

***Gujarat State Action Plan:  
Prevention and Mitigation of Impacts of  
Heat Wave  
2020***



**GUJARAT STATE DISASTER MANAGEMENT AUTHORITY**  
Block No. 11, 5th Floor, Udyog Bhavan, Gandhinagar

# ***Gujarat State Action Plan: Prevention and Mitigation of Impacts of Heat Wave 2020***

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**GUJARAT STATE DISASTER MANAGEMENT AUTHORITY**  
**Block No. 11, 5th Floor, Udyog Bhavan, Gandhinagar**



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### Foreword

India, with approximately 1.32 billion people is the second most populous country in the world with considerably high levels of population density. As per 2011 census, 31% of India's population lives in urban areas and 69% live in rural areas. The trend shows that the number of persons living in urban areas will continue to grow at a faster rate than the population in the rural areas due to migration and increasing urbanization. According to World Meteorological Organization (WMO) statement on the state of global climate in 2019, the second warmest year on record was 2019 and the global average temperature has already increased by 1.1°C above the pre-industrial era. India is among the worst disaster prone countries of the world. Heat-waves are projected to increase in number; intensity and duration over the most land area in the 21st century. Hence urban areas are at higher risk.

The Gujarat State Disaster Management Authority (GSDMA) is committed for the safety of citizens especially most vulnerable group of our society. I congratulate GSDMA for the initiative of preparing *Gujarat State Action Plan for Prevention and Mitigation impacts of Heat Wave 2020* which aims in building the capacity and mitigating the effects of heat wave in the Gujarat state by take various preventive and mitigation measures by clear defined Standard Operating Procedure and well defined roles and responsibilities of all stakeholders.

I congratulate the GSDMA for bringing out the Action Plan for Heat Wave for Gujarat state as per NDMA guidelines and wish them the very best for their endeavors.

[Anil Mukim]

**Anuradha Mall, IAS**

**Additional Chief  
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## **Foreword**

India is vulnerable to the impacts of climate change. Experts have been warning that the rising temperatures will lead to more floods, heat-waves, storms, rising sea levels and unpredictable farm yields. There is evidence that climate change is causing increase in extreme weather events as well as severity and frequency of natural disasters. Deforestation is also adding to the environmental instability and contributing to global warming and climate change.

The COP 21 or the Paris Climate Conference led to a new international climate agreement, applicable to all countries, aiming to keep global warming below 2°C, in accordance with the recommendations of the Intergovernmental Panel on Climate Change (IPCC). Sendai Framework for Disaster Risk Reduction 2015-2030 has also emphasized, on the need for a more integrated approach to adaptation, sustainable development, environmental management and DRR, and on the need to improve data on disaster losses by building on, expanding, and strengthening existing national disaster loss databases and risk analysis.

Accordingly, the Gujarat State Disaster Management Authority (GSDMA) has prepared a Gujarat State Action Plan for Prevention and Mitigation Heat Wave 2020 as per the NDMA guidelines 2019 for the Gujarat state.

Hope this will help all the stakeholders to take appropriate steps to mitigate ill effects of heat wave.

**ACS (R&R) & CEO GSDMA**



**Victor Mecwan, IAS**

**Addl. Chief Executive Officer**

*Gujarat State Action Plan: Prevention And Mitigation  
of Impacts of Heat Wave 2020*

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### **Foreword**

Climate change is driving temperatures higher as well as increasing the frequency and severity of heat waves in India. In the past few years, India too is experiencing the impact of climate change in terms of increased instances of heat wave every year. According to a special report released by the Inter- governmental Panel in Climate Change (IPCC) in October 2018, global warming of 1.5°C - 2°C will worsen the situation in the cities where conditions comparable to the deadly 2015 heat wave are expected, along with unavoidable poverty and health risks that come with global warming. Deforestation and rampant construction area are also adding to environmental instability and contributing to global warming and climate change.

People living in urban areas are amongst the hard hit when a heat wave occurs because these are hotter than the surrounding countryside. Along with climate change, urbanization is one of the most transformative trends of this century. Over half the world now lives in urban areas and this is projected to increase to two-thirds by 2050. It is crucial that cities incorporate heat-reduction tactics such as green spaces into their plans for growth or retrofit them in built areas.

This plan aims to facilitate the stakeholders by providing insight into various aspects related to heat risk reduction and mobilization of stakeholders and coordination among various departments, individuals and community based organization for mitigating the impacts of heat wave. The aim is to protect lives of citizens and take preventive measures so that impact of heat wave can be mitigated.

Addl. CEO GSDMA



Table of Contents

<b>S. No</b>	<b>Content</b>	<b>Page No.</b>
1.	Introduction	8
2.	Paris Climate Conference – 2015	8
3.	Major Goals Adopted in Climate Agreement	9
4.	Gujarat: Geography and Profile	9
5.	Heat Wave in India	9
6.	Heat Wave in Gujarat	10
7.	Purpose of the Action Plan	11
8.	Aims of the Action Plan	11
9.	Early Warning and Communication	12
10.	Declare Heat Wave	13
11.	Identification of Colour Signals for Heat Alert	14
12.	Health Impacts of Heat Waves	14
13.	Dealing with Heat Related Illness	15
14.	Hospital Preparedness Measures for Managing Heat related Illness	16
15.	Acclimatization	17
16.	Identification for Heat Wave related Illness and recordings of casualties	17

17.	Standard Operating Procedures – Heat Wave	18
18.	Roles and Responsibility	23
19.	Department wise suggested activities during Heat Wave alerts	32
20.	Communication Plan for Nodal agency to activate Heat alert	41
21.	Measure for Prevention and Mitigation of Impacts of Heat Wave	43
22.	Suggested short-term and long-term measures to reduce Heat Wave impacts	46
23.	Bibliography	48
24.	Annexure	48-61
25.	Emergency contact numbers	



## **1. Introduction**

Global climate change is inevitable. Climate Change reasons increase the mean average surface temperature over a region. We are already witnessing extreme weather events. Heat-waves are projected to increase in number, intensity and duration over the most land area in the 21st century. It is a period of abnormally high temperatures, more than the normal maximum temperature that occurs during the pre-monsoon (April to June) summer season. Heat -waves typically occur between March to June, and in some rare cases even extend till July. Heat waves are more frequent over the Indo-Gangetic plains of India. On an average, 5-6 heat wave events occur every year over the northern parts of the country.

Extreme heat can lead to dangerous, even deadly, health consequences, including heat stress and heat stroke. Impact of rising temperatures and increasing frequency, duration and intensity of hot spells poses challenge to human safety and sustainability. This unusual and uncomfortable hot weather can impact human and animal health. Heat wave is also called a “silent disaster” as it develops slowly and kills and injures humans and animals. Higher daily peak temperatures of longer duration and more intense heat waves are becoming increasingly frequent globally due to climate change.

### **1.1 Paris Climate Conference – 2015 (COP 21) on Climate Change Action and Disaster Risk Reduction**

The COP 21 or the Paris Climate Conference led to a new international climate agreement, applicable to all countries, aiming to keep global warming below 2°C, in accordance with the recommendations of the Intergovernmental Panel on Climate Change (IPCC).

COP 21 aims to build climate resilience on building resilience through risk-sensitive planning and implementation of the Sendai Framework for Disaster Risk Reduction (DRR) 2015-2030, on the need for a more integrated approach to adaptation, sustainable development, environmental management and DRR, and on the need to improve data on disaster losses by building on, expanding, and strengthening existing national disaster loss databases and risk analysis.

There is significant convergence between the problems that disaster risk reduction and climate change adaptation seek to address. The regions already exposed to climate related hazards and

effects will be at greater risk due to a projected increase in the frequency and or intensity of those hazards and effects because of global climate change.

## **1.2 Major Goals Adopted in the Climate Agreement**

The major goals adopted in the agreement:

- I. A consensus on adopting the long-term goal of keeping the increase in global average temperature to well below 2°C above pre-industrial levels.
- II. Aim to limit the increase to 1.5°C, since this would significantly reduce risks and the impacts of climate change.
- III. Accepting the need for global emissions to peak as soon as possible, recognizing that this will take longer for developing countries and
- IV. To undertake rapid reduction of emissions in accordance with the best available science.

## **1.3 Gujarat: Geography and Profile**

The State of Gujarat was formed on 1<sup>st</sup> May 1960. The total geographical area of the state is 196,024 square kilometers. It stretches from 20-6' N to 24-42' N latitude and from 68-10'E to 74-28' E longitude. As per 2011 census, the population of the State comes to nearly 6.04 crores, which is around 5% of the population India. The state of Gujarat comprises of 33 districts, 252 Talukas, 8 Municipal Corporations (Ahmadabad, Surat, Vadodara, Rajkot, Bhavnagar, Jamnagar, Junagadh and Gandhinagar), 159 Municipalities and approx. 18000 Villages<sup>1</sup>.

The maximum temperature ranges between 26°C and 45°C while the minimum temperature varies between 10.8°C and 27.4°C. Gujarat's agro climate is very heterogeneous and constitutes about 20 per cent of arid and 9 per cent semi-arid areas of the country. Vast area of Saurashtra Kutch and North Gujarat falls under Arid to Semi-arid. It comprises low and erratic rainfall. The winter is mild cold, whereas summer is hot.

## **1.4 Heat Wave in India**

Increased mortality due to increasing heat waves is predicted to be a major burden on health due to climate change. The rising maximum temperature during the pre-monsoon months continues till June and in rare cases till July, over the northwestern parts of the country. In recent years,

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<sup>1</sup> Chapter 2 of GSDMP

morbidity and mortality due to heat wave have increased. Abnormally high temperatures were observed during April –June during 2010 to 2018 across the country. With heat wave conditions affecting regions across India, 6,167 heat-related deaths were reported between 2010 and 2018<sup>2</sup>. The year 2015 reported the most fatalities 2,081. Heat wave also caused death of wildlife, birds, poultry in states and most of the zoos in India.

Year	2010	2011	2012	2013	2014	2015	2016	2017	2018
No. of Deaths	269	12	729	1433	548	2081	700	375	20

### **1.5 Heat Wave in Gujarat**

In last decade, due to rapid climate change, urbanization and rapid industrialization effects, we felt effects of Heat Wave almost every year with high intensity and frequent episodes. With heat wave affecting conditions from 2015-2018 the number of deaths reported across the state were as 58, 446, 463, and 775 respectively and which is showing an increasing trend of the deaths and pays emphasis on prevention of mitigation of the same.

In May 2010, Ahmedabad faced a deadly heat wave with peak temperatures of over 46°C causing a spike in illness and death. Over 4,462 (all-cause) deaths occurred in May 2010, comprising an excess of 1,344 (all-cause) deaths, an estimated 43.1% increase when compared to the average of the same month in 2009 & 2011. Following this, the Indian Institute of Public Health Gandhinagar (IIPHG) supported by Natural Resources Defense Council (NRDC) helped the Ahmedabad Municipal Corporation (AMC) to launch the Heat Action Plan (HAP) in Ahmedabad in 2013<sup>3</sup>. This was first such preparedness plan for extreme heat events in South Asia. A study in 2018 evaluated the effectiveness of the Ahmedabad HAP before and after implementation. The study found that an estimated 2,380 deaths were avoided in the post-HAP period. The findings suggest that the Ahmedabad HAP protected health against mortality associated with extreme heat<sup>4</sup>.

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<sup>2</sup> Health department heat wave action plan 2019.

<sup>3</sup> <https://www.nrdc.org/sites/default/files/ahmedabad-heat-action-plan-2018.pdf>

<sup>4</sup> Hess, J.J., et al., 2018. Building Resilience to Climate Change: Pilot Evaluation of the Impact of India's First HeatAction Plan on All-Cause Mortality. Journal of Environmental and Public Health

### **1.6 Purpose of the Action Plan:**

Gujarat State Action Plan: Prevention And Mitigation of Impacts of Heat Wave 2020 aims to provide a framework for the implementation, coordination, and evaluation of extreme heat response activities in Gujarat State that reduce the negative health impacts of 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. This plan will also lay down the role and responsibility of various departments in various alert signs. The Standard Operating Procedures have also been laid down by the GSDMA for the Heat Wave.

### **1.7 Aims of the Action Plan:**

Gujarat State Action Plan: Prevention And Mitigation of Impacts of Heat Wave 2020 aims to reduce extreme heat impacts on vulnerable people like Children, pregnant women and elderly people with early warning system and integrated coordination with concerned agencies.

- I. To incorporate the Prevention and Mitigation measures against Heat Illnesses.
- II. To map potential heat island area and affected people.
- III. To establish coordination and integration of all the concerned agencies from early warning to implementation of Action Plan.
- IV. To build a capacity of concerned professional and agencies.
- V. To make more use of adaptation and mitigation tools for reducing heat waves, and
- VI. To make Gujarat state more resilient against extreme heat wave.
- VII. To help the heat wave affected people in distress through proper medical aid.
- VIII. Ready available of safe drinking water at all prominent places.

