

# Understanding of the Heat Wave



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# Heat wave

- ***A Heat Wave*** is a period of abnormally high temperatures, more than the normal maximum temperature that occurs during the summer season (March to June)

# Heat Wave Definition by WMO

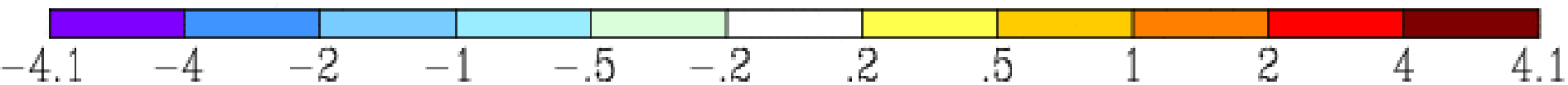


If the maximum temperature of any place continue to be more than 45°C consecutively for two days, it is a heat wave condition

Five or more consecutive days during which the daily maximum temperature exceeds the average temperature by five degree Celsius.

**Factors  
attributable  
to Heat  
Wave**

**Rising Global Temperatures  
1.5°C and reduced span of  
winter**





# Heat Wave defined in India

## a) Based on Departure from Normal

**Heat Wave:** Departure  $4.5^{\circ}\text{C}$  to  $6.4^{\circ}\text{C}$

**Severe Heat Wave:** Departure  $>6.4^{\circ}\text{C}$

## b) Based on Actual Maximum Temperature

**Heat Wave:** Maximum Temperature  $\geq 45^{\circ}\text{C}$

**Severe Heat Wave:** Maximum Temperature  $\geq 47^{\circ}\text{C}$

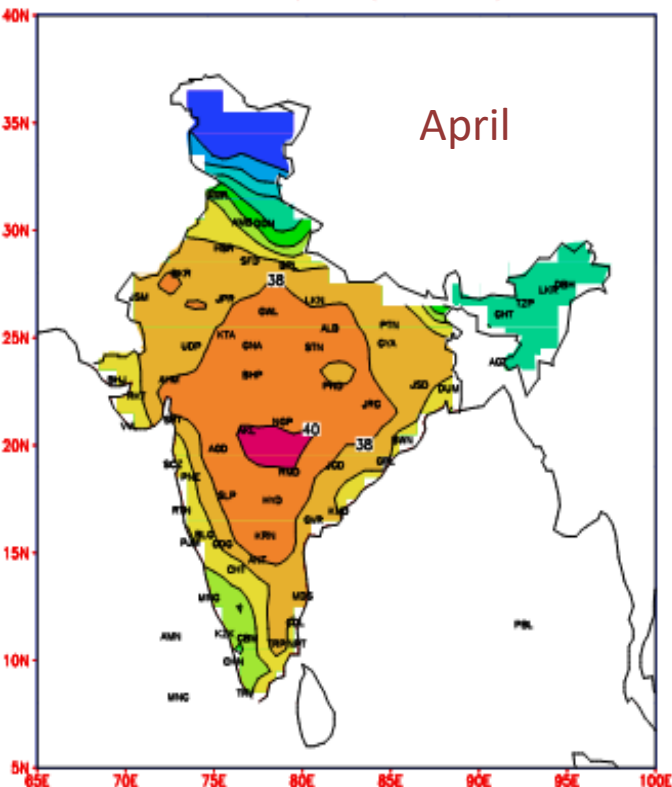
## c) Criteria for describing Heat Wave for coastal stations

- When Max Temp departure from normal is  $4.5^{\circ}\text{C}$  or more,
- Heat wave considered **only when** the actual Max. temp. is  $40^{\circ}\text{C}$  or more for Plains,  $30^{\circ}\text{C}$  or more for Hilly regions, and  $37^{\circ}\text{C}$  or more for the Coastal stations.

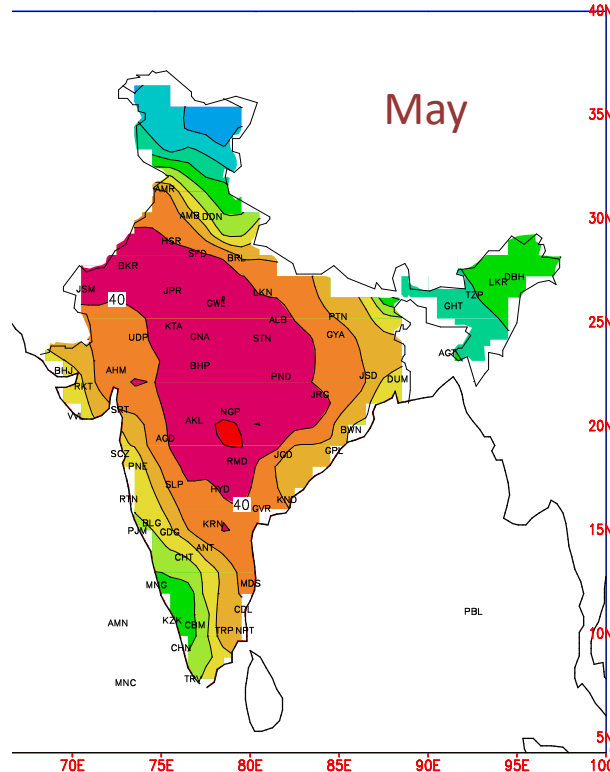
# Heat Wave in India

Abnormally high temperatures were observed during April–June across the country.

