

Surat Heat Wave Action Plan 2018



Surat Heat Wave Action Plan 2018



Prepared for,
Surat Municipal Corporation

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Background and Status

1. Introduction:

1.1 What Is Extreme Heat?

We all expect it to be warm in the summer, but sometimes the heat can be severe or even dangerous. A series of unusually hot days is referred to as an extreme heat event

Extreme heat conditions are defined as weather that is much hotter than average for a particular time and place—and sometimes more humid, too. Extreme heat is not just a nuisance; it kills hundreds of citizens every year and causes many more to become seriously ill.

Heat wave: Heat-wave is a condition of atmospheric temperature that leads to physiological stress, which sometimes can claim human life. Heat-wave is defined as the condition where maximum temperature at a grid point is 3°C or more than the normal temperature, consecutively for 3 days or more. 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. If the maximum temperature of any place continues to be more than 45° C consecutively for two days, it is called a heat wave condition.¹

The heat index is a measure of how hot it feels when relative humidity is factored in with the actual air temperature. Relative humidity is the percentage of moisture in the air compared with the maximum amount of moisture the air can hold. Humidity is an important factor in how hot it feels because when humidity is high, water doesn't evaporate as easily, so it's harder for your body to cool off by sweating.

The extreme heat vulnerable groups are children, lactating mother and infant, old age people, vegetable vendors, auto repair mechanics, cab drivers, construction workers, police personnel, road side kiosk operators and mostly weaker sections of the society have to work in the extreme heat to make their ends meet and are extremely vulnerable to the adverse impacts of heat waves such as dehydration, heat and sun strokes. Therefore, it is not surprising that these workers, homeless people and the elderly constitute the majority of heat wave casualties in the city.

There will be no harm to the human body if the environmental temperature remains at 37° C. Whenever the environmental temperature increases above 37° C, the human body starts gaining heat from the atmosphere. If humidity is high, a person can suffer from heat stress disorders even with the temperature at 37°C or 38°C. To calculate the effect of humidity we can use Heat Index Values. The Heat Index is a measure of how hot it really feels when relative humidity is factored in with the actual air temperature. As an example, if the air temperature is 34°C and the relative humidity is 75%, the heat index--how hot it feels--is 49°C. The same effect is reached at just 31°C when the relative humidity is 100 %. The temperature vs humidity chart is placed and the temperature actually felt is placed below on next page.

Higher daily peak temperatures and longer, more intense heat waves are becoming increasingly frequent globally due to climate change.² Climate change is leading to an increase in average temperatures and increased possibilities of severe heat waves. Extreme heat can lead to dangerous, even deadly, health consequences, including heat stress and heatstroke. Extreme heat causes more deaths than any other weather-related hazard—more than cyclones, lightning, drought or flooding. In addition, thousands of people who are exposed to extreme heat seek medical treatment each year.

¹ Heat-wave defines by Indian Meteorological Department (IMD) on <http://www.imd.gov.in/doc/termglossary.pdf>.

² IPCC, "Special Report on Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation," March 8, 2012



Background and Status

NOAA National Weather Services: Heat Index

Temperature (°C)

	27	28	29	30	31	32	33	34	36	37	38	39	40	41	42	43
40	27	27	28	29	31	33	34	36	38	41	43	46	48	51	54	58
45	27	28	29	31	32	34	36	38	40	43	46	48	51	54	58	
50	27	28	29	31	33	35	37	40	42	45	48	51	55	58		
55	27	29	30	32	34	37	38	41	44	47	51	54	58			
60	28	29	31	33	35	38	41	43	47	51	54	58				
65	28	29	32	34	37	40	42	46	49	53	58					
70	28	30	32	35	38	41	44	48	52	57						
75	29	31	33	36	40	43	47	51	56							
80	29	32	34	38	41	45	49	54								
85	29	32	36	39	43	47	52	57								
90	30	33	37	41	45	50	55									
95	30	34	38	42	47	53										
100	31	35	40	44	49	56										

Relative Humidity (% RH)

