



# HEAT ACTION PLANS IN INDIA

**Ajay K Jha**  
September 2022

## **Heat Action Plans in India**

*by Ajay K Jha*

September 2022

Cover Image: *Getty Images*

Layout: *Rajneesh*

Published by

*Public Advocacy Initiatives for Rights and Values in India (PAIRVI)*

*K-8, Third Floor, Lajpat Nagar III, New Delhi - 110024 (INDIA)*

Contact: +91 11-29841266 | [pairvidelhi1@gmail.com](mailto:pairvidelhi1@gmail.com) | [www.pairvi.org](http://www.pairvi.org)

© Content of this publication can be used/reproduced for information purpose mentioning author and the publisher's details.

# HEAT ACTION PLANS IN INDIA

Ajay K Jha

## Introduction

2022 has created new records of the extreme heat waves all over the world. UK reached high temperatures of 40 degrees Celsius for the first time in history. The government declared Red Alert due to extreme heat. In Spain and Portugal more than 1700 people (most above 65 years) died due to extreme heat only in two weeks during July with temperatures climbing up to 42 degrees (WHO, 2022). Seville in Spain named the heat wave as “Zoe” became the after instance of heat wave being named like hurricanes (Climatewire, July 2022). Half of the EU is facing the specter of droughts. Heat waves reminded people of the extreme heat in 2003, which caused 70,000 additional deaths in Europe. In USA more than 70% population especially on the west coast faced high temperatures and heat waves. China suffered extreme heat wave conditions and extreme heat warning were issued for 70 cities when temp reached 40 degrees in mid-July (CNN, 2022). Drying rivers and water bodies halted hydro power generations and many cities suffered black outs (Reuters, 2022). Extreme heat kills more than 1/3rd Million people every year. It is estimated that by the end of the century that 3/4th of the population will be exposed to deadly heat. According to SE4ALL, 9 countries facing biggest risk of deadly heat waves are India, China, Pakistan, Bangladesh, Indonesia, Brazil, Nigeria, Sudan & Mozambique.

The proportion of earth’s area that was subjected to scorching summer heat increased from 1% (between 1951 to 1980) to 10% (between 1981-2010). Record breaking heat waves were recorded in Australia, Argentina, China, Central Asia, large parts of Europe, Mexico, Japan, South Korea and US in 2016 too.

## **What is a heat wave**

There is no universally accepted definition of heat wave. WMO defines HW as “five or more consecutive days during which the daily maximum temperature surpasses the average max temp by 5 degrees or more. US-National Weather Service defines HW as a spell of abnormally and uncomfortably hot and unusually humid weather over two days or more. Denmark considers 3 consecutive days above 28 degrees as heat wave. Adelaide (Australia) 5 straight days with temp at or above 35 degrees or or 3 days at 40 degrees are declared as heat waves (ORF, 2022)

IMD defines “heat wave occurs when the temperature crosses 40 degrees for plains, 37 degrees in coastal areas and 30 degrees for hills.” Heat wave is declared on a day when an area records temperatures 4.5 to 6.4 degrees above normal, above 6.4 degrees it’s called extreme heat wave.

## **Heat waves in India**

2022 has been the second hottest summer in India replacing 2016 (first being 2010). India suffered hottest March and third hottest April in 122 years. Over a Billion people were exposed to extreme heat in the month of April itself. This year, in pre monsoon summer (March to May) average air temperature has been higher by 1.24 degrees as compared to the baseline (170-2000) but lower than 1.48 degrees in 2010 summer. Land surface temp (LST) has been higher by 1.46 degrees. Monsoon season (June to Sept) temperature has been higher by 0.3 to 0.4 degrees. India’s North West (Chandigarh, Delhi, Haryana, Himachal Pradesh, J&K, Ladakh, Punjab, UP & UK) have been 4 degrees above normal, almost twice of all India average (CSE, 2022). Most of the India outside northwest was also hotter but the number of heat wave days were less.

India recorded 280 heat wave days in 2022 between 11th March to 24th April as compared to 40 heat wave days in 2011. Just 5 states (Rajasthan, MP, HP, Gujarat and Haryana) accounted for 54% of heat wave days in the country. Rajasthan faced 39 HW days, MP 38 and Himachal Pradesh faced 37 heat wave days. HP, J&K, Uttarkhand too have been unusually hot this year. (DTE, 2022)

Delhi, Mumbai, Kolkata, Hyderabad have generally 1-2 degrees higher temp than all India avg. due to urban heat island effect. In Delhi maximum temp is reported at Najafgarh (SW district) followed by Badarpur, Jaitpur etc. generally 40 degrees. Yamuna and Okhla bird sanctuary report lowest temp during summers. On the heat wave Index (Temp+humidity), Kolkata has been 5 degrees higher than Delhi, Mumbai 4.6 degree and Hyderabad 1.1 degree higher than Delhi.