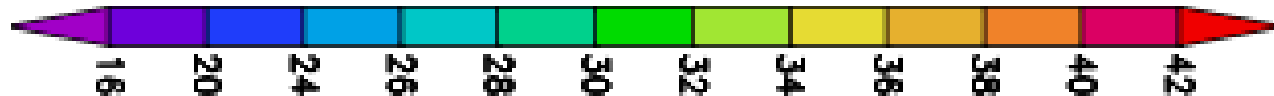
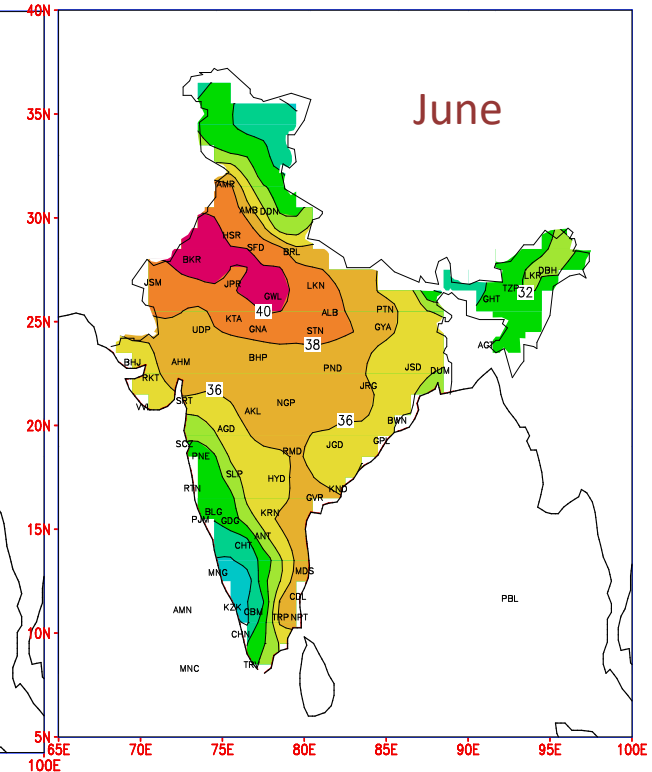
(b) Normal Maximum Temperature for April  
Based on period (1971–2000)



(c) Normal Maximum Temperature for May  
Based on period (1971–2000)



(d) Normal Maximum Temperature for June  
Based on period (1971–2000)



# Extreme temperature combined with high humidity.

Relative Humidity %	Temperature °C																
	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43
40	27	28	29	30	31	32	34	35	37	39	41	43	46	48	51	54	57
45	27	28	29	30	32	33	35	37	39	41	43	46	49	51	54	57	
50	27	28	30	31	33	35	36	38	41	43	46	49	52	55	58		
55	28	29	30	32	34	36	38	40	43	46	48	52	54	58			
60	28	29	31	33	35	37	40	42	45	48	51	55	59				
65	28	30	32	34	36	39	41	44	48	51	55	59					
70	29	31	33	35	38	40	43	47	50	54	58						
75	29	31	34	36	39	42	46	49	53	58							
80	30	32	35	38	41	44	48	52	57								
85	30	33	36	39	43	47	51	55									
90	31	34	37	41	45	49	54										
95	31	35	38	42	47	51	57										
100	32	36	40	44	49	56											
<div> <div></div> Caution                     <div></div> Extreme Caution                     <div></div> Danger                     <div></div> Extreme Danger                 </div>																	



# **Link between Global to Local**

## **Sendai Framework for DRR**

- **In March 2015, India along with 186 other Countries ratified Sendai Framework for Disaster Risk Reduction (SFDRR), 2015-30, with 7 Global Targets to be accomplished under 4 priorities.**
- **The Sendai Framework is the first part of the post-2015 development agenda that provides a once-in-a-generation opportunity to implement development that is both resilient and sustainable.**



# **Priorities for action under Sendai framework**

- **Understanding disaster risk.**
- **Strengthening disaster risk governance to manage disaster risk.**
- **Investing in disaster risk reduction for resilience.**
- **Enhancing disaster preparedness for effective response and to “Build Back Better.”**

**17  
Goals  
169  
Targets**

**Indicators  
specified  
for each  
goal**

# THE GLOBAL GOALS

## For Sustainable Development



# Indian context



- 1.32 billion population, second most populous country in the world
- Multi-hazard prone, Increase heatwave intensity
- 19 out of 29 states are prone to heat waves
- The extreme temperatures combined with high relative humidity adversely affecting people

## Threats of Heat wave

- The Elderly, women, children and poor are particularly vulnerable to Heat Wave related illnesses
- Direct and Indirect impact of heat wave on Food, Sanitation, Employment and Education
- Overall economy of the country is affected by heat wave

# Heat-Wave Vulnerability

Year	No of Heat wave affected states	No of HW affected districts (total districts)	% of HW affected districts
2015	9	191 (640)	29.84%
2016	13	225 (640)	35.16%
2017	17	271 (660)	41.06%
2018*	19	376 (718)	52.37%



# Heat-Wave Vulnerable States

**Follow up  
IMD Norms  
of Heat  
wave  
definition**

SN	State	Total District	Heat prone Dist.2016	Heat prone Dist.2017
1	A.P.	13	13	13
2	Bihar	38	13	13
3	Chhattisgarh	27	8	12
4	Delhi (UT)	9	5	6
5	Gujarat	33	15	18
6	Karnataka	30	14	14
7	M.P.	51	15	26
8	Maharashtra	36	33	33
9	Odisha	30	17	17
10	Rajasthan	33	27	27
11	Telangana	10	7	9
12	Tamil Nadu	32	5	8
13	Uttar Pradesh	72	19	39
14	Jharkhand	24	8	8
15	Haryana	21	5	15
16	Punjab	20	4	12
17	West Bengal	19	1	1
	<b>Sub Total</b>	<b>498</b>	<b>209</b>	<b>271</b>