## **2. Early Warning and Communication:**

**Heat Wave:** Heat wave is a condition of atmospheric temperature that leads to physiological stress, which sometimes may cause death. The World Meteorological Organization defines a heat wave as five or more consecutive days during which the daily maximum temperature exceeds the average maximum temperature by five degrees Celsius. Different countries define heat wave differently in context of their local conditions. In India, heat wave conditions are considered if maximum temperature of a station reaches at least 40°C or more for plains, 37°C or more for coastal areas and at least 30°C or more for hilly regions.

As per India Meteorological Department (IMD) following criteria is used to declare a heat wave conditions in India<sup>5</sup>:

a) Based on Departure from Normal:

- Heat Wave: Departure from normal is 4.5°C to 6.4°C
- Severe Heat Wave: Departure from normal is > 6.4°C.

b) Based on Actual Maximum Temperature:

- Heat Wave: When actual maximum temperature  $\geq 45^{\circ}\text{C}$
- Severe Heat Wave: When actual maximum temperature  $\geq 47^{\circ}\text{C}$ .

c) Warm Night:

It should be considered only when temperature remains 40 °C or more. It may be defined based on departure or actual minimum temperature as follows:

- Warm night: minimum temperature departure is 4.5°C to 6.4°C.
- Very warm night: minimum temperature departure is > 6.4°C.

d) Criteria for describing Heat Wave for coastal stations:

When the maximum temperature departure is 4.5°C or more from normal, Heat Wave may be described provided actual maximum temperature is 37°C or more.

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<sup>5</sup> India meteorological department and NDMA heat wave guidelines 2019.

## 2.1 Declare Heat Wave

To declare a heat wave, the above criteria should be met for at least two stations in Meteorological sub-divisions for at least two consecutive days. A heat wave will be declared on the second day.

As per the annual climate summary report of the India Meteorological Department (IMD), the mean temperature over India has increased at a rate of  $0.63^{\circ}\text{C} / 100$  years since the beginning of the 20th century with large positive anomalies in the last couple of decades. The increase of mean temperature during summer season (March-May) in the same period has been at a rate of  $0.56^{\circ}\text{C} / 100$  years. On an average, more than eight heat days and one to three severe heat wave days are experienced during the summer season from March to July over north and central parts of the country. Also, many of the stations in northwest India, Gangetic plains, Central India and east coast of India have experienced continued heat wave spell of more than 10 days, mostly during May and June. There has been an increasing tendency to extreme temperatures is higher along the west coast of India.

## 2.2 Identification of Colour Signals for Heat Alert:

India Meteorological Department (IMD) issues forecast and warnings for all weather related hazards in short to medium range (valid for the next five days) every day as a part of its multi-hazard early warning system. These warnings, updated four times a day, are available at <http://imdahm.gov.in/stateforecast.pdf>.

Colour Code	Alert	Impacts	Suggested activities
White (Normal)	Normal Day	Comfortable temperature. No cautionary action required	Normal activity
Yellow Alert (Stay updated)	Hot Day	Moderate temperature. Heat is tolerable for general public but moderate health concern for vulnerable people e.g. infants, elderly, people with chronic diseases.	(a) Avoid heat exposure. (b) Wear lightweight, light-coloured, loose, cotton clothes. (c) Cover your head
Orange Alert (Moderate Condition)	Severe Heat Alert Day	High temperature. Increased likelihood of heat illness symptoms in people who are wither exposed to sun for a prolonged period or doing heavy work. High health	(a) Avoid heat exposure- keep cool. (b) Wear lightweight, light-coloured, loose cotton clothes (c) Cover your head (d) Drink sufficient water- even if not thirsty € Use ORS, homemade

		concern for vulnerable people e.g. infants, elderly, people with chronic diseases.	drinks like lassi, buttermilk etc. (f) Avoid alcohol, tea, coffee and carbonated soft drinks (g) Take bath in cold water.  <u>In case of Heatstroke:</u> Lay the person in a cool place, under a shade. Wipe her/him with wet cloth/ wash the body frequently. Pour normal temperature water on the head. Consult doctor immediately/ Call 108
Red Alert (Severe Condition-take action)	Extreme Heat Alert for the Day	Very high likelihood of developing heat illness and heat stroke in all ages.	Along with suggested actions in orange alert extreme care needed for vulnerable people.

### **2.3 Health Impacts of Heat Waves**

The health impacts of Heat Waves typically involve dehydration, heat rash, heat cramps, heat exhaustion and/or heat stroke. The signs and symptoms are as follows:

**Heat rash:** Diffused red colour skin or vesicular rash, itching of the skin without visible eruption.

**Heat Cramps:** Edema (swelling) and Syncope (Fainting) generally accompanied by fever below 39°C i.e. 102°F.

**Heat Exhaustion:** Fatigue, weakness, dizziness, headache, nausea, vomiting, muscle cramps and sweating.

**Heat Stroke:** Body temperatures of 40°C i.e. 104°F or more along with delirium, seizures or coma. This is a potential fatal condition.



### **3. Dealing with Heat Wave Related Illness:**

#### **3.1 Prevention of Heat Related Illness:**

Heat waves characterised by long duration and high intensity have the highest impact on morbidity and mortality. The impact of extreme summer heat on human health may be exacerbated by an increase in humidity. There is growing evidence that the effect of heat wave on mortality is greater on days with high levels of ozone and fine particulate matter. Global climate change is projected to further increase the frequency, intensity and duration of heat waves and attributable death (WHO).

Heat related illness is avoidable. It can be best prevented if the vulnerable populations/communities are made aware of prevention tips, basic Do's and Don'ts through effective use of various media. Knowledge of effective prevention and first-aid treatment, besides an awareness of potential side-effects of prescription drugs during hot weather, is crucial for physicians and pharmacists to best mitigate the effects of heat illnesses.

#### **Symptoms and First Aid for various Heat Disorders**

<b>Heat Disorder</b>	<b>Symptoms</b>	<b>First Aid</b>
Heat rash	Skin redness and pains, possible swelling, blisters, fever, headaches.	Take a shower using soap to remove oils that may block pores preventing the body from cooling naturally. If blisters occur, apply dry, sterile dressings and seek medical attention.
Heat Cramps	Painful spasms usually in leg and abdominal muscles or extremities. Heavy Sweating.	Move to cool or shaded place. Apply firm pressure on cramping muscles or gently massage to relieve spasm. Give sips of water. If nausea occurs, discontinue.
Heat Exhaustion	Heavy sweating, weakness, Skin cold, pale, headache and clammy extremities. Weak pulse. Normal emperature possible. Fainting, vomiting.	Get victim to lie down in a cool place. Loosen clothing. Apply cool, wet cloth. Fan or move victim to air-conditioned place. Give sips of water slowly and if nausea occurs, discontinue. If vomiting occurs, seek immediate medical attention, call 108 and 102 for ambulance.
Heat Stroke (Sun )	High body temperature. Hot, dry skin. Rapid, strong pulse.  Possible unconsciousness or altered mental status. Victim will likely not sweat.	Heat stroke is a severe medical emergency. Call 108 and 102 for ambulance for emergency medical services or take the victim to a hospital immediately. Delay can be fatal. Move victim to a cooler environment. Try spraying water, cold water on body & fan the wet body. If possible sponging or cool bath sponging to reduce body temperature. Use extreme caution. Remove clothing. Use fans and/or air conditioners. <b>DO NOT GIVE FLUIDS ORALLY if the person is not conscious.</b>

### **3.2 Hospital Preparedness Measures for Managing Heat related Illness:**

Director / Incharge of hospitals, CHCs, PHCs and UHCs should ensure the following measures:

- A detailed action plan to tackle Heat related illnesses well in advance of hotter months.
- Operational framework-preparing specific health adaptation plan, development of guidelines and response plan for climate sensitive diseases.
- Need for updating Heat Health Action Plan and issuing Advisory for Hospital Preparedness, Surveillance and weekly monitoring including Capacity Building.
- Promoting Strategic media coverage of climate and health, linkages at the state level in regional languages to increase support for climate mitigation and adaptation responses.
- Long term measures such as adopting cool roof, improving green forest coverage and analyzing health impacts in urban planning.
- Standard Operating Procedures to tackle all levels of Heat related illnesses. Capacity Building measures for doctors, nurses and other staffs should be undertaken.
- Cases with expected heat stroke should be rapidly assessed using standard treatment protocols.
- Identify search capacities and mark the beds dedicated to heat stroke victims and enhance emergency department preparedness to handle more patients.
- Identify RRT (Rapid Response Team) to respond to any exigency call outside the hospital.
- Ensure adequate arrangements of staff, beds, IV Fluids, ORS, essential medicines and equipments to cater to management of volume depletion and electrolyte imbalance.
- May try to establish outreach clinics at various locations easily accessible to the vulnerable population to reduce the number of cases affected. Health Centers must undertake awareness in campaigns for neighborhood communities using different means of information dissemination.
- Primary Health Centers must refer the patients to higher facility only after ensuring adequate stabilization and basic definitive care (cooling and hydration).
- Hospitals must ensure proper networking with nearby facilities and medical centers to share the patient load which exceed their search capacities.

- All cases of heat-related illnesses (suspected or confirmed) should be reported to IDSP (Integrated Disease Surveillance Programme) unit of the district.

### **3.3 Acclimatization**

Those who come from a cooler climate to hotter climate especially during heat wave season at risk. They should be advised not to move out in open for period of one week. This helps the body get acclimated to heat. They should also be advised to drink plenty of water. Acclimatization is achieved by gradual exposure to the hot environment during a heat wave season.

### **3.4 Identification for Heat Wave related Illnesses and recordings of casualties**

It is important to undertake an objective identification of heat wave illnesses and systematically records casualties resulting from heat wave. States may form committees at the district level with members not below the rank of Assistant Civil Surgeon, Mamlatdar (Disaster Management) and Inspector of Police to enquire into deaths due to heat strokes/heat waves or correct reporting. In order to do so, the following factors need to be taken into account:

- Record maximum temperature during the particular time period and place.
- Recording incidents, *panchnama* or other witnesses, evidence or verbal-autopsy.
- Postmortem/medical check up reports with causes.
- Local authority or local body enquiry/verification report.
- Cases of heat exhaustion and heat stroke should be reported.

The information regarding Heat strokes cases and deaths will be reported by Mamlatdar (Disaster Management) in format 'C' – Annexure 7.

### **Other Annexure.**

<b>Sr. No</b>	<b>Annexure</b>	<b>Purpose</b>
1.	Annexure 1	For heat wave Do's and Don'ts.
2.	Annexure 2	For case definitions – range of heat illness, typical presentations as symptoms, signs and prognosis.
3.	Annexure 3	For heat related illness treatment protocol.

#### 4. Standard Operating Procedures- Heat Wave

Sr. No.	Emergency Support Functions/ Task	Aim	Primary Department/ Agency	Secondary Department/ Agency	Responsibility of
1.	<b>Formulation of Policy, Plan and Guidelines</b>	<ul style="list-style-type: none"> <li>Preparation of Heat Wave Action Plan with all the key stakeholders according to NDMA Guidelines (October'19)</li> </ul>	<ul style="list-style-type: none"> <li>GSDMA</li> <li>IMD</li> <li>Health</li> <li>IIPHG</li> <li>Revenue</li> </ul>	<ul style="list-style-type: none"> <li>Commissioner of Health</li> <li>CoR</li> </ul>	<ul style="list-style-type: none"> <li>Officials of the respective department.</li> </ul>
2.	<b>Early Warning and Dissemination</b>	<ul style="list-style-type: none"> <li>Establish Early Warning System.</li> <li>Strengthening of Early Warning System with accurate &amp; timely alerts.</li> <li>Issue Heat Wave warnings &amp; weather forecasts of Short/Medium/Long Range duration.</li> <li>Disseminate the heat health warning, determine the threshold for action &amp; communicate the risks.</li> <li>Provide color coded threshold values.</li> </ul>	<ul style="list-style-type: none"> <li>IMD</li> <li>GSDMA</li> </ul>	<ul style="list-style-type: none"> <li>UDD</li> <li>CoR</li> </ul>	<ul style="list-style-type: none"> <li>Municipal Commissioner</li> <li>Collector</li> <li>DDO</li> </ul>
3.	<b>Response and Relief</b>	<ul style="list-style-type: none"> <li>Issue directives for hospital preparedness &amp; mitigation.</li> <li>Formulation of Schemes and programmes for heat health safety.</li> <li>Ensuring 24x7 heat health facilities with adequate provision of basic medicines like ORS, Glucose etc.</li> </ul>	<ul style="list-style-type: none"> <li>Health Department</li> <li>CoR</li> </ul>	<ul style="list-style-type: none"> <li>UDD</li> <li>Commissioner of Health</li> <li>108 GVK</li> </ul>	<ul style="list-style-type: none"> <li>Municipal Commissioner</li> <li>Superintendent Medical Colleges.</li> <li>Medical Officer of Health.</li> <li>CDHO</li> <li>PHC's</li> <li>CHC's</li> <li>UHC's</li> </ul>

