and 30°C in hilly areas.[15] This approach fails to account for severe health impacts that can occur even on the first day of extreme heat, especially in vulnerable regions. High temperatures affect areas differently depending on regional climate, geography, and population vulnerability.[16] For example, 35°C in humid Kerala may be more dangerous than 40°C in dry Rajasthan due to differing heat-humidity levels. States with large populations of outdoor workers in sectors like agriculture or construction may also require lower thresholds to trigger alerts and protective measures.[17] A one-size-fits-all model overlooks these variations. To ensure timely and effective responses, state-specific thresholds based on local data and health risks must be developed.

- **Lack of monitoring and evaluation mechanism:** While states have made progress by incorporating post-event reviews and periodic updates of HAPs through consultations with relevant stakeholders, a critical gap remains in the form of real-time monitoring and evaluation mechanisms. The HAPs lack integrated systems, such as dashboards and live data tracking, to monitor the actual implementation and on-ground impact of heatwave responses as and when they occur. In the absence of such a real-time monitoring dashboard, the ability of state governments to assess how effectively interventions are being implemented. Without real-time feedback, it is difficult to make mid-course corrections in the planned strategy for tackling the heat wave effects. Integrating real-time dashboards and monitoring frameworks within HAPs is therefore crucial for improving responsiveness, transparency, and overall effectiveness of heatwave management efforts. A centralized digital platform—similar to the "PRANA" portal for air pollution management in non-attainment cities could be developed to allow states and cities to regularly update their HAPs and the preparedness status and action taken report of respective states and cities.[18] Such a portal would enable nodal agencies appointed by the states to upload real-time data on key preparedness actions, facilitating better coordination and more effective heatwave management in mines with their HAPs.

National Legislations can be Enabling

The heatwaves have increasingly become a growing concern. Between March 2023 and July 2024, 360 reported heat stroke related deaths were reported [19] . Further concern deepens as IMD announces the April–June (AMJ) season of 2025 to be above-normal number of heatwave days across many regions. Vulnerable groups, particularly outdoor workers such as construction labourers, street vendors, and daily wage earners, who together constitute nearly 49% of India's workforce—will be disproportionately affected.[20]

The review of the above listed HAPs, highlights a major gap existing at the policy level that is limited recognition of heat waves as disasters in India. While the existing Disaster Management Act, 2005 defines a 'disaster' as a catastrophe, mishap, calamity, or grave occurrence in any area arising from natural or man-made causes, or by accident or negligence, heatwaves in India have not been able to make up to the list of other natural disasters under the Act. This potentially restricts the national response to effectively mitigate its impact and significantly limits the ability of States to access the complete range of institutional and financial mechanisms necessary for managing disaster-related emergencies.

A step in this direction would be to recognize heatwaves as a notified disaster under the Disaster Management Act. Such recognition would enable States to access the National Disaster Response Fund (NDRF) not only for post-disaster compensation, but also to support proactive preparedness,

timely response measures, and long-term mitigation efforts. This forward-looking measure would reflect the evolving nature of climate risks and contribute to a more inclusive and resilient national disaster management framework.

Conclusion

Extreme heat is no longer a seasonal event, it has become a growing public health emergency that demands immediate and sustainable actions. Each year, new temperature records are set, highlighting the urgency of this crisis. With climate change fueling more frequent and intense heat events, heatwaves have evolved from environmental phenomena into critical public health threats requiring strategic policy attention. In such situations States/UTs must prioritize the annual review of their HAPs and update them regularly to incorporate evolving strategies and best practices to reduce any impact on health and livelihood of people. This approach will ensure that response measures are adaptive to local needs and effective in mitigating the impact of extreme heat on vulnerable populations.

Additionally, to strengthen the effectiveness of HAPs, it is essential to mandate the integration of monitoring and evaluation systems such as digital dashboards and real-time data tracking tools, to assess implementation progress and on-ground impact during heatwave events. Furthermore, HAPs must be customized to regional climate realities, with temperature thresholds aligned to geographical variations, and should draw on successful models from both national and international contexts.

Ultimately, the real challenge is not merely to increase the number of HAPs across Indian states, but to fundamentally transform how they are designed, financed, monitored, and updated. As climate studies predict sharper temperature extremes in the coming years, India must elevate heat governance to a core pillar of its public health.

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