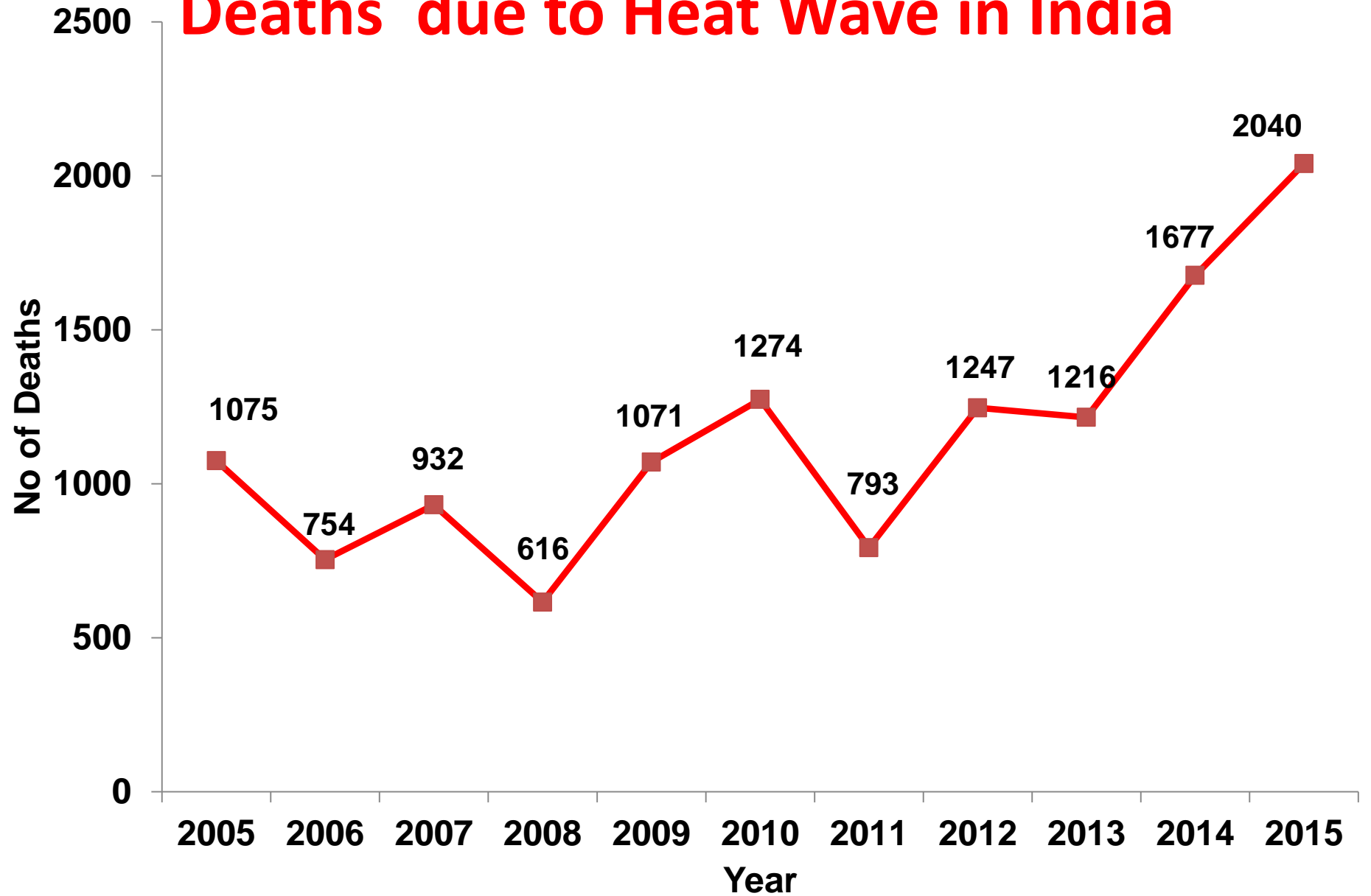
# Heat-Wave Vulnerability

**Vegetable vendors,  
cab drivers, auto  
repair mechanics,  
construction workers,  
police...**

**... mostly weaker  
sections of the  
society**

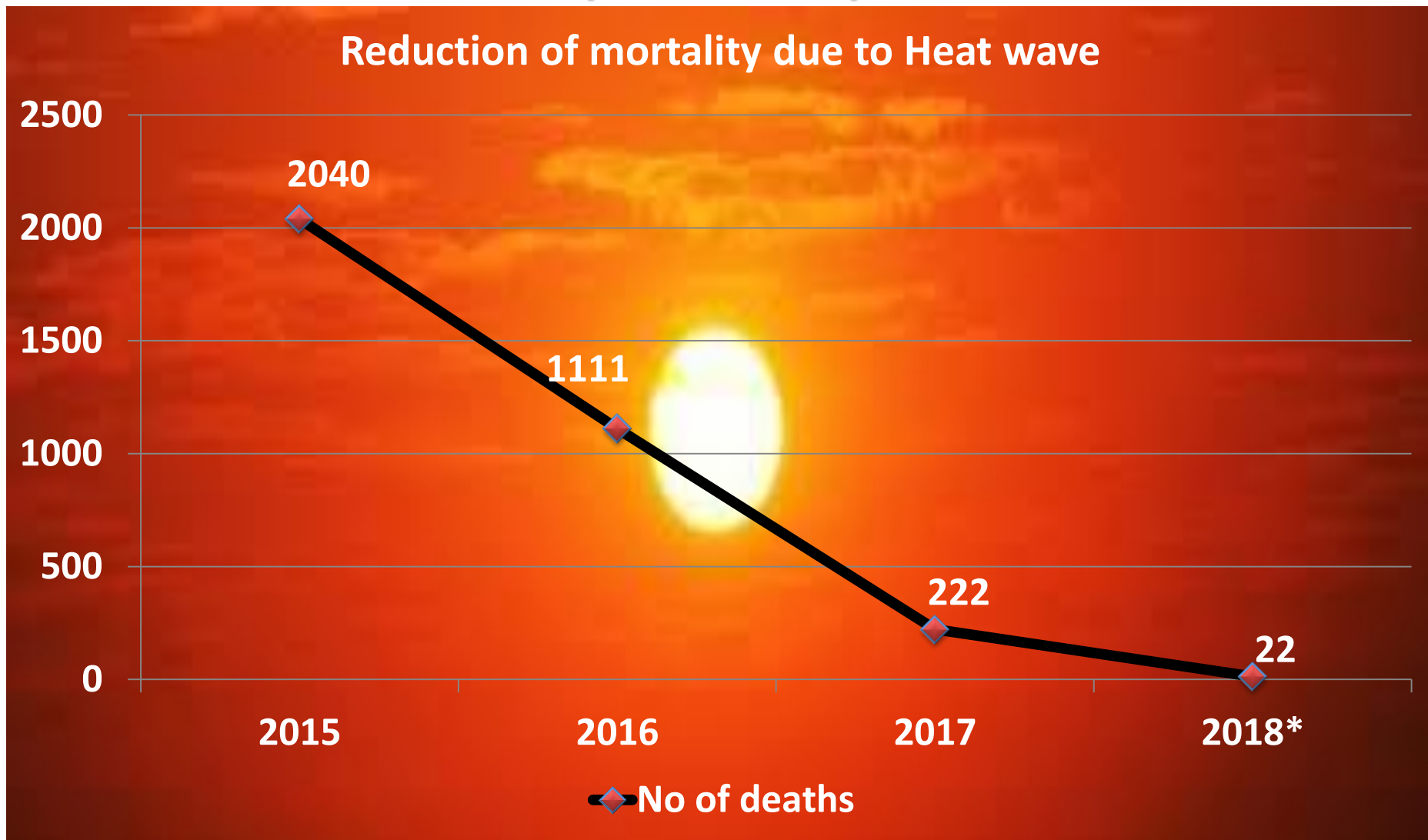


# Deaths due to Heat Wave in India





# Significant reduction of mortality (2015-2018)