Sr. No.	Emergency Support Functions/ Task	Aim	Primary Department/ Agency	Secondary Department/ Agency	Responsibility of
		<ul style="list-style-type: none"> <li>Safety and security of public.</li> </ul>			
4.	<b>Prevention and Mitigation of Heat Illnesses</b>	<ul style="list-style-type: none"> <li>Prepare Heat Wave Action Plan for Municipal Corporations and Municipalities.</li> <li>Local Engineers of Water Resources Department.</li> </ul>	<ul style="list-style-type: none"> <li>UDD</li> </ul>	<ul style="list-style-type: none"> <li>Relevant officials of Urban Health Centre's (UHC's)</li> </ul>	<ul style="list-style-type: none"> <li>Municipal Commissioner</li> <li>Collector</li> <li>Superintendent Medical Colleges.</li> <li>Medical Officer of Health.</li> <li>CDHO</li> <li>UHC's</li> <li>NGO's/CBO's and other voluntary organizations.</li> </ul>
5.	<b>Public Awareness</b>	<ul style="list-style-type: none"> <li>To broadcast relevant information regarding heat wave to public at large.</li> <li>Display of Do's and Don'ts in public areas, hospitals, parks etc.</li> <li>Display board with colour coding for heat wave alert.</li> </ul>	<ul style="list-style-type: none"> <li>Information and Broadcasting Department</li> </ul>	<ul style="list-style-type: none"> <li>IMD</li> <li>Health</li> <li>UDD</li> <li>CoR</li> <li>GSDMA</li> </ul>	<ul style="list-style-type: none"> <li>Municipal Commissioner</li> <li>Collector</li> <li>DDO</li> <li>CDHO</li> <li>Superintendent of Health.</li> </ul>
6.	<b>Public Transport</b>	<ul style="list-style-type: none"> <li>To ensure adequate supply of drinking water at bus depot and prominent places.</li> <li>To ensure shelter/sheds at bus stops.</li> <li>Appropriate bus timings for commute of citizens.</li> </ul>	<ul style="list-style-type: none"> <li>Transport Department</li> <li>UDD</li> </ul>	<ul style="list-style-type: none"> <li>Department of Water Resources</li> <li>Municipal Transport Services (AMTS/BRTS)</li> <li>Health Department</li> </ul>	<ul style="list-style-type: none"> <li>Commissioner of Transport</li> <li>Municipal Commissioner</li> </ul>

<b>Sr. No.</b>	<b>Emergency Support Functions/ Task</b>	<b>Aim</b>	<b>Primary Department/ Agency</b>	<b>Secondary Department/ Agency</b>	<b>Responsibility of</b>
		<ul style="list-style-type: none"> <li>• Enable better emergency transport system for affected people to health care facilities with adequate equipments.</li> <li>• Protection of roads from melting and take precautionary measures</li> </ul>			
<b>7.</b>	<b>Supply of Safe Drinking Water</b>	<ul style="list-style-type: none"> <li>• To ensure the availability of Drinking Water</li> <li>• To ensure water supply in the state, Municipal Corporations, Districts, Taluka and villages.</li> </ul>	<ul style="list-style-type: none"> <li>• Water Resources Department</li> </ul>	<ul style="list-style-type: none"> <li>• Chief Engineer/</li> <li>• Superintending Engineer of the District.</li> <li>• Local Engineers of Water Resources Department.</li> </ul>	<ul style="list-style-type: none"> <li>• Municipal Commissioner</li> <li>• Collector</li> <li>• DDO</li> </ul>
<b>8.</b>	<b>To ensure uninterrupted power supply</b>	<ul style="list-style-type: none"> <li>• To ensure repair and maintenance work for uninterrupted power supply before and during the summer.</li> <li>• Rescheduling of load shedding.</li> </ul>	<ul style="list-style-type: none"> <li>• Energy and Petrochemicals Department</li> </ul>	<ul style="list-style-type: none"> <li>• Electricity Distribution Companies (UGVCL, PGVCL, DGVCL and MGVL)</li> <li>• Private Companies (Torrent etc)</li> </ul>	<ul style="list-style-type: none"> <li>• Municipal Commissioner</li> <li>• Collector</li> <li>• MD/CEO of concerned Electricity Distribution Company</li> </ul>

Sr. No.	Emergency Support Functions/ Task	Aim	Primary Department/ Agency	Secondary Department/ Agency	Responsibility of
9.	<b>Safety and Security of Women &amp; Children</b>	<ul style="list-style-type: none"> <li>To ensure safety and security of children (below 5 years) in Anganwadis.</li> <li>To ensure safety &amp; security of pregnant women.</li> </ul>	<ul style="list-style-type: none"> <li>WCD</li> <li>Health</li> </ul>	<ul style="list-style-type: none"> <li>Director ICDS</li> <li>Commissioner of Health</li> <li>UDD</li> </ul>	<ul style="list-style-type: none"> <li>Nodal Officer of Municipal Corporation</li> <li>DDO</li> <li>CDHO</li> <li>Functionaries of WCD / Health Department at District, Taluka and Village including Anganwadis.</li> </ul>
10.	<b>Safety and Security of Students</b>	<ul style="list-style-type: none"> <li>To ensure safety and security of children.</li> <li>To ensure availability of safe drinking water in Schools (primary, Secondary, higher education, colleges and universities).</li> <li>Rescheduling of school timings and vacations as per heat wave situation.</li> <li>To ensure that students avoid outdoor physical activities during summers in schools.</li> </ul>	<ul style="list-style-type: none"> <li>Education Department</li> </ul>	<ul style="list-style-type: none"> <li>District Primary Education Officer</li> <li>Commissioner of Schools</li> <li>Commissioner of Higher and Technical Education</li> </ul>	<ul style="list-style-type: none"> <li>University heads</li> <li>Principals of Colleges</li> <li>DEO</li> <li>Principals of Primary, Secondary &amp; Higher Secondary Education</li> </ul>
11.	<b>Protection of Gardens &amp; Zoos</b>	<ul style="list-style-type: none"> <li>To ensure animal protection in zoos</li> <li>To ensure gardens are safe and secure</li> <li>Adequate amount of drinking water in gardens/parks/zoos.</li> </ul>	<ul style="list-style-type: none"> <li>Forest &amp; Environment Department</li> </ul>	<ul style="list-style-type: none"> <li>UDD</li> </ul>	<ul style="list-style-type: none"> <li>Municipal Commissioner</li> <li>Collector</li> <li>DDO</li> </ul>
12.	<b>Protection of Animals and Wild life</b>	<ul style="list-style-type: none"> <li>To ensure safe shelter for livestock and animals.</li> <li>Availability of</li> </ul>	<ul style="list-style-type: none"> <li>Forest &amp; Environment Department</li> <li>Agriculture,</li> </ul>	<ul style="list-style-type: none"> <li>PCCF (Wildlife)</li> <li>CoR</li> <li>Director of</li> </ul>	<ul style="list-style-type: none"> <li>Municipal Commissioner</li> <li>Collector</li> <li>DDO</li> </ul>



Sr. No.	Emergency Support Functions/ Task	Aim	Primary Department/ Agency	Secondary Department/ Agency	Responsibility of
		adequate amount of water and fodder. <ul style="list-style-type: none"> <li>To ensure pre-positioning of adequate veterinary medicines and supplies.</li> </ul>	Farmers Welfare & Co-operation Department <ul style="list-style-type: none"> <li>Revenue Department</li> </ul>	Agriculture <ul style="list-style-type: none"> <li>Director of Animal Husbandry</li> <li>Relevant NGO's and CBO's</li> </ul>	<ul style="list-style-type: none"> <li>District Agricultural Officer</li> <li>Animal Husbandry Officer</li> </ul>
13.	<b>Safety and Security of Labourers</b>	<ul style="list-style-type: none"> <li>To ensure safety &amp; security of labour force in the industrial establishment.</li> <li>Rescheduling of working hours for employees.</li> <li>To ensure drinking water facilities at work places.</li> <li>To provide emergency ice packs and heat illness prevention materials to construction workers.</li> </ul>	<ul style="list-style-type: none"> <li>Labour and Employment Department</li> </ul>	<ul style="list-style-type: none"> <li>DISH</li> <li>Health Department</li> </ul>	<ul style="list-style-type: none"> <li>Directorate of Industrial Safety and Health</li> </ul>
14.	<b>Safety and security of labourers at Village level</b>	<ul style="list-style-type: none"> <li>To ensure safety and security of all labourers under MGNREGA.</li> <li>To ensure safety and security of all labourers under schemes of Rural Development and Panchayati Raj.</li> </ul>	<ul style="list-style-type: none"> <li>Panchayat, Rural Housing and Rural Development department.</li> </ul>	<ul style="list-style-type: none"> <li>Commissioner of rural development</li> <li>Development Commissioner</li> <li>GLPC</li> </ul>	<ul style="list-style-type: none"> <li>DDO</li> <li>TDO</li> <li>Sarpanch</li> </ul>
15.	<b>Safety and security of Oldage persons, Orphanages and persons with disability</b>	<ul style="list-style-type: none"> <li>To ensure the safety and security of people living in old age homes and orphanage homes.</li> <li>To ensure proper care of persons with disability.</li> </ul>	<ul style="list-style-type: none"> <li>Social Justice and Empowerment Department</li> </ul>	<ul style="list-style-type: none"> <li>Director of Social welfare.</li> <li>Director, social defense</li> <li>Commissioner for Persons with disabilities</li> </ul>	<ul style="list-style-type: none"> <li>Functionaries at district, taluka and village level.</li> </ul>

Sr. No.	Emergency Support Functions/ Task	Aim	Primary Department/ Agency	Secondary Department/ Agency	Responsibility of
16.	<b>Prevention of Fire</b>	<ul style="list-style-type: none"> <li>To ensure prevention and mitigation of Fire</li> <li>Availability of adequate amount of water for fire fighting.</li> </ul>	<ul style="list-style-type: none"> <li>UDD</li> </ul>	<ul style="list-style-type: none"> <li>Director of Fire</li> <li>Chief Fire Officer</li> <li>Fire services of Municipal Corporations</li> </ul>	<ul style="list-style-type: none"> <li>Municipal Commissioner</li> <li>Collector</li> </ul>
17.	<b>Capacity Building, Training and IEC</b>	<ul style="list-style-type: none"> <li>Co-ordinating with different departments for capacity building activity.</li> <li>Develop training modules and conduct proper training programme for different stakeholders.</li> <li>Preparation of Capacity Building Programme &amp; Implementation.</li> </ul>	<ul style="list-style-type: none"> <li>GSDMA</li> <li>GIDM</li> </ul>	<ul style="list-style-type: none"> <li>NDMA</li> <li>NIDM</li> <li>IMD</li> <li>UDD</li> <li>Dept of Health</li> <li>Water Resources Dept</li> <li>WCD</li> <li>Education</li> <li>Transport</li> <li>Animal Husbandry</li> <li>Agriculture</li> </ul>	<ul style="list-style-type: none"> <li>Heads of the respective departments.</li> </ul>

#### **4.1 Roles and Responsibility**

Responsibilities of various departments at State, District, Taluka and village level for Gujarat State Action Plan for Prevention and Mitigation of impacts of Heat Wave are as below.

##### **State Level**

#### **1. Revenue Department – CoR and GSDMA**

##### **Pre-Heat Season (January to March)**

- Constitute a Gujarat State Action Plan: Prevention and Mitigation of Impacts of Heat Wave Committee, with CEO GSDMA as Chairman and Nodal Officer as Member Secretary, representatives of all departments to be member of this committee.
- Gujarat State Action Plan: Prevention and Mitigation of Impacts of Heat Wave Committee should meet at-least 3 times in year, once in pre-heat, during-heat and post-heat season.

- Health Department should monitor all-cause death and all hospital admission cases during heat season
- Establish heat mortality tracking system and update datasets
- Create list of heat vulnerable areas in each district.
- Designate point of contact for each department for heat wave.
- Re-engage key agencies to facilitate communications and schedule monthly meetings.
- To review preparedness instructions to all concerned departments for the heat season.

**During Heat Season (April to June)**

- To issue necessary instruction regarding strict adherence of the plan.
- To ensure mid-course correction.
- To deploy monitors/ supervisors to concurrent monitoring and feedback.
- Activate **Heat alert** and local response in each department by notifying the key leaders in accordance with the communication plan.
- Activate cooling centers/shaded areas with each department such as temples, public buildings, malls during **heat alert**.
- Hold a frequent conference call to discuss report and breaking development during heat alert and ensure that the communication channels remain operational.
- Instruct water department or local municipal department to ensure availability of staff and clean drinking water during **Heat alert**.
- To monitor the implementation of the Gujarat State Action Plan: Prevention And Mitigation of Impacts of Heat Wave.

**Post Heat Season (July to September)**

- Review quantitative and qualitative data for process evaluation and improvements
- Call meeting for annual evaluation of heat plan with key agency leaders and community partners.
- To fine-tune the heat action plan based on the experience of various stake-holders.