HW in India and Pakistan made 30 times more likely due to climate change (WMO, 2022).

## **Heat wave kills**

Heat waves are the second biggest killers in India. Heat waves killed 20615 persons during 2000-2020 (after lightning which killed 49679 deaths during the same period). In India, North Western states are considered hottest, but this year most deaths were reported outside of the north western states.

Between 2015 to 2020, 2137 people died in NW states (NCRB). Southern Peninsula reported 2444 deaths during the same period with more than half reported by Andhra alone.

In 2022 media reported only 90 deaths which is clearly an underestimate. In 2021, 1700 people lost lives in heat waves most in Maharashtra (350) followed by Odisha (230) and MP (191).

In fact many heat wave deaths remain unaccounted (indiaSpend, 2022). According to the experts, medically certified heat wave deaths are only 10% of actual deaths, rest being counted as deaths due to co morbidities (Dileep Mavlankar, IIPH, Gandhinagar). Reasons for not declaring heat wave deaths include compulsion to provide compensation (in some states) and also lack of availability of daily morbidity data at city/ward and panchayat. Heat wave not identified as disaster (under Disaster Management Act) cutting it from disaster relief funds.

Economic losses from heat waves are mounting too. India lost 4.3% of working hours due to heat waves in 1995, likely to rise to 5.8% by 2030 which equals to 34 M full time jobs (ILO, 2022)

There has been 30% reduction in India's expenditure on natural calamities in 2021-22, 6 states and UT cut down has been over 50%, 70% for another 7 states.

### **HW historical Calendar**

1. **May, 1956:** 10th May, Alwar recorded 50.6 degrees highest ever in India (all India avg 35.4 degrees. Record was broken after 60 years when Phalodi recorded 51 degrees (churu 50 degrees) in 2016.
2. **June-July 1966:** temp over 11 degrees above normal in Bihar, UP, WB and Odisha.
3. **April-May, 1973:** IIT Gandhinagar paper declared that hottest summer for the region comprising AP, Odisha, TN and MP
4. **May 1998:** El Nino year, avg maximum temp soared to 36 degrees, 3058 deaths, most in Odisha.
5. **May 2002:** 1000 deaths in Andhra
6. **May 2010:** 46.8 degrees in Ahmedabad, 1200-1300 deaths, AHD developed HAP
7. **May 2015:** Andhra accounted for 1700/2300 deaths
8. **May 2016:** Phalodi touched 51 degrees, Churu 50 degrees
9. **May June 2019:** longest heat wave in three decades lasting for 32 days affecting Bihar, WB, Rajasthan, Vidarbha, Andhra

(Source: the Print, 2022)

## **What is being done to face heat waves**

According to the "Assessment of climate change over Indian region", India's average temp has increased by 0.7% degrees between 1901-2018. It will increase by 4.4 degrees by 2100. While heat waves will multiply by a factor of 2 or 3; their duration will double as compared to 1976-2005 period.

Mckinsey global Institute also made similar conclusion predicting that by 2050 India would face many lethal; heat waves, 3 days events during

which average daily temperature which exceeds survival thresholds (wet bulb temperature). Healthy humans can survive at 35 degrees wet bulb temp by resting in shades for about 5 hours.<sup>1</sup>

Around 23 states and more than 120 cities/districts have developed Heat Action Plans (HAPs).

Ahmedabad was the first city to make Heat Action Plan in 2013. Ahmedabad is now implementing 6th iteration of the HAP and claims that mortality has come down by 30-40%. AHD had only 20/2400 deaths in 2015 due to HAP.

## HAPs pillars

1. **Public awareness and community outreach:** Scientific info, social media on impacts, efforts to reach out the most vulnerable, school (including closures)
2. **EWS and interagency coordination:** EWS like color coded warning (yellow, orange, red), communication, SOPs, mock drills
3. **Capacity building of health infra:** Training on HW impacts and systems, emergency infra deployment, ambulances, list of dos and donts
4. **Addressing vulnerable groups:** Elderly, labour, slums, space cooling, shelters
5. **Adaptive measures:** Drinking water, changes work hours/schedules, land use strategy, traffic congestions

HAP and its implementation shows substantive positive outcomes. Government claims that due to the HAPs deaths have been reduced from 2044 in 2015 to just 4 in 2020. However, their assessment shows implementation deficits including lack of coordination, communication and outreach gaps and inadequate response. There is high variability in different states due to varied capacity of the states.