\* = provisional data up to 25.06.2018, Source: IDSP-NCDC, Ministry of Health & Family Welfare, GoI

# Reducing disaster impact (mortality and affected people)



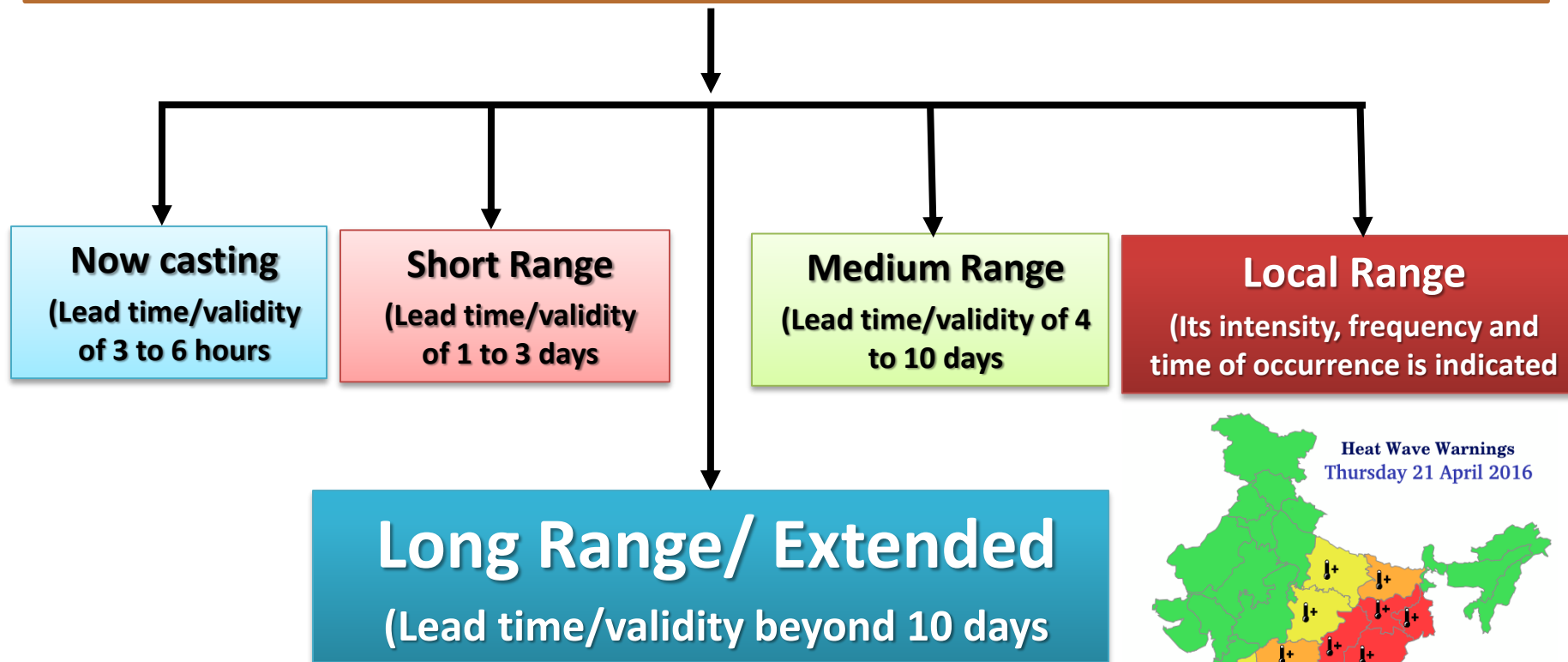
Year	Heat affected People	No of deaths due to Heat	% of Illness & Deaths Ratio
2015	28500	2040	7.16%
2016	35121	1111	3.16%
2017	39563	222	0.56%
2018*	5856	22	0.37%