**2. India Meteorological Department (Gujarat Regional Office)**

**Pre-Heat Season (January to March)**

- Issue prior Warnings with details of temperature and districts

**During Heat Season (April to June)**

- Provide daily/ weekly forecasts
- Communicate Heat wave alerts/warnings promptly.
- Update heat wave details regularly in their website.
- Determine threshold district wise e.g. Percentile method.

**Post Heat Season (July to September)**

- Provide season report containing duration of Heat wave and location-wise maximum temperatures.

- Participate in annual evaluation of heat action plan.

### **3. Health & Family Welfare Department**

#### **Pre-Heat Season (From January to March)**

- Check inventories of medical supplies in health ward
- Identify areas that are vulnerable.
- Identify cooling ward and barriers to access cooling ward.
- Community involvement for workers and trainers' education.
- Instruct hospitals PHCs, CHCs and UHCs to get additional hospitals and ambulances ready.
- Update surveillance protocols and programs, including to track daily heat-related data (morbidity, mortality, all cause with heat related)
- Arrange awareness training workshops for medical officers and paramedics

#### **During Heat Season (April to June)**

- Display heat-related illness prevention tips and how to stay cool around hospitals PHCs and UHCs.
- Distribute “Dos and Don’ts” to equip community hospitals with additional materials
- Keep emergency cooling ward ready
- Keep stock of small reusable ice packs
- Report heat stroke patients daily
- Keep adequate stocks and ensure availability of medical supplies like ORS in all hospitals/ PHCS/ UHCs, hospitals.

#### **Post Heat Season (July to September)**

- Incorporate data and findings into future versions of the Heat Action Plan.
- Participate in annual evaluation of heat action plan
- Review revised heat action plan

### **4. 108 Emergency Service:**

#### **Pre-Heat Season (From January to March)**

- Prepare handouts for paramedics about heat illness.
- Create displays on ambulances to build public awareness during local events.
- Identify at-risk areas of vulnerable population, by utilizing the list of high risk areas.

#### **During Heat Season (April to June)**

- Ensure adequate supply of ice packs and IV fluids.
- Disseminate SMS text message to warn local residents during a **heat alert**.

#### **Post Heat Season (July to September)**

- Provide data to key agency leaders
- Participate in annual evaluation of heat action plan

**5. Urban Development & Urban Housing Department (UDD)**

**Pre-Heat Season (From January to March)**

- Mandating installation of cool roofs in new or modified government buildings, educational/healthcare
- Allocate funds for implementation (govt buildings)
- Overall cool roof program coordination & implementation
- Conduct Cool roof and cool building awareness and training workshop
- Create awareness among vulnerable community and residence on cool roof benefits.

**During Heat Season (April to June)**

- Oversee implementation

**Post Heat Season (July to September)**

- Undertake impact evaluations

**6. Labour & Employment Department**

**Pre-Heat Season (From January to March)**

- Arrange training workshop on heat illness diagnosis and management for factory medical officers and general practitioners.
- Awareness activities for construction workers, factory laborers, manual laborers and workers whose occupations require intensive work outdoors during extreme heat about the risks, signs, and symptoms of heat stress.
- Generate list of factory medical officers and contractors to include in heat action communications from Nodal Officer
- Communicate directly about heat season with non-factory workers
- Utilize maps of construction sites to identify more high-risk outdoor workers.
- Conduct publicity campaigns during high-risk days in identified high-risk areas

**During Heat Season (April to June)**

- Guideline for workers to protect from heat exposure and provision of First Aid, drinking water and cooling space at work site.
- Advisory for a cool room at factory facilities for emergency.
- Issue directives for flexible working hours to restrict heat exposure for e.g. extended afternoon break or alternate working hours for workers.
- Ensure health centers/dispensary are open during peak summer hours.
- Ensure overseeing construction sites, quarries, factories and other vulnerable worksites, particularly during high heat season, to enforce labor laws related to heat safety.

**Post Heat Season (July to September)**

- Participate in annual evaluation of heat action plan

## **7. Transport Department**

### **Pre-Heat Season (From January to March)**

- Explain importance of proper shade, availability of drinking water and other facilities for transport officers.
- Incorporate cool roof (applying reflection paint on roof) in bus stand or public waiting area.
- Distribute pamphlets / posters on heat related illness prevention; Do's and don'ts for display & further distribution to passengers at Bus stations, bus shelters, cab and auto stands etc
- Ensure availability with of ORS and Cool drinking water

### **During Heat Season (April to June)**

- Display heat warning at bus stations, bus shelters, cab or auto stands.
- Display posters & distribute pamphlets on prevention of heat related illness.
- Ensure availability of shade, drinking water, ORS for passengers.
- Operate more AC buses during peak hours (12 noon -4.00 p.m.) when Heat wave is declared.
- Ensure that buses do not run during peak hours (12-4 pm) when Heatwave is declared.

### **Post Heat Season (July to September)**

- Review implementation and effectiveness of Plan.
- Obtain and give feedback for further improvement of Plan.

## **8. Indian Railways / Gujarat Metro Rail Corporation LTD.**

### **Pre-Heat Season (From January to March)**

- Display posters & distribute pamphlets on prevention of heat related illness.
- Use white refractory paints or other cool roof techniques on rail/metro roof.
- Explain importance of proper shade, availability of drinking water and other facilities.

### **During Heat Season (April to June)**

- Ensure availability of shade, drinking water, ORS etc. for staff and visitors.
- Display of Heat alert with Do and Don'ts.

### **Post Heat Season (July to September)**

- Obtain and feedback for further improvement of Plan.

## **9. Education Department**

### **Pre-Heat Season (From January to March)**

- Review plan with Education Department officials (School/Colleges, etc)
- Arrange awareness classes and mock drills on heat wave related illness/sunstrokes for teachers and students.

- Explain importance of proper shade, cool roof, availability of clean drinking water, ORS and other facilities for Students
- Distribute pamphlets/posters on heat related illness prevention; Do's and Don'ts for display & further distribution to students in Schools & Colleges
- Ensure availability of ceiling fans in class room's for students.

**During Heat Season (April to June)**

- Display posters & distribute pamphlets on prevention of heat related illness in Schools and Colleges
- No open-air classes to be conducted when Heat wave is declared
- Ensure school buses are parked in sheds, sprinkle water on the roof of the buses, before commuting.
- Restriction of school timing (6.00 am to 11.00 am) during heat season.
- Scheduling of examinations before starting of Heat period normally.

**Post Heat Season (July to September)**

- Review implementation and effectiveness of Plan.
- Obtain and give feedback for further improvement of Plan.

**10. Women and Child Development Department**

**Pre-Heat Season (From January to March)**

- Setting up of nutritional resource centers at Anganwadi centers to supplement nutritional deficiency in children.
- Pre heat wave necessary precautionary methods such as provision of proper stock of ORS, buttermilk and other rehydration methods may be arranged well in advance as the heatwave extends for about 17-45 days.
- To create a surveillance mechanism on tracking children, lactating mothers and women through ICDS and Anganwadi centers in the state.
- Capacity building of Anganwadi sevikas, Asha workers, ANM nurses and ICDS workers to identify symptoms in women and children and to report it when necessary.
- To identify the districts or villages where high child mortality rates are present to take necessary precautionary methods.

**During Heat Season (April to June)**

- Display IEC materials at Anganwadis and encourage Integrated Child Development Scheme (ICDS) workers to disseminate Heat Wave related information with special focus on infants, children below five years, pregnant and lactating mothers, and geriatric population to protect them from dehydration.
- Provision of drinking water and first aid at all the Anganwadi Centers, old age homes, orphanages.

**Post Heat Season (July to September)**

- Participate in annual evaluation of heat action plan



**11. Industries and Mines Department - Tourism**

**Pre-Heat Season (From January to March)**

- Ensure proper registration of tourists who are visiting the State during heat season.
- Ensure availability of heat relief measures at tourist places.
- Display of Heat Wave precautionary measures for tourists during summer at tourist points and related information in website of department of tourism.
- Provision of funds for Heat Wave management.

**During Heat Season (April to June)**

- Ensure the availability of drinking water and cool resting sheds.
- Restrict the timing of the visit of tourist places during peak summer days.

**Post Heat Season (July to September)**

- Participate in annual evaluation of heat action plan

**12. Agriculture, Farmers Welfare and Co-operation Department**

**Pre-Heat Season (From January to March)**

- Ensure construction of wells/ water point for roaming livestock to provide them with drinking water.
- Prepare material like Posters & pamphlets separately for tips to take care during heatwaves
- Activate field staff to create awareness among the Livestock farmers on the Animal Management during Heat Wave conditions.
- Capacity building of veterinary officials on diagnosis and management heat related illness.
- Maintaining database and surveillance on heat related morbidity and mortality.

**During Heat Season (April to June)**

- Display posters / distribute pamphlets in villages, and important government offices
- Check availability of drinking water in the water points kept for roaming livestock's.

**Post Heat Season (July to September)**

- Review implementation of Heat Action Plan.
- Revise plan accordingly.

**District Level**

**13. District Development officer (DDO)/ District collector/ Municipal commissioner:**

**Pre-Heat Season (From January to March)**

- Constitute a District Heat Action Task Force (DHATF), with District Collector as Chairman and DDO as Member Secretary, with representatives of all departments to be

member of this committee.

- DHATF should meet at-least 3 times in year, once in pre-heat, during-heat and post-heat season.
- Collector should monitor all-cause death and all hospital admission cases during heat season
- Create list of heat vulnerable areas in each district.
- To review preparedness for the heat season in rural areas of the district.
- Collector should monitor all-cause death and all hospital admission during heat season.
- To issue necessary instruction to all concerned departments.
- For better inter-sectoral co-ordination.

**During Heat Season (April to June):**

- General meeting of District Heat Action Task Force (DHATF).
- Collector at district should monitor all-cause death and all hospital admission during heat season.
- To monitor the implementation of the Heat Action Plan.
- To issue necessary instruction regarding strict adherence of the plan.
- To ensure mid-course correction.
- To deploy monitors/ supervisors to concurrent monitoring and feedback.

**Post Heat Season (July to September)**

- To review the implementation of the heat action plan.

<b>Taluka Level</b>
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**14. Taluka Development officer at Taluka level:**

**Pre-Heat Season (From January to March)**

- Supervise preparedness of the Gram Panchayats.
- To issue necessary instruction to all concerned departments.
- For better inter-sectoral co-ordination.
- Taluka Development Officer (TDO) should monitor all-cause death and all hospital admission during heat season
- Arrangements for establishing rehabilitation centers and materials required thereof
- Arrangements for supply of good quality drinking water/ORS and other items of basic necessities
- Explain importance of proper shade and cool roof to the village level.

**During Heat Season (April to June):**

- To monitor the implementation of the Heat Action Plan.
- To issue necessary instruction regarding strict adherence of the plan.
- To ensure mid-course correction.

- To deploy monitors/ supervisors to concurrent monitoring and feedback.

**Post Heat Season (July to September)**

- To review the implementation of the heat action plan.

**Village Level**

**15. Sarpanch Gram Panchayat:**

**Pre-Heat Season (From January to March)**

- Convening meetings of ward members to ensure proper information regarding the warning signals reached the people through all media modes.
- For better inter-sectoral co-ordination.
- Prepare Vulnerability map.
- Should monitor all-cause death and all hospital admission during heat season.
- Sensitize vulnerable population on Heat Wave.
- Prepare proper shade, cool roof, availability of drinking water and other facilities for the Public and animal.
- Encourage for alternative livelihood activities like Construction of ponds, artificial lakes for cooling the environment by evaporation
- Arrangements for water kiosks, tube wells, tankers at strategic locations.

**During Heat Season (April to June):**

- To monitor the implementation of the Heat Action Plan.
- To issue necessary instruction regarding strict adherence of the plan.
- To ensure mid-course correction.
- To deploy monitors/ supervisors to concurrent monitoring and feedback.
- Public announcement about the do's and don'ts issued by the department of Health and family welfare

**Post Heat Season (July to September)**

- To review the implementation of the heat action plan.

**NGO's, Community based organization (CBO's) and Voluntary organizations**

**16. NGOs, Community Groups and Individuals**

**Pre-Heat Season (From January to March)**

- Distribute pamphlet and other materials to community
- Sensitize link workers and community leaders.
- Dissemination of materials in slum communities.
- Coordinate outreach efforts with other community groups, non- profits, and higher

education.

**During Heat Season (April to June)**

- Keep cool and hydrated during the heat season by drinking water, staying out of the sun, and wearing light clothing.
- Office and field visit timings to be re-worked.
- Check on vulnerable neighbours, particularly during a heat alert.
- Limit heavy work in direct sun or indoors if poorly ventilated, especially during a heat alert.