Likelihood of heat disorders with prolonged exposure or strenuous activity

	Caution		Extreme Caution		Danger		Extreme danger
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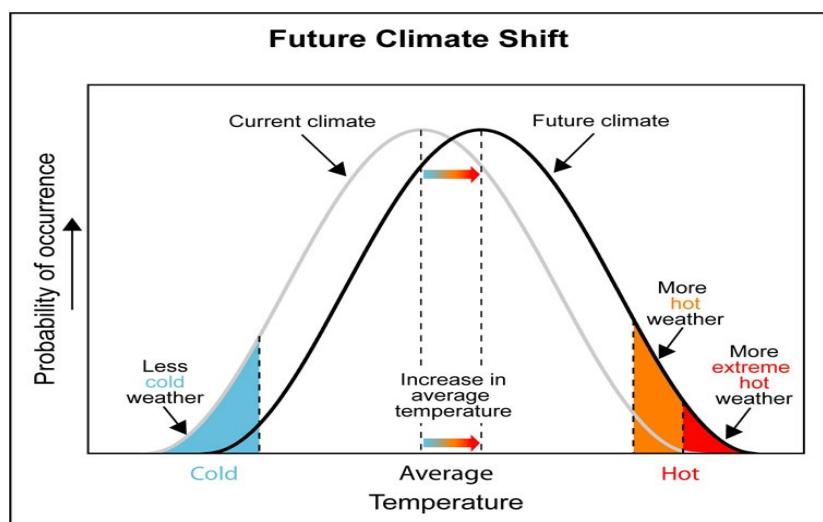
Background and Status

1.2 What might I experience in the future?

Temperatures will continue to rise as people add more heat-trapping greenhouse gases to the atmosphere. As a result, scientists expect heat waves to become more common, more severe, and longer-lasting.^{3,4} More extreme heat will likely lead to an increase in heat-related illnesses and deaths, especially if people and communities don't take steps to adapt and protect themselves. Even small increases in extreme heat can result in increased deaths and illnesses.

Without big steps to reduce greenhouse gas emissions, the average number of extremely hot days in the United States is projected to more than triple from the year 2050 to 2100. This means the potential heat wave season will be longer, and extreme heat could catch communities off-guard if it happens earlier or later than expected in a particular area.

Increase in Average Temperature



1.2.1 Extreme Heat Events Will...

- A. **Become More Common:** As climate change continues, there will be more hot days each year. For instance, city may experience up to 40 more days a year where the temperature is over 35°C.
- B. **Become More Severe:** Rising average summer temperatures will make the hottest days even hotter than they used to be, especially in the area of less vegetation or less water bodies. For example, East Zone may experience summers that are 1°C hotter than South West or West Zone.
- C. **Last Longer:** Consecutive days of extreme heat are projected to last even longer in the future. Now city like Surat may experience a stretch of days with temperatures above 35°C that is 28 days longer than the longest stretch of such days in the recent past.

³ When average temperatures increase, the average temperature of “hot weather” and “record hot weather” will become even hotter.
Source: IPCC, 2001



Background and Status

1.2.2 More Extreme Heat Events Are Likely to Cause More Illnesses and Deaths

“Scorching sun and heat waves can cause number of illnesses. From mild heat cramps to serious heat-strokes, it cannot be taken lightly.”

As extreme heat events become more common, more severe, and longer-lasting, scientists expect to see an increase in deaths and illnesses from heat, particularly among vulnerable populations, such as children, the elderly, economically disadvantaged groups, and those with chronic health conditions made worse by heat exposure.

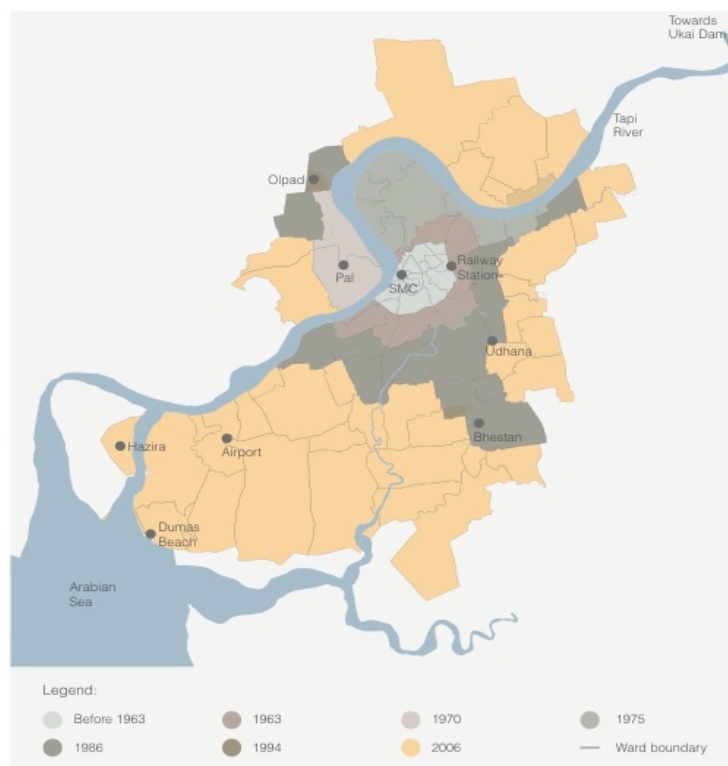
Even small temperature increases above seasonal normal levels can result in illnesses and deaths, though the temperature may not be considered “extreme.” A series of consecutive days with warmer-than-average temperatures often results in more hospital admissions for respiratory, cardiovascular, and kidney-related diseases. This can especially occur in spring and early summer, before people are accustomed to warm summer temperatures.