\* = provisional data up to 25.06.2018

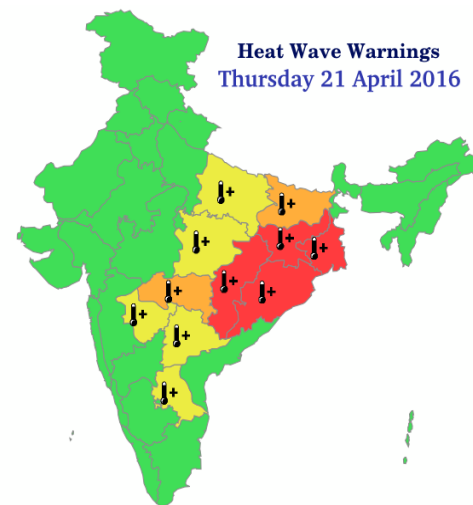
Source: IDSP-NCDC, Ministry of Health & Family Welfare, GoI

# Heat-Wave Early Warning & Communication

**Temperature Forecast: Specific Range, Time, duration and area**



**Also IMD issues Warning/Alert in Colour Coding**



# IMD Warning/Alert in Colour Coding

Green (No action)	Normal Day	Maximum temperatures are near normal	Comfortable temperature. No cautionary action required.
<b>Yellow Alert (Be updated)</b>	<b>Heat Alert</b>	Heat wave conditions at district level, likely to persist for 2 days	Moderate temperature. Heat is tolerable for general public but moderate health concern for vulnerable people e.g. infants, elderly, people with chronic diseases. Avoid heat exposure.
<b>Orange Alert (Be prepared)</b>	<b>Severe Heat Alert for the day</b>	(i) Severe heat wave conditions may persist for 2 days.  (ii) With varied severity, heat wave is likely to persist for 4 days or more.	High temperature. Increased likelihood of heat illness symptoms in people who are either exposed to sun for a prolonged period or doing heavy work. High health concern for vulnerable people e.g. infants, elderly, people with chronic diseases. Avoid heat exposure – keep cool. Avoid dehydration.
<b>Red Alert (Take Action)</b>	<b>Extreme Heat Alert for the day</b>	(i) Severe heat wave may persist for more than 2 days. (ii) Total number of heat/severe heat wave days likely to exceed 6 days.	Very high likelihood of developing heat illness and heat stroke in all ages.  Extreme care needed for vulnerable people.



# **NDMA Initiatives**

# NDMA issued Guidelines



- ***“Guidelines for Preparation of Action Plan – Prevention and Management of Heat-Wave –issued in 2016”***
- ***“Issued a Revised Guidelines for Preparation of Action Plan – Prevention and Management of Heat-Wave-2017”***
- ✓ **To facilitate the stakeholders in preparing a Heat Wave Management Plan.**
- ✓ **To help in mobilization and coordination of various stakeholders**



# National Workshop on Heat wave in collaboration with State governments





# Constitute Expert Committee



- Frequently meet with Expert Committee on Heat wave
- Technical Inputs



**Reviewing  
Heat wave  
preparedness  
through  
Video  
Conference  
with states**



# Publicity & Awareness



क्या आप  
“लू”  
से बचाव के लिए तैयार हैं?

निम्नलिखित सावधानियां बरतें



- पर्याप्त मात्रा में पानी पिएं – भले ही प्यास न लगी हो।
- ओआरएस (ओरल रीहाइड्रेशन सॉल्यूशन), घर में बने पेय जैसे लस्सी, तोरानी (चावल का मांड) नींबू पानी, छाछ आदि का सेवन कर तरोताजा रहें।
- फोन, टीवी, रेडियो एवं समाचार पत्र के माध्यम से स्थानीय मौसम की जानकारी रखें।
- हल्के रंग के ढीले सूती कपड़े पहनें।
- अपना सिर ढककर रखें, कपड़े, हैट अथवा छतरी का उपयोग करें।
- जानवरों को छाया में रखें और उन्हें पर्याप्त मात्रा में पीने का पानी दें।
- बच्चों अथवा पालतू जानवरों को वाहनों में छोड़कर न जाएं – उन्हें लू लगने का खतरा हो सकता है।



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राष्ट्रीय आपदा प्रबंधन प्राधिकरण  
भारत सरकार



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#BeatTheHeatIndia

# Social media campaigns

Do's & Don'ts

Facebook

Twitter

LinkedIn

TVCs Commercial

Print & Electronic Media



# TVCs commercial film on Heat waves

Heat Wave Safety Tips



▶ ⏮ 🔊 0:26 / 0:50





# Initiatives by States

# Heat-Wave Action Plan

- A framework for implementation, coordination and evaluation of extreme heat response activities
- Mobilization individuals and communities to help protect their neighbors friends, relatives and themselves
- Defined the role's and responsibilities of departments concerned
- Multi-sectoral and multi dimensional administrative approach



- 13 states have prepared Heat wave Action Plan
- More than 90 district/cities have plan now.