**Post Heat Season (July to September)**

- Inform fellow community members about how to keep cool and protect oneself from heat.
- Participate in annual evaluation of heat action plan

**4.2 Department wise suggested activities during heat wave alerts:**

Sr. No.	Name of the Department	Responsibilities of the Department
1.	Health and Family Welfare Department	<b>Yellow Alert (Stay updated)</b>
		<ul style="list-style-type: none"> <li>• Enhance targeted training programs, capacity building efforts and communication on heat illness for medical staff at local hospitals and Urban Health Centers (UHCs), based on the Framework of CORPORATION Medical Professionals and Health Workers (see attachment). These efforts should include nursing staff, paramedics, field staff and link workers, and consider the susceptibility of particular wards.</li> <li>• Hospitals should be instructed to update their admissions and emergency case records to track heat-related morbidity and mortality.</li> <li>• Train hospitals to improve expedience of recording of cause of death certificates.</li> <li>• Create simple, user-friendly means to track daily heat-related data and behavioral change impacts.</li> <li>• Organize training on recording information education &amp; communication (IEC) efforts.</li> </ul>
		<b>Orange Alert (Moderate Condition)</b>
		<ul style="list-style-type: none"> <li>• Adopt heat-focused examination procedures at local hospitals and urban health centers.</li> <li>• Purchase and distribute reusable soft plastic ice packs for the citywide UHCs, 108 emergency centers, ambulances and</li> </ul>

		<p>hospitals.</p> <ul style="list-style-type: none"> <li>Produce weekly reports of the public health impact for CORPORATION Nodal Officer during a heat alert.</li> </ul>
		<b>Red Alert (Severe Condition- Take action)</b>
		<ul style="list-style-type: none"> <li>Keep all UHCs functional till 7 PM.</li> <li>Keep sufficient stocks of reusable soft plastic ice packs for the citywide UHCs, 108 emergency centers, ambulances and hospitals.</li> <li>Explore creation of ice pack dispensaries to increase access to vulnerable communities.</li> <li>Post heat-related illness prevention tips and how to stay cool around hospitals and UHCs.</li> <li>Ensure adequate medical supplies available.</li> <li>Produce weekly reports of the public health impact for CORPORATION Nodal Officer during a heat alert.</li> <li>Increase staffing at hospitals and UHCs to attend to the influx of patients during a heat alert, if feasible.</li> <li>Increase link worker and community health worker outreach in at-risk neighborhoods during a heat alert, if feasible.</li> <li>Have zonal health officer visit UHCs to confirm proper preparation has been made for heat related illness and conduct case audits during heat season.</li> <li>Provisions should be made to treat Heat stroke patient in emergency.</li> </ul>
2..	108 Emergency Service	<b>Yellow Alert (Stay updated)</b>
		<ul style="list-style-type: none"> <li>Create displays on ambulances during local events to build public awareness (see ad attached)</li> <li>Identify at-risk areas of vulnerable populations, in part by utilizing the list of high-risk areas.</li> <li>Enhance targeted training programs and communication on heat illness for paramedics and field staff.</li> </ul>
		<b>Orange Alert (Moderate Condition)</b>
		<ul style="list-style-type: none"> <li>Keep sufficient stocks of reusable soft plastic ice packs for the 108 citywide emergency ambulances.</li> <li>Organize training on recording information education &amp; communication (IEC) efforts.</li> </ul>
		<b>Red Alert (Severe Condition- Take action)</b>
		<ul style="list-style-type: none"> <li>Keep sufficient stocks of reusable soft plastic ice packs for the citywide 108 emergency ambulances.</li> <li>Ensure adequate supply of ice packs and IV fluids.</li> <li>Disseminate SMS text messages to warn local residents during a heat alert.</li> </ul>

3.	Municipal Corporation - Nodal Officer	<b>Yellow Alert (Stay updated)</b>
		<ul style="list-style-type: none"> <li>Organize preventive training and outreach efforts for health workers, link workers, school children, and the local community with the Health Department.</li> <li>Distribute multilingual pamphlets and posters with tips to prevent heat stress to hospitals, schools, and professional associations (see pamphlets at Annexure 9, 10 &amp; 11).</li> <li>Create a list of the high-risk areas of the city vulnerable to heat waves for more focused activities on heat prevention.</li> <li>Regular meetings with NGOs and slum leaders on weekly basis for preparation for next week and review of previous week activities for heat resilience.</li> </ul>
		<b>Orange Alert(Moderate Condition)</b>
		<ul style="list-style-type: none"> <li>Reengage state and local agencies to facilitate internal communications.</li> <li>Follow-up meetings with stakeholders, NGOs and slum leaders regarding activities on heat prevention and heat alerts</li> <li>Organize workshop with doctors and health professionals for identification of heat illness.</li> <li>Organize meeting to take special measures for the elderly and infants.</li> <li>All cause deaths should be daily reported by SMS to MC and totalled and declared to press every day.</li> </ul>
		<b>Red Alert (Severe Condition- Take action)</b>
		<ul style="list-style-type: none"> <li>Convene key agency leaders to respond to extreme heat events.</li> <li>Announcement should be made in all areas like slums, semi slum areas about the red alert.</li> <li>Inform to all ward councillors, NGO and representative of Ward.</li> <li>Publicity using Auto rickshaw should be done for Red alert</li> <li>Activate “cooling centers,” such as temples, public buildings, malls, during a heat alert.</li> <li>Expand access to shaded areas for outdoor workers, slum communities, hutments and other vulnerable populations across all the corporatons of Gujarat state.</li> <li>Hold a frequent, possibly daily, conference call to discuss reports and breaking developments during a heat alert, and ensure that communication channels remain operational.</li> <li>Identify and set up public displays of temperature and forecasts.</li> <li>Continue surveillance of temperature data and forecasts.</li> </ul>

		<ul style="list-style-type: none"> <li>• Communicate the suspension of all non-essential uses of water (other than drinking, keeping cool)</li> <li>• Increase efforts to distribute fresh drinking water to the public.</li> <li>• Communicate the local utility protocol to prioritize maintaining power to critical facilities (such as hospitals and UHCs).</li> <li>• Notify the Steering Committee and relevant agencies when the heat alert is over.</li> </ul>
4.	Information and Broadcasting Department	<b>Yellow Alert (Stay updated)</b>
		<ul style="list-style-type: none"> <li>• Media training workshop on heat wave prevention and heat alert.</li> <li>• Provide information and heat communication materials developed by the Corporation to the public.</li> <li>• Increase the number of installed LED screens with rolling updated temperature forecasts available to the public.</li> </ul>
		<b>Orange Alert (Moderate Condition)</b>
		<ul style="list-style-type: none"> <li>• Increase public communication including distributing the multilingual pamphlet and advertisements on heat stress prevention and tips for health protection during extreme heat events.</li> <li>• Commence public messaging to the public about the dangers of heat-related illness with the Nodal Officer of Corporation through press conferences, SMS, Radio, TV and use of Print media.</li> </ul>
		<b>Red Alert (Severe Condition- Take action)</b>
		<ul style="list-style-type: none"> <li>• Using Electronic and Print Media, publicity should be done on large scale.</li> <li>• Publish heat IEC materials provided by the Corp to the public.</li> <li>• Circulate warnings via text alerts or WhatsApp mobile messages, in collaboration with private sector telecom companies utilizing centralized mobile databases, in addition to traditional media during a heat alert.</li> <li>• Inform all citizens about RED alert by using bulk SMS.</li> <li>• Develop an SMS alert system to send direct messages to private practitioners in addition to the medical professionals at public hospitals and UHCs.</li> <li>• Utilize local radio FM broadcasts to disseminate heat protection tips and high temperature warnings to the city's at-risk populations during a heat alert.</li> <li>• Explore other means of communications, such as broader use of social media, for example, Facebook and the WhatsApp mobile application.</li> </ul>



5.	Ports & Transport Department	<b>Yellow Alert (Stay updated)</b>
		<ul style="list-style-type: none"> <li>Obtaining lists of risk areas and review of bus timings and available shelters in the high-risk areas.</li> <li>Planning for shade / shelter, drinking water and fans in the waiting areas of passengers.</li> <li>Display of precautionary measures (Do's and don'ts) on busses, autos, in bus stations &amp; auto stands and distribution of pamphlets to passengers.</li> </ul>
		<b>Orange Alert (Moderate Condition)</b>
		<ul style="list-style-type: none"> <li>Review measures of HAP with cab operator / auto / transport associations and also Highway patrol.</li> <li>Provide ORS, ice packets etc. and medical services in bus stations.</li> <li>Pilot project to provide emergency ice packs and heat-illness prevention materials to BRTS / AMTS transit staff and all transport departments.</li> <li>Display posters &amp; distribute pamphlets on prevention of heat related illness in bus stands, auto stands etc.</li> </ul>
6.	Water Resources and Water Supply Department	<b>Red Alert (Severe Condition- Take action)</b>
		<ul style="list-style-type: none"> <li>Establish health teams at major bus stands / terminals and other public places.</li> <li>Ensure availability of shade / shelters, drinking water, ORS packets etc., in bus stands, auto stands etc.</li> <li>Inform all the contractors and officers to keep road site jobs closed during 12 to 4 pm.</li> <li>Make provision of water and buttermilk for all labourer staff.</li> <li>Display of messages inside the bus on TV screen about RED alert.</li> </ul>
		<b>Yellow Alert (Stay updated)</b>
		<ul style="list-style-type: none"> <li>Release water in canals during summer.</li> <li>Promote sprinkler irrigation.</li> </ul>
7.	Energy and Petrochemicals Department	<b>Orange Alert (Moderate Condition)</b>
		<ul style="list-style-type: none"> <li>Ensuring efficient potable water supply.</li> </ul>
		<b>Red Alert (Severe Condition- Take action)</b>
		<ul style="list-style-type: none"> <li>Supply drinking water at various locations of the city and village.</li> </ul>
7.	Energy and Petrochemicals Department	<b>Yellow Alert (Stay updated)</b>
		<ul style="list-style-type: none"> <li>Create awareness among people on energy conservation.</li> <li>Develop a policy for power cuts depending on vulnerable areas and population. Power shedding should be cut</li> </ul>

		<p>down/reduced during severe heat (frequency and timing). The timing should be announced before one day.</p> <ul style="list-style-type: none"> <li>• Issue guideline for workers of the department.</li> </ul>
		<b>Orange Alert (Moderate Condition)</b>
		<ul style="list-style-type: none"> <li>• Ensuring efficient electricity supply.</li> </ul>
		<b>Red Alert (Severe Condition- Take action)</b>
		<ul style="list-style-type: none"> <li>• No power cuts during red alert.</li> </ul>
8.	Women and Child Development Department	<p><b>Yellow Alert (Stay updated)</b></p> <ul style="list-style-type: none"> <li>• Create awareness and educate young girls and mothers regarding the dangers of Heat Waves, its related health impacts and the precautionary measures to be taken.</li> <li>• Display IEC materials at Anganwadis and encourage integrated child development scheme (ICDS) workers to disseminate Heat Wave related information with special focus on infants, children below five years, pregnant and lactating mothers, and geriatric population to protect them from dehydration.</li> <li>• Ensure provision of drinking water and first aid at all the Anganwadi Centers.</li> <li>• Ensure provision of funds for Heat Wave management.</li> </ul>
		<b>Orange Alert (Moderate Condition)</b>
		<ul style="list-style-type: none"> <li>• Ensure that they receive heat alert daily.</li> <li>• Distribution of ORS at AWC .</li> </ul>
		<b>Red Alert (Severe Condition- Take action)</b>
		<ul style="list-style-type: none"> <li>• Special cooling measures for old people and infants.</li> <li>• Inform about RED alert to parents of children coming in Anganwadi.</li> </ul>
9.	Education Department	<p><b>Yellow Alert (Stay updated)</b></p> <ul style="list-style-type: none"> <li>• Design child-friendly educational preventative trainings and distribute heat protection materials at local schools.</li> <li>• Training of school teachers to equip them with knowledge of heat protection tips and activities which they can disseminate in classrooms.</li> <li>• IEC activities on heat wave prevention and management in schools.</li> <li>• Promote School Safety Plan.</li> <li>• Encourage plantation of trees and promote green campus.</li> <li>• Provision of funds for heat wave management.</li> </ul>
		<b>Orange Alert (Moderate Condition)</b>
		<ul style="list-style-type: none"> <li>• Scheduling of examinations before starting of heat period</li> </ul>

		<p>normally.</p> <ul style="list-style-type: none"> <li>• Ensure supply of water for students and teachers if school is functioning.</li> <li>• Communicate to keep cool and hydrated during the heat season by drinking water, staying out of the sun, and wearing light clothing.</li> <li>• Restrict the school timings, if necessary</li> <li>• Ensure avoidance of physical activities during school hours.</li> </ul> <p><b>Red Alert (Severe Condition- Take action)</b></p> <ul style="list-style-type: none"> <li>• Ensure that all school and colleges should be closed during heat wave days.</li> <li>• If school is not functioning, permit use of school premises as shelter during day time.</li> <li>• Corporation schools and Private schools should get alert messages and also send messages to parents through Bulk messages.</li> <li>• Sensitize school /College, University teachers/ and other faculties about RED alert.</li> </ul>
10.	Forest and Environment Department	<p><b>Yellow Alert (Stay updated)</b></p> <ul style="list-style-type: none"> <li>• Directive for making water available for animals in reserved/ protected forests / parks and sanctuaries and make necessary provisions, where necessary.</li> <li>• Issue directives to the zoo authorities for special arrangements for the animals in zoo to protect them from the effect of Heat Wave.</li> <li>• Provision of drinking water like ponds/water bodies for wild life.</li> <li>• Directive for provision of water to human habitations facing water scarcity inside reserved forests.</li> </ul> <p><b>Orange Alert (Moderate Condition)</b></p> <ul style="list-style-type: none"> <li>• Ensure drinking water for wild life.</li> </ul> <p><b>Red Alert (Severe Condition- Take action)</b></p> <ul style="list-style-type: none"> <li>• Keep gardens and park open during heat alert so that people may take shelters in case of heat wave under tree shades etc.</li> <li>• Provide drinking water, shelters and ORS for public.</li> </ul>
11.	Labour & Employment Department	<p><b>Yellow Alert (Stay updated)</b></p> <ul style="list-style-type: none"> <li>• Sensitization workshop for employers, outdoor laborers and workers regarding health impacts of extreme heat and recommendations to protect themselves during high temperatures.</li> </ul>