The city of Surat had total of 36,167 deaths for 961 summer days (2001-2012) were analysed. It means daily mortality was estimated at 37.6 ± 9.4 for the study period. There is an increase of 11% mortality when temperature crossed 40°C . There is an increase of 3 (9%) deaths per day during danger ($41-54^{\circ}\text{C}$) level heat risk days and 6 (18%) deaths per day during high risk heat days ($>54^{\circ}\text{C}$ - extreme danger) respectively. The effect of extreme heat on mortality is at peak at day-2 of the maximum temperature.⁴

1.2.3 Demographic and geographic profile of the city

Surat is the 8th largest city of India with a population of 4.46 million. It is hub of the textiles and diamond industries of India. The city saw an unprecedented growth in the last four decades, recording one of the highest growth rates in the country and a 10-fold population rise over four decades. The city area has expanded with time (major expansion being in 2006) and presently covers 326.515 sq.km. The population of Surat is expected to grow from 4.46 million (2011) to 6.4 & 8.5 million by 2021.

Surat is a port city situated on the banks of the Tapi river. It has an average elevation of 13 meters. The temperature of Surat is mild to warm with the summer time maximum temperatures averaging to 34°C while the winters are relatively cool with the night time temperatures averaging to around 14°C . In peak summer, the maximum temperature can go up to $44-50^{\circ}\text{C}$. With its proximity to the Arabian Sea, the relative humidity of the city remains high.