### Action Plan: Prevention and Management of Heat Wave in Uttar Pradesh

Year – 2017



Heat Wave Action Plan – 2017, UP



### HEAT WAVE ACTION PLAN OF ANDHRA PRADESH 2016

REVENUE (DISASTER MANAGEMENT) DEPARTMENT



GOVERNMENT OF TELANGANA

### THE TELANGANA STATE HEATWAVE ACTION PLAN – 2016

REVENUE (DISASTER MANAGEMENT) DEPARTMENT



### NAGPUR CITY HEAT ACTION PLAN 2017



NAGPUR MUNICIPAL CORPORATION NAGPUR

### AHMEDABAD HEAT ACTION PLAN 2017

GUIDE TO EXTREME HEAT PLANNING IN AHMEDABAD, INDIA



### Heat Wave Action Plan 2018

Revenue & Disaster Management Department  
Govt. of Haryana

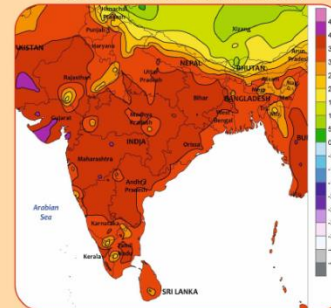


Centre for Disaster Management  
Haryana Institute of Public Administration  
Gurugram



### HEAT WAVE ACTION PLAN 2018

Extreme Maximum Temperature (°C)



HEAT  
WAVE

DEPARTMENT OF REVENUE (DISASTER MANAGEMENT)  
GOVT. OF KARNATAKA

### Heat Action Plan for Odisha - 2017



# Department are Involve in the effective Heat wave Management

Department	Department
Panchayati Raj	Municipal Administration
Rural/urban Development	Medical and Health
Rural Water Supply	Environment & Forest
Education & Literacy	Animal Husbandry
Labour	Revenue & Disaster Management
Agriculture	Road Transport and Building
Electricity & Power Supply	Information & Broadcasting
Women and Child	Traffic Police



# Action taken

## Early warning dissemination

- Warnings by using mobiles, what's-app etc.
- Advisories for tourists.



## Preparedness

- Implementation of Heat Wave Action Plans
- Stockpiling of Oral Rehydration Solution (ORS)
- Repairing Drinking Water hand pumps
- Capacity Building of Health personnel







# Mitigation

- Early start and early closure of schools, colleges, institutions/department
- Drinking water kiosk/stall.
- Setting up special shelters for “Wage Employment” workers and rescheduling their working hours.
- Supply of water through tankers.
- Construction of Animal shelters with fodder banks





# **Awareness generation**

- **Disseminations Do's and Don'ts and IEC material in local languages.**
- **Information dissemination in local newspapers**
- **Radio jingles and TVCs in regional language.**
- **Harnessing Social Media for outreach**
- **Mass mailing and text messages**



## **Long term measures**

- **Adopting Cool roof as a Long term measure**
- **Improving Forest Coverage and green areas**

## **Review and Monitoring**

- **Review of heat wave preparedness and implementation of Heat Action Plans**
- **Data collection and Analysis**
- **Documentation**



**Adopting  
Cool roof  
techniques  
as Long  
term  
measures**





આપને એમાં કહી દીધે છે કે કાલનાં પહેલે  
જાને ૬૬૬ પડી જાય તોય કાલનાં બહેન





# नागपूर महानगरपालिका, नागपूर



## उष्णतेचा इशारा

उन्हाच्या तडख्यापासून  
कसे वाचवाल स्वःताला

पाणी, ताक किंवा इतर पेय शीतपेय नाही  
सावलीत थांबा.  
थंड ठिकाणी थांबा.  
सुती कपडे घाला.  
उन्हात जाणे टाळा.



## उष्माघाताची लक्षणे.

- शरीरावर घामोळ्या येणे.
- खुप घाम येणे व अशक्तपणा वाटणे.
- डोके दुखणे व जीव मळमळ करणे.

आपातकालीन सेवेकरिता  
**CALL :- 108**

भरपूर पाणी प्या.



## उष्माघातापासून सावधान

उष्माघातापासून  
सुरक्षेसाठी  
या दक्षता घ्या

### हे करू नका

- दुपारी १२ ते ३ उन्हात फिरू नका.
- मद्यसेवन, वाहू, कॉफी आणि काबोनिटेड सोफ्ट ड्रिंक्स घेऊ नका, त्यामुळे डीहाड्रेट होते.
- उच्च प्रथिनायुक्त आहार आणि शिळे अन्न खाऊ नका.
- पार्किंग केलेल्या वाहन मध्ये मुले किंवा पाळीव प्राण्यांना सोडू नका.



### हे करा

- तहान नवल्यास ही पुरेसे पाणी प्या
- सोप्या रंगाचे, सैल, आणि कॉटनचे कपडे वापरा.
- बाहेर जाताना गॉगल्स, छात्री, टोपी, बटू किंवा बप्पल वापरा.
- प्रवास करताना सोबत पाणी घ्या.
- आपले घर घंटा देवा, पावडे, झडपा, सनशेड बसवा आणि रात्री खिडक्या उघड्या ठेवा.
- उन्हात डोक्यावर छात्री, टोपीचा वापर करा. डोके, गळा, चेहऱ्यासाठी ओल्या कपड्याचा वापर करा.
- अशक्त, कमजोरी असेल तर त्वरित डॉक्टरांचा सहाय घ्या.
- ओआरएस, घरची लस्सी, तोरणी, लिंबू पाणी, ताक इत्यादी घ्या.
- जनावरांना सावलीत ठेवा आणि पुरेसे पाणी द्या.
- केंचा बाबर करा, घंटा पाण्याने ओथळ करा.