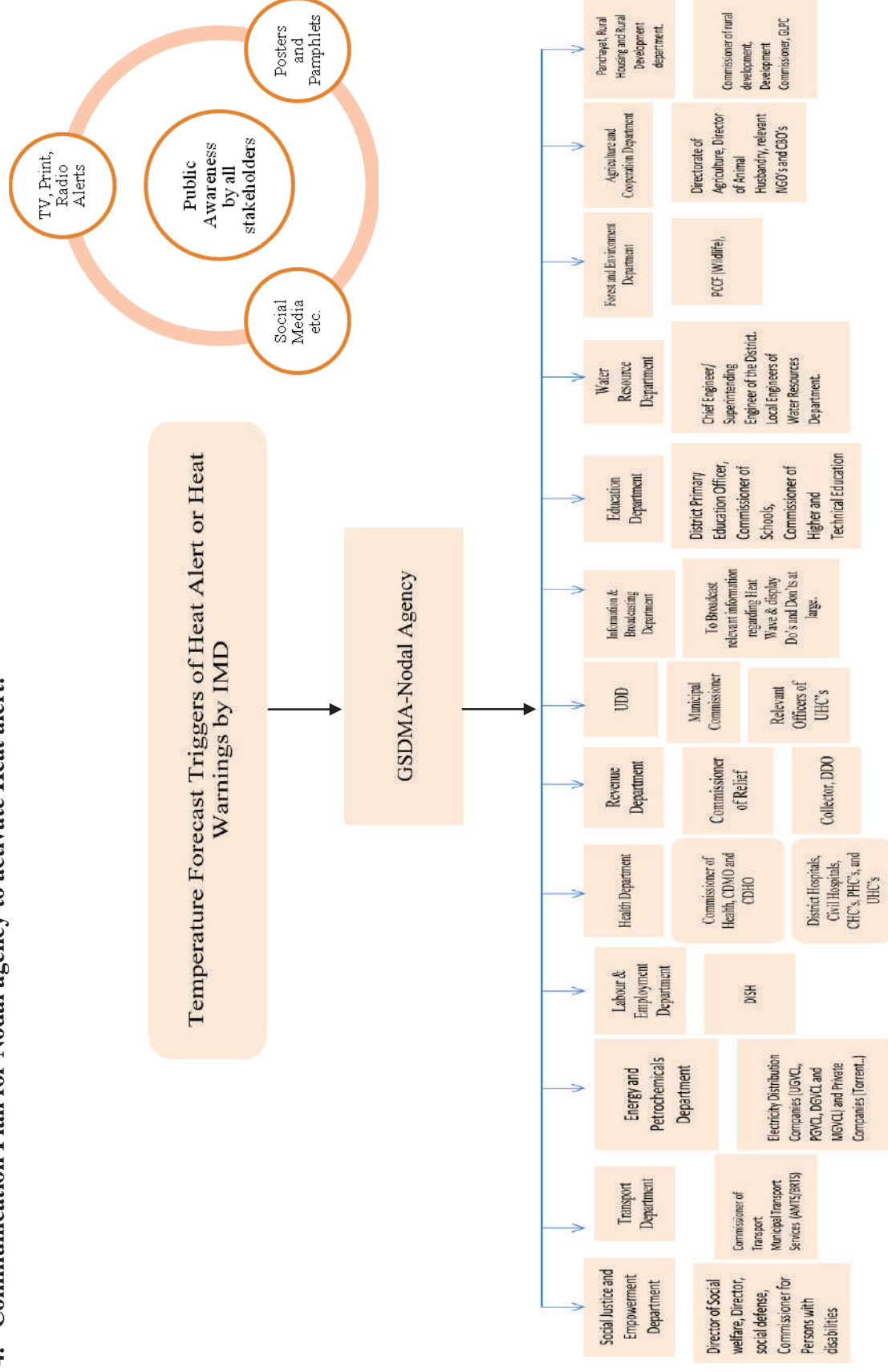
		<ul style="list-style-type: none"> <li>Utilize maps of construction sites to identify more high-risk outdoor workers. Potentially overlay irradiation map stroke / heat island map from ISRO as per satellite imagery<sup>6</sup>.</li> </ul>
		<b>Orange Alert (Moderate Condition)</b>
		<ul style="list-style-type: none"> <li>Organize training for employers, outdoor laborers and workers regarding health impacts of extreme heat and recommendations to protect themselves during high temperatures.</li> </ul>
		<b>Red Alert (Severe Condition- Take action)</b>
		<ul style="list-style-type: none"> <li>Conduct publicity campaigns during high-risk days to these specific areas.</li> <li>Provide sufficient potable drinking water.</li> <li>Change working hours of labourers. Encourage employers to shift outdoor workers' schedules away from peak afternoon hours (1pm – 5pm) during a heat alert.</li> <li>Pilot project to provide emergency ice packs and heat-illness prevention materials to traffic police, BRTS, AMTS etc transit staff and construction workers.</li> </ul>
12.	Panchayat, Rural Housing and Rural Development department.	<b>Yellow Alert (Stay updated)</b> <ul style="list-style-type: none"> <li>Sensitization of labourers and contractors working under MGNREGA and other labourers working under different schemes of Rural development department and Panchayati Raj.</li> </ul>
		<b>Orange Alert (Moderate Condition)</b>
		<ul style="list-style-type: none"> <li>Sensitization of villagers about the Heat wave illness.</li> <li>Ensure supply of potable drinking water in villages.</li> <li>Conduct wide publicity campaigns during high-risk days.</li> </ul>
		<b>Red Alert (Severe Condition- Take action)</b>
		<ul style="list-style-type: none"> <li>Shift the working times of labourers working under MGNREGA and other labourers working under different schemes of Rural development department and Panchayati Raj.</li> <li>Ensure availability of shade / shelters at all prominent places of public gatherings like bus stops, religious places, railway stations, market places etc.</li> </ul>
13.	Social Justice and Empowerment Department	<b>Yellow Alert (Stay updated)</b> <ul style="list-style-type: none"> <li>Train staff regarding health impacts of extreme heat and recommendations to protect themselves during high temperatures.</li> </ul>

<sup>6</sup> <https://solargis.com/maps-and-gis-data/download/world>

		<ul style="list-style-type: none"> <li>Cool room facility at Old age home, Orphanages and institutions dealing with persons with disabilities.</li> <li>Ensure safety during heat wave of all venerable groups of society.</li> </ul>
		<b>Orange Alert (Moderate Condition)</b>
		<ul style="list-style-type: none"> <li>Ensure adequate supply of water and cooling devices.</li> <li>Communicate to keep cool and hydrated during heat wave.</li> <li>Staying indoors or cooler places.</li> </ul>
		<b>Red Alert (Severe Condition- Take action)</b>
		<ul style="list-style-type: none"> <li>Advising them to restrict there exposure to direct sun heat.</li> <li>Establishment of Parb (water pots)/ mobile drinking water stations.</li> <li>Use of public address system for dissemination of red alert.</li> <li>Use of mobile vans for shifting of vulnerable groups to the cooling places/cool shades/ cooling centres.</li> <li>Change of working timings during heat alert.</li> </ul>
14.	Fire Department	<b>Yellow Alert (Stay updated)</b>
		<ul style="list-style-type: none"> <li>Train staff regarding health impacts of extreme heat and recommendations to protect themselves during high temperatures.</li> </ul>
		<b>Orange Alert (Moderate Condition)</b>
		<ul style="list-style-type: none"> <li>Ensure adequate numbers of vehicles and firefighting equipment.</li> </ul>
		<b>Red Alert (Severe Condition- Take action)</b>
		<ul style="list-style-type: none"> <li>Ensure presence of staff during heat alert period, if necessary by restricting leaves.</li> <li>Ensure functioning of communication equipment to receive messages / alerts of occurrence of fire.</li> <li>Ensure adequate supply of water and foam to fight fire.</li> </ul>
15.	NGO's, CBO's, Voluntary Organizations, NCC, NSS and NYK	<b>Yellow Alert (Stay updated)</b>
		<ul style="list-style-type: none"> <li>Training and distribute heat protection materials.</li> <li>Dissemination of heat wave dos and don'ts.</li> <li>Increase outreach programmes to different vulnerable groups.</li> </ul>
		<b>Orange Alert (Moderate Condition)</b>
		<ul style="list-style-type: none"> <li>Conduct training workshops and outreach sessions with community groups and mobilizers such as Mahila Arogya Samiti, Self-Employed Women's Association (SEWA), ASHA/Aaganwadis workers and municipal councilors to help</li> </ul>

		<p>inform and get vulnerable communities more actively involved.</p> <ul style="list-style-type: none"> <li>• Incorporate other sectors and community leaders to increase reach to communities.</li> <li>• Encourage individuals to discussion of the early signs of heat exhaustion with their local doctor or Urban Health Centers.</li> <li>• Inform fellow community members about how to keep cool and protect oneself from heat</li> </ul>
		<b>Red Alert (Severe Condition- Take action)</b>
		<ul style="list-style-type: none"> <li>• Regular meetings with community groups and inform them about red heat alert.</li> <li>• Limit heavy work in direct sun or indoors if poorly ventilated, especially during a heat alert.</li> <li>• Communicate to keep cool and hydrated during the heat season by drinking water, staying out of the sun, and wearing light clothing.</li> <li>• Check on vulnerable neighbours, particularly during a heat alert.</li> </ul>

#### 4. Communication Plan for Nodal agency to activate Heat alert.



## **5. Measure for Prevention and Mitigation of Impacts of Heat Wave**

### **5.1 Introduction**

Extreme heat events are on the rise, but there are things you can do now—in your own home, workplace, or neighbourhood—to reduce your current and future risks. Here are some ways through which we can reduce the impact of Heat Wave to some extent:

### **5.2 Be prepared at home.**

The best time to prepare for an extreme heat event is before it happens. Each spring, check your household's fans, air conditioners, and other cooling equipment to make sure they are in good working order. Write down a list of family, friends, and neighbours who might need assistance in an extreme heat event, and make sure you have their phone numbers. Look up the location of your nearest cooling center(s) in case you need to go there.

### **5.3 Be prepared in your community.**

If you work outdoors or in a physically demanding job without air conditioning, work with your employer to establish a committee at your workplace to develop a heat response plan. Get involved in children's school and sports organizations to ensure that proper measures are in place for extreme heat days and outdoor athletic practices take place during the coolest part of the day.

### **5.4 Install a cool roof.**

A cool roof is made of materials or coatings that reflect sunlight and heat away from your home, reducing roof temperatures. This makes your home cooler, increasing your comfort and reducing the amount of air conditioning needed during hot days.

Cool roofs offer a simple and cost-effective solution to urbanization challenges. Cool roofs save energy, increase thermal comfort and reduce cooling demand. Cool roofs reflect sunlight and absorb less heat. 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<sup>7</sup>.

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<sup>7</sup>V. Garg, et al. 2016, Assessment of the impact of cool roofs in rural buildings in India, Energy and Buildings, 114, 156-163 (available at <http://dx.doi.org/doi:10.1016/j.enbuild.2015.06.043>)



## Cool Roofing Material

The choice of an appropriate cool roof material in a particular context depends on a range of factors, from existing roof material, life and maintenance, availability, cost, time needed for installation and availability of skilled labor. To help cater to a range of contexts, cool roofs techniques can be broadly divided into four categories and building owners can choose from these techniques as appropriate for implementing cool roofs.

- I. **Coated cool roofs:** these roofs involve the coating of a material or paint with high reflectivity on top of a conventional roof material to increase the roof surface's solar reflectance index. These are liquid applied coatings made of simple materials such as lime wash or an acrylic polymer or plastic technology and are usually white in color.
- II. **Membrane cool roofs:** these roofs involve using pre-fabricated materials such as membranes or sheeting to cover an existing roof in order to increase the roof surface's SRI. These types of roofs can be polyvinyl chloride (PVC) or bitumen-based.
- III. **Tiled cool roofs:** these roofs involve the application of high albedo, china mosaic tiles or shingles on top of an existing roof or to a new roof.
- IV. **Special cool roof materials such as Mod Roof:** these roofs, made of coconut husk and paper waste, have been installed in households around Gujarat and Delhi and can serve as an alternative to reinforced cement concrete roofs.
- V. **Green roofs:** green roofs make use of vegetation to help the roof absorb less solar energy by providing a thermal mass layer to reduce flow of heat into a building. Vegetation is especially useful in reflecting infrared radiation. Green roofs are also considered cool roofs, but due to higher costs and need for water, they are likely not a cost-effective solution for heat reduction in low-income communities in India.