---

1 Wet bulb temperature is a phenomenon where body stops evaporating and cooling itself due to high temp and high humidity conditions. IPCC says that for every 1% rise in global temperature, humidity rises by 7%.

Before 2015 there was no national plan. It was entirely responsibility of the state disaster management Authority which could use 10% of the funds. In 2016, NDMA came up with the Heat Wave Guidelines, which was revised in 2017 and further in 2019 to include built in environment. NDMA categorizes 23 states and 100 cities/districts as most vulnerable which it guides in developing and implementing HAPs. In 2005 number of vulnerable states was only 9, which rose to 16 in 2016 and to 23 in 2020 (Reuters, 2022). It is also conducting a study on HAP experience in India and Asia as well as North America and Europe.

IMD issues 3 alerts beginning with seasonal on 1st March, short range (1 days projection?), Extended range (4 weeks projection) and seasonal (3 months) at National, regional and local levels for 350 cities (up from 100 cities in 2016). In 2021, IMD started issuing heat index alerts, warm nights warnings (when max temp above 40 degrees and night temp is 4.5 degrees above normal, district level vulnerability mapping for HW prone states.

## **Existing gaps in HAPs**

Some important issues to look into are as follows;

1. Most of the plans are near term, responsive in nature rather than proactive and long term
2. Climate insensitive, HAPs (except Odisha and Rajkot) lack climate analysis of cities/state. A detailed view of historical climatology is essential to understand the areas of importance or heat hot spots.
3. Failure to account for socio-economic difference/profiling of residents and communities
4. Not based on climate vulnerability, ground level studies, no climate projections
5. Heat wave index
6. Need to develop ward/village level thresholds/index
7. Expand scope, include animals, cattle, crop production etc.



# What can be done

## 1. Policy Measures

- (i) Declaring heat wave a disaster under Disaster Management Act to enable disaster fund access
- (ii) Daily mortality figures, ward/ village levels to be published
- (iii) Strengthen HAPs by including climate adaptive measures (historical climatology, vulnerability assessments of communities, socio-economic profiling of residents)
- (iv) Determining location wise, decentralized thermal thresholds
- (v) Incorporating Heat Index

## 2. Implementation/operational measures

- (i) Clear/sound early warning systems
- (ii) Public health guidelines for people
- (iii) Special attention to most vulnerable
- (iv) Potable water, cooling sheds, parks open, ORS, ice pack available
- (v) Cap building of health care professionals
- (vi) Partnership with CSOs
- (vii) Cool roofs
- (viii) School timing

## 3. Long term

- (i) climate resilient cities
- (ii) more green and less built area
- (iii) green transport/energy
- (iv) reduce UHI effect
- (v) building water bodies, fountains in dense areas
- (vi) improving building by laws to include passive cooling
- (vii) more investment
- (viii) increase number of automatic weather stations in heatwave prone districts/states

## **Donors & organizations working on the HAPs**

Among donors IDRC Canada and NRDC USA have been supporting HAPs. Prominent organizations working on the issues include IRADE, CDKN, WRI, PHFI, CSE etc.

## **What can we do**

Andhra, Bihar<sup>2</sup>, Gujarat, Odisha (preceded AHD HAP) and Maharashtra have reportedly good HAPs. Rajasthan has the distinction of having climate resilient HAP, but lot of hotter cities can be targeted (Phalodi, Churu, Alwar, JSM, Bikaner etc.). MP HAP is only a part of the SAPCC. No organization is working on HAPs (and lightning) in Bihar. These states can be focused.

\*\*\*

---

2 Interestingly, DM of Gaya had to impose S.144 during June 2019 to prevent people from going out in extreme heat (ORE, 2000)





## **Heat Action Plans in India**

by Ajay K Jha

September 2022

**Public Advocacy Initiatives for Rights and Values in India (PAIRVI)**

K-8, Third Floor, Lajpat Nagar III, New Delhi 110024

Phone: 011-29841266, 46101652

email: [pairvidelhi1@gmail.com](mailto:pairvidelhi1@gmail.com), [info@pairvi.org](mailto:info@pairvi.org)

Website: [www.pairvi.org](http://www.pairvi.org)