# राजस्थान क्लाइमेट चेंज प्रोजेक्ट

## हीट एक्शन प्लान

लू - तापघात जानलेवा हो सकता है, इससे बचाव संभव है

लू - तापघात से बचाव के घरेलु उपाय



बार बार पानी पीये



पुदीना पानी पीये



आमपन्ना पीये



बेल ज्यूस पीये



नींबू पानी पीये



छांछ पीये

# हारेगी गर्मी जीतेगा राजस्थान

लू/तापघात जानलेवा हो सकता है, इससे बचाव ही उपचार है





[illegible]

# ఎండ తీవ్రతకు గురికాకుండా జాగ్రత్తలు పాటించండి

• వడదెబ్బ లక్షణాలు •

తలనొప్పి, తల తిరగటం, తీవ్రమైన జ్వరం కలిగియుండటం  
మత్తు నిద్ర, కలవరింపులు, ఫిట్స్  
పాక్షిక లేదా పూర్తి అపస్మారక స్థితి




**ఆంధ్రప్రదేశ్ సహకార విపత్తుల నిర్వహణ శాఖ**

**ఎండ తీవ్రంగా ఉన్నప్పుడు తీసుకోవలసిన జాగ్రత్తలు :**

- ☑ తెలుపు రంగు గల పలుచటి కాటన్ వస్త్రాలను ధరించాలి.
- ☑ నెత్తికి టోపి పెట్టుకోవాలి లేదా రూపాలు కట్టుకోవాలి.
- ☑ ఉప్పు కలిపిన మజ్జిగ, గ్లూకోజ్ కలిపిన నీటిని త్రాగవలెను. ఒక రోజు పైగా త్రాగిన నీటిని త్రాగవచ్చును.
- ☑ వడదెబ్బకు గురి అయిన వారిని నీడగా ఉన్న చల్లటి ప్రాంతానికి వెంటనే చేర్చాలి.
- ☑ వడదెబ్బకు గురి అయిన వారిని తడిగుడ్డతో శరీరం అంతా రుద్దుతూ ఉండాలి. ఐస్ నీటిలో బట్టను ముంచి శరీరం అంతా తుడవవలెను. శరీర ఉష్ణోగ్రత 101°F - డిగ్రీస్ ఫారెన్ హైట్ లోపునకు వచ్చేవరకు ఐస్ పాటర్ బట్టతో శరీరాన్ని తుడుస్తూ ఉండాలి మరియు ఫ్లూను క్రింద ఉంచాలి.
- ☑ వడదెబ్బకు గురి అయినవారు సాధారణ స్థితికి రానిచో వారిని శీతల వాతావరణంలో దగ్గరలోని ప్రాథమిక ఆరోగ్య కేంద్రానికి తరలించవలెను.
- ☑ మంచినీరు ఎక్కువ సార్లు త్రాగాలి.
- ☑ ఇంటి నుంచి బయటకు వెళ్ళేముందు ఒక గ్లాసు మంచి నీరు త్రాగాలి.
- ☑ ఎండలో నుంచి వచ్చిన వెంటనే చల్లని నిమ్మరసము గాని, కొబ్బరినీరు లేదా చల్లని నీరు త్రాగాలి.
- ☑ తీవ్రమైన ఎండలో బయటికి వెళ్ళినప్పుడు తలతిరుగుట మొదలైన ఇతర అవార్నింగ్స్ నున్నవి ఏర్పడితే దగ్గరలో వున్న వైద్యశ్రీ సంప్రదించి ప్రాథమిక చికిత్స పొంది వడదెబ్బ బారిన పడకుండా కాపాడుకోవచ్చును.

**ఎండ తీవ్రంగా ఉన్నప్పుడు చేయకూడనివి**

- ☑ సూర్యకిరణాలకు, వేడి గాలికి గురి కాకుండు. వేడిగా ఉన్న సూర్యకాంతితో గొడుగు లేకుండా తిరుగరాదు.
- ☑ వేసవికాలంలో నలుపురంగు దుస్తులు, మందంగా ఉండే దుస్తులు ధరించరాదు.
- ☑ నెత్తికి టోపి లేక రుపాలు లేకుండా సూర్యకాంతితో తిరుగరాదు.
- ☑ వడదెబ్బకు గురి అయిన వారిని వేడి నీటిలో ముంచిన బట్టతో తుడువరాదు.
- ☑ దగ్గరలోని ప్రాథమిక ఆరోగ్య కేంద్రానికి చేర్చుటలో ఏ మాత్రం అలస్యం చేయరాదు.
- ☑ మధ్యాహ్నం తరువాత (అనగా ఉదయం 10.00 గంటలనుండి సాయంత్రం 4.00 గంటల మధ్యకాలంలో) ఆరుబయట ఎక్కువ శారీరక శ్రమతో కూడిన పనిచేయరాదు.
- ☑ ఎండలో బయట నుంచి వచ్చిన వెంటనే తీసిపదార్థములు మరియు తేనె తీసుకొని కూడదు.
- ☑ శీతలపానీయములు మరియు మంచుముక్కలు వంటివి తీసుకొంటే గొంతుకు సంబంధించిన అవార్నింగ్స్ ము ఏర్పడుతుంది.