The cost implications vary by the type of material used for cool roofing. However, most of these materials have been applied locally in India and are available through local vendors.

### **5.5 Plant trees or erect shade structures in strategic locations.**

Trees and vegetation that directly shade your home can lower surrounding temperatures; this can decrease the need for air conditioning, make your home more comfortable, and reduce your energy bill. Trees also protect your family's health by improving air quality, providing cooling shade for outdoor activities, and reducing your exposure to the sun.

### **5.6 Use cool paving materials in your driveway.**

If you've ever walked barefoot on hot pavement, you know it can heat up quickly in the sun. Hot pavement also transfers heat to the surrounding air, adding to the urban heat island effect. Cool pavement stays cooler in the sun than traditional pavement by reflecting more solar energy or enhancing water evaporation. Cool pavement can be created from asphalt and concrete, as well as through the use of coatings or grass paving.

### **5.7 Replace your old cooling devices.**

Replace the old or damaged cooling units which are inefficient and more energy consumption devices, meaning you're paying more money for less actual cooling ability. We should purchase energy efficient devices before we need it.

### **5.8 Contribute to a community-wide heat response plan.**

Many state and local governments have already developed plans that identify locations, infrastructure, and people that are vulnerable to climate change and extreme heat. These plans also describe actions a community can take to improve resilience. Check online or call your local representatives to see if your community has a plan. If you are interested in heat response planning efforts in your community, your town or city hall is a great place to start. Ask how you can get involved!

### **5.9 Find out about local heat alert systems and subscribe to them.**

Local governments, weather stations, medical providers, or others may have systems for issuing heat alerts through the television, radio, newspapers, phone calls, social media, texts, emails, or the internet. Find out what systems are in place for your community, and sign up to receive alerts.

#### **5.10 Determine whether there are resources for support in your community.**

Community based organizations should come forward to beat the heat wave through supply of drinking water and other community wellbeing activities like putting of shade at prominent places etc.

#### **5.11 Recurring / regular activities**

- Putting up display boards for colour coded heat alerts and Do's and Don'ts in public places such as parks, hospitals, etc.
- Multiple medium of communication (preferably in Gujarati language) like TV, Radio and newspaper for awareness.
- Identify and reduce awareness gaps through disseminating of information using pamphlets, hoardings, LED display on advertisement boards.
- Change in timings of schools, colleges, offices, markets etc.

### **Suggested short-term and long-term measures to reduce Heat Wave impacts**

#### **5.12 Short-term activities**

- Installing temporary kiosks for shelter and distribution of water, medicines, etc.
- Developing mobile applications for spreading awareness on heat-related issues and locating shelters, drinking water kiosks, etc.
- Issuing advisories for tourists.
- Setting up special cool shelters for “Wage Employment Programmes” such as Mahatma Gandhi National Rural Employment Guarantee Scheme (MNREGA).
- Providing shade and drinking water for on duty traffic personnel.

#### **5.13 Medium – Term activities**

- LED display boards installed at District Headquarters displaying the real time weather data pertaining to rainfall, Temperature, Humidity and Wind Speed should be incorporated into precautionary measures for Disaster Management.

- Involving Forest department for collecting local coping and adaptation strategies, indigenous technologies such as vernacular building materials, construction of green building, energy conservation building codes (ECBC) etc. related to heat wave risk mitigation.
- New heat wave criteria must be evolved based on gridded data with maximum and minimum temperature, to develop a scientific model to determine all-cause mortality.
- Zonal/regional Heat Action Plan for all municipal corporation viz. Ahmadabad, Bhavnagar, Gandhinagar, Jamnagar, Rajkot, Surat and Vadodara.
- Identify “Heat Hot Spots” in Gujarat through appropriate tracking and modelling of meteorological data and promote the timely development and implementation of local Heat Action Plans with strategic inter-agency coordination, and a response which targets the most vulnerable groups.

#### **5.14 Long Term activities**

- Installation of Green Roof Tops to minimize the in house temperature.
- Use of white paint (Chinii Mitti)/ white glazed tiles on rooftops for reflection of Sun rays and avoiding heat wave.
- Focused capacity building Heat wave mitigation management should be added in school curriculum to sensitize school children and local people. Training programmes in local level/community level for awareness among people.
- Integrate climate variability of heat wave plan through response and feedback data collection.
- Operational forecast of maximum temperature over India in short, medium and extended range timescale is very useful in giving Heat Wave Outlook.
- Upgradation of forecast system & associated equipments to provide heat wave alerts minimum of 2 to 3 weeks prior to the event.
- Health harming air pollution apportionment studies, emission inventories and health impact assessments of ambient and household air pollution through State wise Clean Air Action Plans, and use these findings to inform policies targeted at reducing the main sources of pollution via an inter- ministerial approach.
- Evaluation of cascading effects of heat waves over flood, drought and hydrological models.
- Involvement of academia along with collaboration and more participation from higher educational institutes may be developed. The centres for excellence and dedicated research centres may have pivotal role to play.

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## **Annexure I**

### **(Refer Para 3.0)**

#### **Heat wave Do's and Don'ts**

##### **Do's and Don'ts**

Heat Wave conditions can result in physiological strain, which could even result in death. To minimize the impact during the heat wave and to prevent serious ailment or death because of heat stroke, the following measures are useful:

##### **Do's**

##### **Must for All**

- Listen to Radio, watch TV, read Newspaper for local weather forecast to know if a heat wave is on the way
- Drink sufficient water and as often as possible, even if not thirsty
- Use ORS, homemade drinks like lassi, unripe mango juice (kachi keri), lemon water, buttermilk, etc. which help to re-hydrate the body
- Wear lightweight, light-coloured, loose, and porous cotton clothes. Use protective goggles, umbrella/hat, shoes or chappals while going out in sun.
- Cover your head; Use a cloth, hat or umbrella

##### **Employers and Workers**

- Provide cool drinking water near work place
- Caution workers to avoid direct sunlight
- Schedule strenuous jobs to cooler times of the day
- Increasing the frequency and length of rest breaks for outdoor activities.
- Pregnant workers and workers with a medical condition should be given additional attention.

##### **Other Precautions**

- Stay indoors as much as possible
- Keep your home cool, use curtains, shutters or sunshade and open windows at night.

- Try to remain on lower floors
- Use fans, damp clothing and take bath in cold water frequently.
- While travelling, carry water with you.
- If you work outside, use a hat or an umbrella and also use a damp cloth on your head, neck, face and limbs.
- Recognize the signs of heat stroke, heat rash or heat cramps such as weakness, dizziness, headache, nausea, sweating and seizures. If you feel faint or ill, see a doctor immediately.
- Keep animals in shade and give them plenty of water to drink.

### **Don'ts**

- Avoid going out in the sun, especially between 12.00 noon and 3.00 p.m.
- Avoid wearing dark, heavy or tight clothing.
- Avoid strenuous activities when the outside temperature is high.
- Avoid working outside between 12 noon and 3 p.m.
- Do not go out barefoot
- Avoid cooking during peak hours. Open doors and windows to ventilate cooking area adequately.
- Do not leave children or pets in parked vehicles- as they may get affected by Heat Wave
- Avoid alcohol, tea, coffee and carbonated soft drinks, which dehydrates the body.
- Avoid high-protein food and do not eat stale food.

**The best defense against extreme heat is to be prepared, and remember:**

**Get ready:** Take steps now to prepare your home, workplace, and community for preparation and prevention of heat wave.

**Get set:** Know the symptoms of heat-related illnesses and what to do in an emergency.

**Go:** Check on those who may need help during an extreme heat event, like children, elderly family members, homebound neighbours, or outdoor workers.

**Annexure II**  
**(Refer Para 3.0)**

**Case Definitions**

**Range of Heat Illness – Typical Presentations – symptoms, signs and prognosis**

<b>Clinical Entity</b>	<b>Age Range</b>	<b>Setting</b>	<b>Cardinal Symptoms</b>	<b>Cardinal/ Important Signs</b>	<b>Pertinent Negative findings</b>	<b>Prognosis</b>
Heat rash/ prickly heat/ Malaria	All, but frequently children	Hot environment; +/- insulating clothing or swaddling (Wrap in tight clothes)	Itchy rash with small red bumps at pores in the skin. Seen in setting of heat exposure; bumps can sometimes be filled with clear or white fluid	Diffused red color skin or vesicular rash, itching of the skin without visible eruption	Not focally distributed like a contact dermatitis	Full recovery with elimination of exposure and supportive care
Heat cramp	All	Hot environment; typically with exertion, +/- insulating clothing	Painful spasms of large and frequently used muscle groups	Uncomfortable appearance, may have difficulty fully extending affected limbs/joints	No contaminated wounds/tetanus exposure; no seizure activity	Full recovery with elimination of exposure and supportive care
Heat Exhaustions	All	Hot environment; +/- exertion; +/- insulating clothing or swaddling (Wrap in tight clothes)	Feeling overheated, light headedness, exhausted and weak, unsteady, feeling of vomiting, sweaty and thirsty, inability to continue activities	Sweaty/diaphoretic flushed skin; hot skin; normal core temperature; +/- dazed, +/- generalized weakness, slight disorientation	No coincident signs and symptoms of infection; no focal weakness; no difficulty in swallowing food or speech; no overdose history	Full recovery with elimination of exposure and supportive care; progression to heat syncope/stroke if continues exposure



Heat syncope	Typically Adults	Hot environment; +/- exertion; +/- insulating clothing or swaddling (Wrap in tight clothes)	Feeling hot and weak; lightheadedness followed by a brief loss of consciousness	Brief generalized loss of consciousness in hot setting, short period of disorientation, if any	No seizure activity, no loss of bowel or bladder continence, no focal weakness; no difficulties in food swallowing or speech	Full recovery with elimination of exposure and supportive care; progression to heat stroke if continued exposure
Heat Stroke	All	Hot environment; +/- exertion; +/- insulating clothing or swaddling (Wrap in tight clothes)	Severe overheating; profound weakness; disorientation, not fully alert, convulsion, or other altered mental status	Flushed, dry skin (Not always), core temp $\geq 40^{\circ}\text{C}$ or $104^{\circ}\text{F}$ ; altered mental status with disorientation, incoherent behaviour, coma, convulsion; tachycardia; +/-hypotension	No coincidental signs and symptoms of infection; no focal weakness; no difficulties in food swallowing or speech, no overdose history	25-50% mortality even with aggressive care; significant morbidity even if survives

### **Annexure-III**

#### **(Refer Para 3.0)**

### **Heat Illness Treatment Protocol**

Recognizing that treatment protocols may vary slightly according to the setting (EMS, health centre, clinic, hospital emergency department, etc.), the following should apply generally to any setting and to all patients with heat related illnesses:

1. Initial patient assessment primary survey (airway, breathing, circulation, disability, exposure), vital signs including temperature.
2. Consider heat illnesses in differential diagnosis if:
  - a. Presented with suggestive symptoms and signs
  - b. Patient has one or more of the following risk factors:
    - i. Extremes of age (infants, elderly)
    - ii. Debilitation/physical deconditioning, overweight or obese
    - iii. Lack of acclimatization to environmental heat (recent arrival, early in summer season)
    - iv. Any significant underlying chronic disease, including psychiatric, cardiovascular, neurologic, hematologic, obesity, pulmonary, renal, and respiratory disease.
    - v. Taking one or more of the following:
      1. Sympathomimetic drugs
      2. Anticholinergic drugs
      3. Barbiturates
      4. Diuretics
      5. Alcohol
      6. Beta blockers
3. Remove from environment heat exposure and stop physical activity.
4. Initiate passive cooling procedures:
  - a. Cool wet towels or ice packs to axillae, groin, and around neck; if patient is stable, may take a cool shower, but evaluate risk of such activity against gain and availability of other cooling measures.
  - b. Spray cool water or blot cool water onto the skin
  - c. Use fan to blow cool air onto moist skin.
5. If body temperature lower than 40°C, repeat assessment every 5 minutes, if patient is fully conscious and improving, attempt to orally hydrate (clear liquids, ORS can be used but not necessary, cool liquids better than cold). If body temperature is 40°C or above, initiate IV rehydration and immediately transport to emergency department for stabilization.