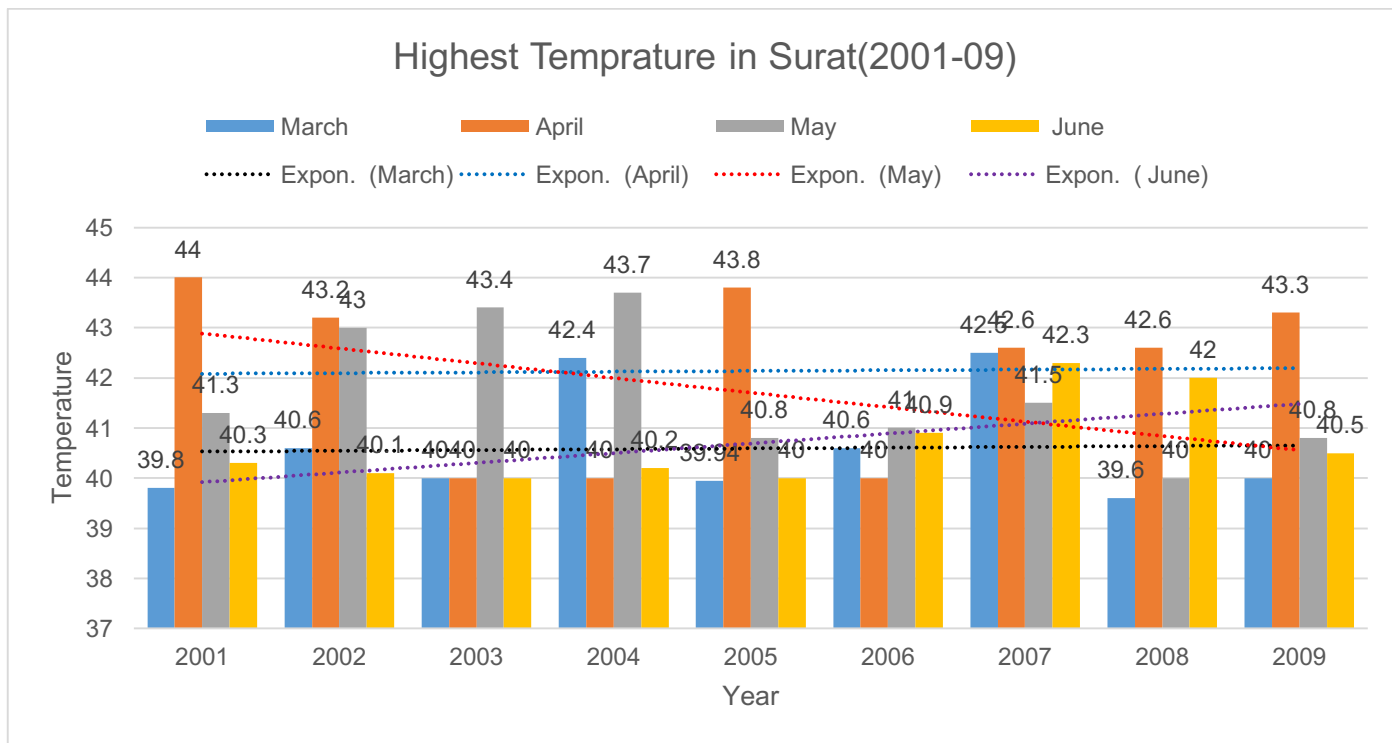


⁴ Surat Heat and Health Action Plan by UHCRC in 2016

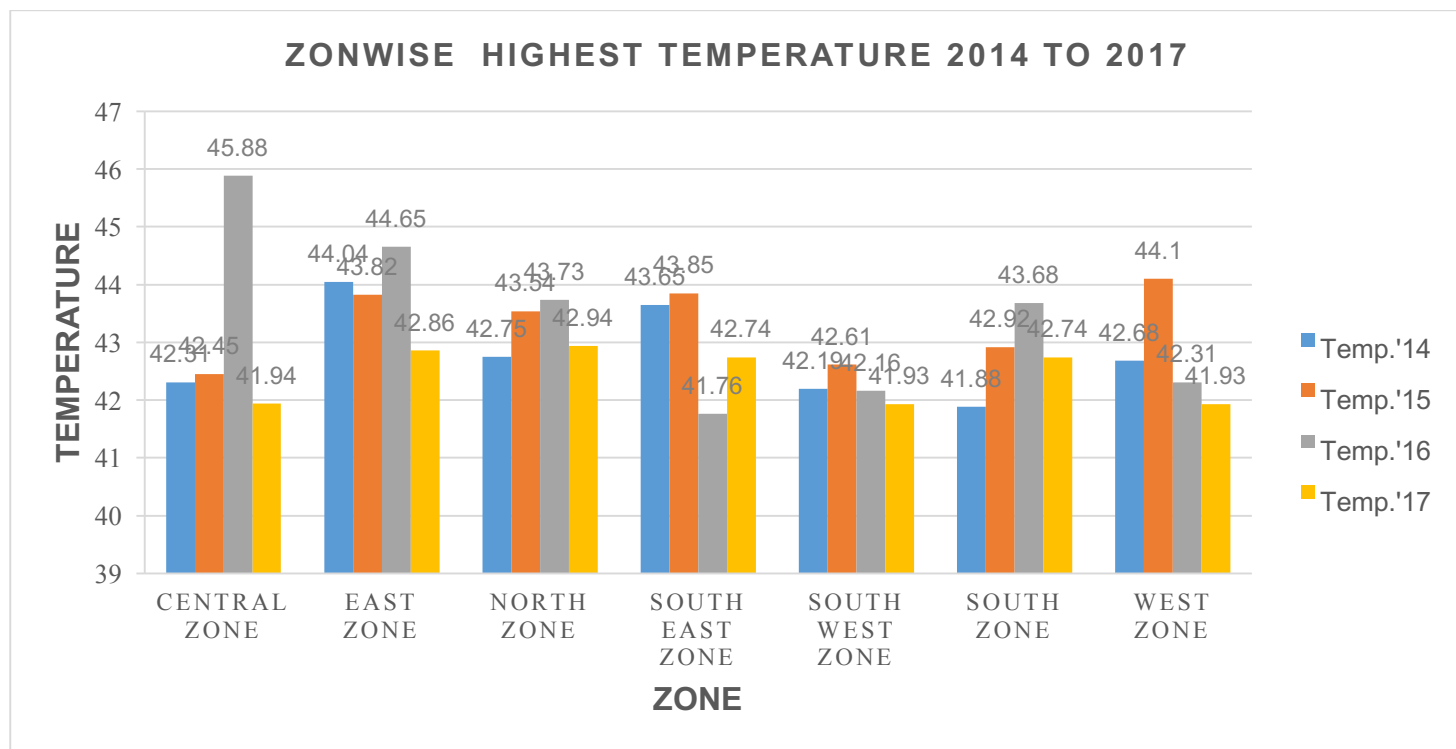


Background and Status

Extreme Heat in Surat since 2001 to 2009:



Source: Anand Agriculture University



Source: AWS-Surat Climate Change Trust



2. Heat Wave and Disaster Management

Section 2 (d) of the Disaster Management Act 2005 defines “disaster” as a catastrophe, mishap, calamity or grave occurrence in any area, arising from natural or man-made causes, and is of such a magnitude to be beyond the coping capacity of the affected area. Heat-wave has not been notified as a disaster by Government of India yet. But the data of the casualties it has been causing suggests that it is time that the various stakeholders realize the damaging repercussions that heat wave can cause to the health of humans and animals. Heat wave is not notified in the list of twelve disasters eligible for relief under National/ State Disaster Response Fund norms. However, a State Government may use up to 10 per cent of the funds available under the SDRF for providing immediate relief to the victims of natural disasters that they consider to be „disasters” within the local context in the State and which are not included in the notified list of disasters of the Ministry of Home Affairs subject to the condition that the State Government has listed the State specific natural disasters and notified clear and transparent norms and guidelines for such disasters with the approval of the State Authority.⁵

2.1 Purpose of the SHAP:

This Heat Action Plan aims to provide a framework for the implementation, coordination, and evaluation of extreme heat response activities in Surat 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.

2.2 Aims of the SHAP:

Surat Heat Action Plan (SHAP) aims to reduce extreme heat impacts on Vulnerable people with early warning system and integrated coordination with concerned agencies.

1. To map potential heat island area and affected people
2. To aware more citizen with clear information
3. To establish coordination and integration of all the concerned agencies from early warning to actual action
4. To build a capacity of concerned professional and agencies
5. To make more use of adaptation and mitigation tools for reducing heat waves and
6. To make Surat more resilience against extreme heat wave

2.3 Extreme heat action planning includes:⁶

1. Identifying vulnerable populations and the health risks specific to each group;
2. Developing effective strategies, agency coordination, and response planning to shape HAP that addresses heat-health risks;
3. Implementing the Heat Action Plan and activating heat alerts; and
4. Evaluating and updating the Heat Action Plan regularly.

⁵ NDMA Guideline for Heat Wave Action Plan

⁶ State of Victoria Department of Human Services, “Heatwave Planning Guide: Development of heatwave plans in local councils in Victoria [Australia],” 2009,