# Key steps in developing HAP

**Plan and planning is dynamic ongoing process, there are always scope of improvisations.**

- City, district, state government engagement
- Background data & analysis – weather and mortality / health – Determining threshold
- Understanding city and vulnerable groups
- Early warning system and setting thresholds
- Feasible interventions and its detailing – IEC
- Writing the plan and disseminating
- Implementing and monitoring the impact
- Revising the plan

# Specific Target

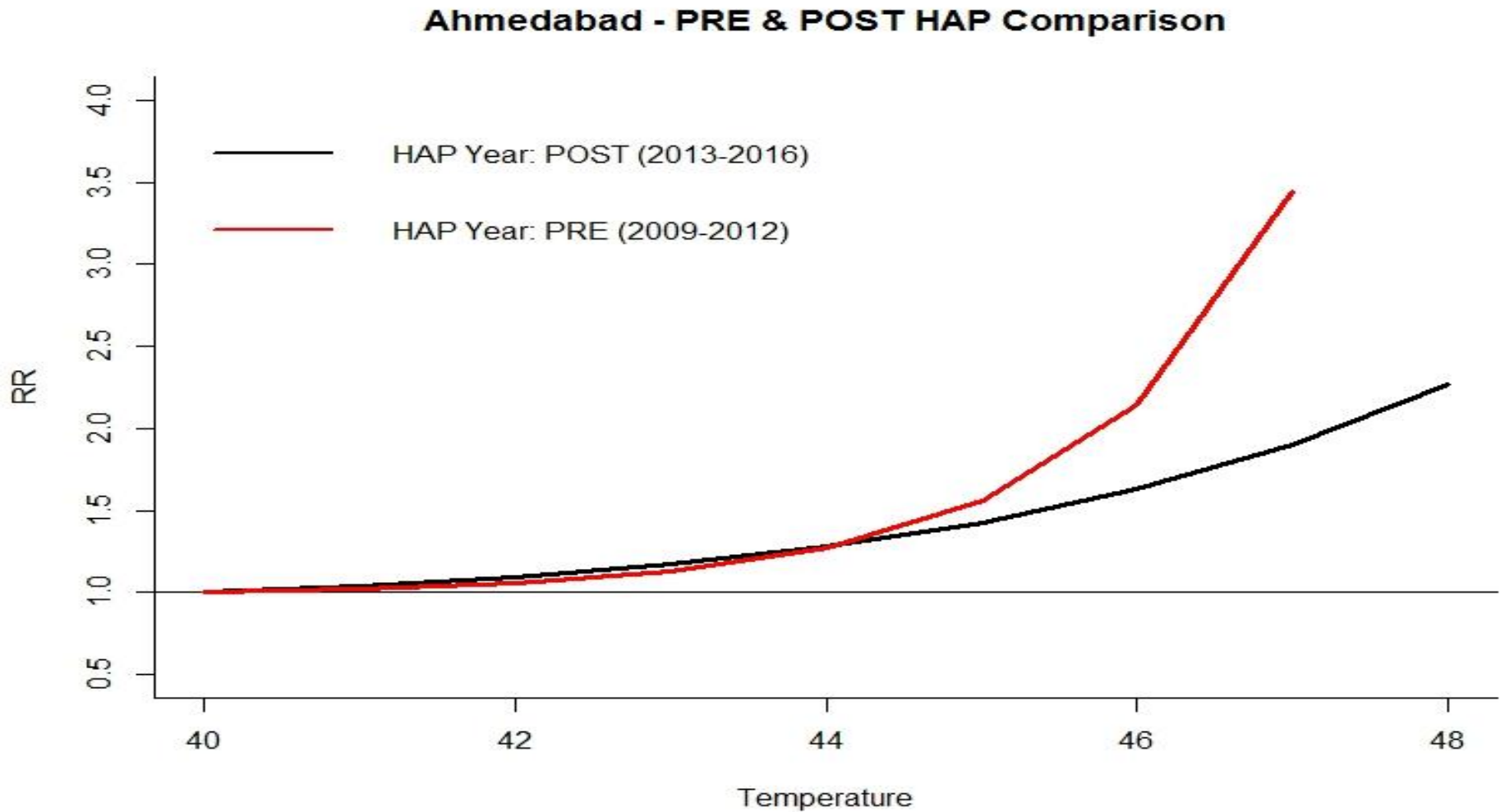
- *Effective Communication strategies*
- *Informational Pamphlets – for specific groups*
- *Drinking water supply*
- *Shelter home provision*
- *Public access to cool places*
- *Changing of cooking fuel pattern*
- *Chronic diseases and medication – more qualitative research*



# **Key lessons on development of HAP at state and local level**

- **Involvement of administrative and health and political leadership**
- **Use of Local IMD and **Health data -death** registration, OPD, Indoor admission, ambulance calls... data**
- **Facilitation by local and national institutions / experts**
- **Learning and adapted HAP developed in other countries / cities**
- **Measurement of process of implementation and Impact on mortality and morbidity**

# Relative Risk of Death with max temperature – Ahmedabad Pre & Post HAP

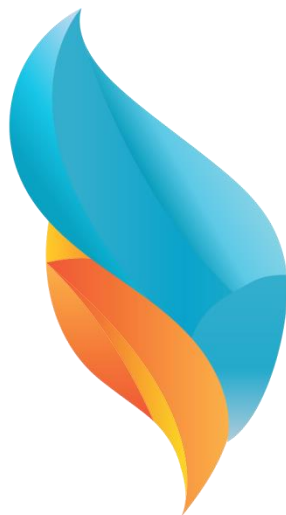


**Adilabad district of Telangana reported Nil casualty in 2017 compare to 44 deaths in 2016 and 60 deaths in 2015 due to District Heat Action Plan and well implemented.**



# Key lessons learnt

- Political and administrative commitment
- Strengthening of Early warning System
- The developed local Threshold
- Preparation of Heat Action Plan & institutional Mechanism
- Horizontal integration – multi-sectoral approach
- Revised the formats for data collection
- Clear cut Role and responsibilities



**#BeatTheHeatIndia**

# Thanks