**Annexure-IV**

**(Refer Para 3.0)**

**List of Departments Concerned with Heat Wave Management**

<b>Sr. No.</b>	<b>Name of the Concerned Department</b>
1.	Agriculture, Farmers Welfare & Co-operation Department
2.	Climate Change Department
3.	Director of Industrial Safety and Health (DISH)
4.	Education Department
5.	Energy and Petrochemicals Department
6.	Forests & Environment Department
7.	Gujarat Institute of Disaster Management (GIDM)
8.	Gujarat State Disaster Management Authority (GSDMA)
9.	Health & Family Welfare Department
10.	India Meteorological Department
11.	Indian Institute of Public Health, Gandhinagar (IIPHG)
12.	Information and Broadcasting Department
13.	Labour and Employment Department
14.	Narmada, Water Resources, Water Supply and Kalpasar Department
15.	Panchayat, Rural Housing and Rural Development department.
16.	Ports and Transport Department
17.	Revenue Department
18.	Social Justice and Empowerment Department
19.	Space Applications Centre, ISRO
20.	Urban Development & Urban Housing Department
21.	Women & Child Development Department

**Annexure-V**

**Format A: Death Reported due to Heat Wave**

Name of the State:				Year:				Reporting Period:				Date of Reporting:				
District		Location				Occupation				Economic						
		Urban		Rural		Total	M	F	Farmers	Labours	Hawkers	Others	Total	BPL	APL	Total
M	F	M	F													
	Age Group															
District 1	0-6 Years															
	7-18 Years															
	19-35 Years															
	36-60 Years															
	61 > Years															
	Sub Total															
District 2	0-6 Years															
	7-18 Years															
	19-35 Years															
	36-60 Years															
	61 > Years															
	Sub Total															
Total State																

\*If any other information related to Heat Wave, please enclose a separate page.

To be reported to health department, CoR and GSDMA

Name and Designation of the reporting officer:

Signature with Date:

CDHO

**Annexure-VI****Format B: Details of the death reported due to Heat Wave (Record to be kept with State Government)**

Sr. No.	Name & Address	Age	Sex (M/F)	Occupation	Place of Death	Date & Time of Death	Max Temp Recorded (Rectal & Oral)	Deaths Reported due to Heat Wave Period or not	List of Chronic Diseases present (Ask the family members)	Date and Time of Post Mortem (If conducted)	Date & Time of Joint Enquiry conducted with a revenue authority	Remarks	
												Related to Post mortem	Related to Joint Enquiry

Name and Designation of the reporting officer:

Signature with Date:

**Annexure: VII**

**FORMAT C**

Daily Report of Heat Stroke Cases and Deaths (District Report to State Government)

S.No	Village	PHC	Block/City	Name & Of Son/Daughter/Wife of	BPL Y/N	Age & Sex	Date Of Attack Of Heat Stroke	Any Antecedent Illness	Cause Of Death	Death Confirmed By MO's and MOR's

To be reported to health department, CoR and GSDMA

Signature with Date:

Mamlatdar (DM)

**Annexure: VIII**

**FORMAT D**

(To be cumulated at State Level and sent to Central Government)

DEATH DUE TO HEAT RELATED ILLNESS: GUJARAT STATE

Date:

S.No	Name Of The Districts (Name Of All The Districts)	New heat illness admitted due to the reporting period	Cumulative number of cases reported due to heat related illness since 1 <sup>st</sup> April	Deaths reported due to heat related illness since the last reporting period	Cumulative number of deaths reported due to heat related illness since 1 <sup>st</sup> April	Remarks (if any shortage of ORS/IV Fluids/treatment facilities etc)

**Commissioner of Relief**



**Annexure: IX**

# Protect Yourself from Sunstroke (Heat Wave)

## Precautions

- Do not expose yourself to direct sunlight
- Wear lightweight, light coloured, and loose-fitting cotton clothing, wear cap, use umbrella
- If you work outside, use a hat or an umbrella and also use a damp cloth on your head, neck, face and limbs
- Take shelter under the tree
- Drink ORS, homemade drinks like lassi, lemon water, coconut water, buttermilk, (Chaas) etc. which help to re-hydrate the body
- Avoid tea, coffee and carbonated soft drinks, which dehydrates the body
- Do not eat food kept in open place & commercially prepared ice
- Avoid outside uncovered and stale food particularly milk products
- Avoid fasting and try to take regular lunch by 12.00 noon
- Do not take bath immediately after coming from outside during daytime. Bath must be taken only after body is at normal temperature
- Use kesu flowers and neem leaves in water to bathe children
- Keep your home cool, use curtains, shutters or sunshade and open windows at night
- Children, Pregnant Women, Aged & sick person should take special precautions

**Avoid venturing outside between 2-4pm during Heat Wave Warning**

## Symptoms of Sun Stroke

- |                               |                              |
|-------------------------------|------------------------------|
| • Head ache, pain in calf     | • Unconsciousness            |
| • Increased body temperature  | • Fainting, disorientation   |
| • Excessive thirst            | • In severe case-convulsions |
| • Nausea, vomiting, Giddiness |                              |

**As per Ayurveda, in summer season- sharbat of saunff, unripe mango (kachi keri), rose are beneficial to health. Dried black grapes soaked in water overnight, may be consumed next morning. Eating water melon during daytime also benefits**

**Sunstroke, if not treated urgently may result in to Heat Stroke.  
Seek treatment at the nearest Primary Health Centre or Govt. Hospital**



Issued in public interest by Govt. of Gujarat



Annexure: X

# ગરમીમાં લૂ લાગવા (હીટ વેવ) થી બચો

## આરોગ્યલક્ષી સુચનો

- \* હીટ વેવ દરમિયાન સુધી બહાર નીકળવાનું ટાળવું, આખું શરીર અને માથું ઢંકાઈ તે રીતે સફેદ સુતરાઈ ખુલતા કપડાં પહેરવા, ટોપી, ચશ્માં, છત્રીનો ઉપયોગ કરવો.
- \* નાના બાળકો, સગર્ભા માતાઓ, વૃદ્ધો તથા અશક્ત અને બિમાર વ્યક્તિઓએ તડકામાં વિશેષ કાળજી લેવી
- \* સીધા સૂર્ય પ્રકાશથી બચો
- \* ભીનાં કપડાંથી માથું ઢાંકી રાખો અવાર-નવાર ભીનાં કપડાંથી શરીર લૂછો વારંવાર ઠંડું પાણી પીવું
- \* લીંબુ શરબત, મોળી છાશ, તાડફળી અને નારીયેળનું પાણી, ખાંડમીઠાનું દ્રાવણ, ઓ.આર.એસ. વગેરે પુષ્કળ પ્રમાણમાં પીવા
- \* બાળકો માટે કેસુડાનાં ફુલ તથા લીમડાના પાનનો નાહવાના પાણીમાં ઉપયોગ કરવો
- \* ગરમીમાં બહારથી ઘરે આવ્યા બાદ શરીરનું તાપમાન નીચું આવે ત્યારબાદ જ નહાવું, શક્ય હોય તો ઘરના બારી અને બારણા સાથે ખસતી ટટ્ટી પાણી છાંટી બાંધી રાખવી
- \* દિવસ દરમિયાન ઝાડ નીચે, ઠંડક અને છાંયામાં રહેવું
- \* બજારમાં મળતો ખુલ્લો, વાસી ખોરાક ખાવો નહી, બજારમાં મળતા બરફનો ઉપયોગ ટાળવો, લગ્ન પ્રસંગે દૂધ, માવાની આઈટમ ખાવી નહી
- \* ઉપવાસ કરવાનું ટાળવું, સવારનું ભોજન ૧૨:૦૦ વાગ્યા સુધીમાં લઈ લેવું
- \* ચા-કોફી અને દારૂના સેવનથી લૂ લાગવાની શક્યતા વધે છે, તેથી તેનું સેવન ટાળવું

- \* હીટ વેવની ચેતવણીના દિવસોમાં બપોરે બે વગ્યાથી ચાર વગ્યા સુધી બહાર નિકળવાનું ટાળવું

## લૂ લાગવા (હીટ વેવ) ના લક્ષણો

- \* માથું દુઃખવું, પગની પીડીઓમાં દુઃખાવો થવો
  - \* શરીરનું તાપમાન વધી જવું
  - \* ખૂબ તરસ લાગવી
  - \* શરીરમાંથી પાણી ઓછું થઈ જવું
  - \* ઉલ્ટી થવી, ઉબકા આવવા, ચક્રકર આવવા, આંખે અંધારા આવવા
  - \* બેભાન થઈ જવું
  - \* સુધ-બુધ ગુમાવી દેવી (Confusion)
  - \* અતિગંભીર કિસ્સામાં ખેંચ આવવી
- \* વરીયાળી, કાચી કેરી, ગુલાબ, ખસ(વાળા), અને કાળી દ્રાક્ષનું શરબત લઈ શકાય, રાત્રે ૧૦ નંગ કાળી દ્રાક્ષ પાણીમાં પલાળી સવારે આ પાણી પીવું અને દ્રાક્ષ ખાવી, તરબુચનો ઉપયોગ સવારે અને બપોરે કરવો.

લૂ લાગવાની અસર જણાય તો તાત્કાલિક નજીકના પ્રાથમિક આરોગ્ય કેન્દ્ર કે સરકારી દવાખાનાનો સંપર્ક કરવો.



ગુજરાત સરકાર દ્વારા જનહિતાર્થે

**Annexure: XI**

## ઉનાળાની ઋતુમાં ગરમી (હીટ સ્ટ્રોક) થી રક્ષણ માટેના અગત્યના ઉપાયો...



પુષ્કળ પ્રમાણમાં ઠંડુ પાણી તથા લીંબુ  
શરબત જેવા અન્ય પ્રવાહીનું સેવન કરવું.



વધુ પડતો શ્રમ ટાળો શક્ય હોય ત્યાં સુધી  
તડકામાં ફરવાનું ટાળવું.



ભરખપોરે કામ ઉપર જાવ ત્યારે અથવા  
કામના સમયે થોડો સમય છાંયડા નીચે  
આરામ કરો.



ઠંડક માટે માથા પર ઠંડુ ભીનું કપડું રાખો,  
ઉઘાડા શરીરે ફરવું નહીં, ઉપવાસ કરવા  
નહીં તેમજ સુતરાઉ ખુલ્લા કપડાં પહેરવા.



ઠંડકવાળા સ્થળો પર જાઓ, જેવા કે  
મંદિર, મસ્જિદ, થિયેટર, શોપીંગ મોલ.



પંખા, ફુલર તથા એ.સી.નો ઉપયોગ કરો.



સગર્ભા માતાઓ, નાના બાળકો  
અને વૃદ્ધોનું ખાસ ધ્યાન રાખવું.



### ગરમી (હીટ સ્ટ્રોક)ના લક્ષણો

- વધુ તાવ આવવો, ગરમ અને સૂકી ત્વચા.
- નાડીના ઘભકારા વધવા, ઝાડા-ઉલ્ટી જેવું થવું.  
માથાનો દુખાવો, ચક્કર આવવા, બેભાન થવું.

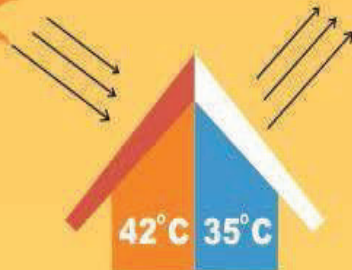


હીટ (હીટ સ્ટ્રોક)ના લક્ષણો જણાય તો તાત્કાલિક નજીકના ડૉક્ટર, મ્યુનિ.હોસ્પિટલ/ અર્બન હેલ્થ સેન્ટરનો સંપર્ક કરો.

**સ્વરક્ષણથી સુરક્ષિત થાઓ અને તમારા પરિવારને પણ સુરક્ષિત કરો.**



**સફેદ થશે છત તો ગરમીથી મળશે રાહત**



### ગરમીમાં ઘરની છત પર

સફેદ રંગ / સફેદ ચૂનો / સફેદ ટાઇલ્સ

### ઘટાડશે

ઘરનું તાપમાન, વીજળીનું બીલ

**અને બચાવશે સ્વાસ્થ્ય**

### **Key participating Agencies & Departments**

1. Gujarat State Disaster Management Authority (GSDMA)
2. Gujarat Institute of Disaster Management
3. Health Department
4. India Meteorological Department
5. Indian Institute of Public Health Gandhinagar (IIPHG)
6. Revenue Department

### **Acknowledgement**

GSDMA wish to acknowledge the support of various agencies, departments, and individuals for their contribution in preparation of the Gujarat State Action Plan: Prevention and Mitigation of Impacts of Heat Wave 2020.

List of some important emergency numbers

<b>S. No.</b>	<b>Service</b>	<b>contact number</b>
1.	National Emergency Number	112
2.	Police	100
3.	Fire	101
4.	Ambulance	102
5.	Medical Helpline	104, 108
6.	Disaster Management Services	108
7.	Women helpline	1091
8.	Disaster Management NDMA	1078
9.	Relief Commissioner for Natural Calamities	1070
10.	SEOC, Gandhinagar	1077
11.	Earthquake / Flood / Disaster, NDRF HQ.	011-24363260, 9711077372
12.	Railway enquiry	139
13.	Senior Citizen Helpline	1091, 1291
14.	Railway Accident Emergency	1072
15.	Road Accident Emergency Service on National Highway for Private Operators	1033
16.	LPG Leak Helpline	1906