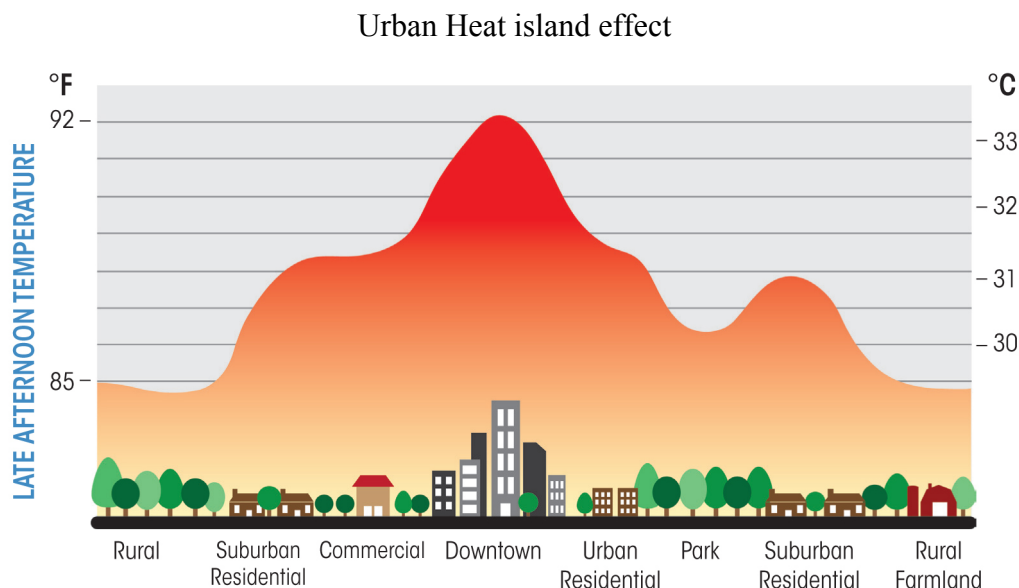
Heat Wave and Disaster Management

2.4 What Is the Urban Heat Island Effect?

As cities develop, vegetation is often lost and more surfaces are paved or covered with buildings. Less vegetation means less shade and moisture to keep urban areas cool. Conventional roofs and pavement reflect less and absorb more of the sun's energy, which leads to higher temperatures near these structures. Additionally, tall buildings and narrow streets can reduce air flow, further trapping the heat that gets absorbed during the day, as well as heat generated by vehicles, factories, and air conditioning vents. All these factors contribute to urban heat islands, which can worsen the impacts of climate change, particularly as more extreme heat events occur.

Urban heat Island is a phenomenon where urban areas experience warmer temperatures than suburban or rural surroundings. It is observed that temperature variation occurs due to human activity and unplanned, unprecedented growth of urban areas. Open and green space, built up area, traffic density and micro-climatic condition of the particular area can affect the ambient air temperature within that zone.

Compared with surrounding rural areas, urban heat islands have higher daytime maximum temperatures and less night time cooling. Temperatures in urban areas can be 1- 3°C warmer than their surroundings during the day. In the evening, this difference can be as high as 2-3°C because the built environment retains heat absorbed during the day.



The 2018, Surat Heat Action Plan (SHAP) is a comprehensive early warning system will be getting from IMD and preparedness plan with concerned government and other agencies for extreme heat events in Surat. The Plan presents actions to increase preparedness, information-sharing, and response coordination to reduce the health impacts of extreme heat on vulnerable population



Heat Wave and Disaster Management

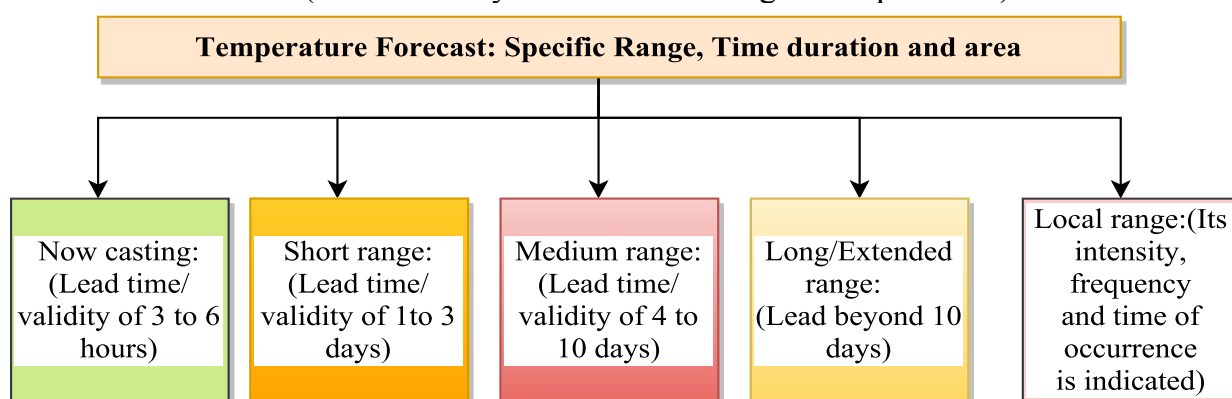
3. Early Warning and Indicators of heat-wave

Early Warning and Indicators of heat-wave Early warning systems can enhance the preparedness of decision-makers and their readiness to harness favorable weather conditions. Early warning systems for natural hazards is based both on sound scientific and technical knowledge. In response to the devastating mortality and morbidity of recent heat-wave events, many countries have introduced heat-wave early warning systems. Heat-wave early warnings are designed to reduce the avoidable human health consequences from heat-waves through timely notification of prevention measures to vulnerable populations.

3.1 Forecast and Issuance of Heat Alert or Heat Warning

The IMD is mandated to meteorological observations and provides current and forecast meteorological information for optimum operation of weather-sensitive activities. It also provides real time data and weather prediction of maximum temperature, Heat-wave warning, Heat-alert for the vulnerable cities/rural area of the severity and frequency. IMD provides following range and validity of time forecast:

3.2 Criteria for Heat Wave :(As defined by Indian Meteorological Department)⁷



Heat wave need not be considered till maximum temperature of a station reaches at least 40° C for Plains and at least 30° C for Hilly regions.

A. When normal maximum temperature of a station is less than or equal to 40°C

- Heat Wave Departure from normal is 5° C to 6° C
- Severe Heat Wave Departure from normal is 7° C or more

B. When normal maximum temperature of a station is more than 40°C

- Heat Wave Departure from normal is 4° C to 5° C
- Severe Heat Wave Departure from normal is 6° C or more

C. When actual maximum temperature remains 45° C or more irrespective of normal maximum temperature, heat wave should be declared.

(Source: The Meteorological Centre, Ahmedabad (“Met Centre”) currently determines whether to declare a heat wave once the daily maximum temperature exceeds a 40°C (104°F) threshold)

⁷ Meteorological Centre, Ahmedabad: <http://www.imdahm.gov.in/#> (click on About MC Tab) (last visited July 30, 2012). Terminologies and Glossary, IMD: <http://www.imd.gov.in/doc/termglossary.pdf>.



Heat Wave and Disaster Management

3.3 Colour Signals for Heat Alert:

The SMC will issue heat alerts, based on thresholds determined by the Meteorological Centre- Ahmedabad, as an additional means of communication by using the following colour signal system

Yellow Alert	Hot Day Advisory	41.1°C - 43°C
Orange Alert	Heat Alert Day	43.1°C – 44.9 °C
Red Alert	Extreme Heat Alert Day	≥ 45°C
No Alert	Normal Day	≤ 40 °C



Communication Plan

4. Implementation and Communication Plan

Health and Hospital Department of the Surat Municipal Corporation is nodal and lead agency for monitoring and supervising overall plan of the city. As they have direct coordination with 38 Urban Health Centres and Hospitals around cities including SMIMER and Civil Hospitals. They are going to monitor heat early warning system and disseminating public health messages to Information System Department (ISD) of the Surat Municipal Corporation. ISD has to send the public health messages to all local concerned departments and other community service agencies in city. Health and Hospital Department has to publish press release in local media and newspapers with clear information regarding preparedness against extreme heat impacts on health.

The SHAP to focus on vulnerable individuals who are getting most affect during heat waves, including slum communities, textile and other outdoors workers, elderly and children. The Plan also focuses medical professionals and organizations, such as Major Hospitals, Urban Health Centres (UHCs) and community workers, who frequently meet with vulnerable people and can provide early diagnosis of heat-related illnesses and preliminary treatment.

NGOs, CBOs, SHGs, Individual, FM radio channels and the media are also part of the information dissemination to the vulnerable group and support fighting the effects of extreme heat. All the concerned groups and individual can prevent themselves and people who are harmful from the heat waves by doing such things as following

Roles and Responsibilities for Managing Heat Wave

Tasks/ Activities	Central/ State Agencies & Their Responsibilities			
	Centre	Responsibility	State	Responsibility
Preparation of Heat Wave Action Plan	NDMA	Guideline on preparing a Heat Wave Action Plan	SDMA/ DDMA/ Municipal Corporation and Local Bodies	Preparing a Heat Wave Action Plan and implementing.
Early Warning	IMD	Issue Heat wave alerts and weather forecasts on Short / Medium / Long range duration	State Governments/ District Administration	To disseminate the information received from IMD to the public at large
Mitigating Heat Wave	Ministry of Urban /Rural Development, Department of Drinking Water and Sanitation, Ministry of Surface Transport/Ministry of Health and Family Welfare	To construct shelters/ sheds, bus stands and provide drinking water points at worksites./Stockpiling of ORS, creating Medical posts at places of mass gathering, Training of Human Resources	Public Health and Engineering Department	To construct shelters/ sheds, bus stands and provide drinking water points at worksites./Stockpiling of ORS, creating Medical posts at places of mass gathering, Training of Human Resources



Communication Plan

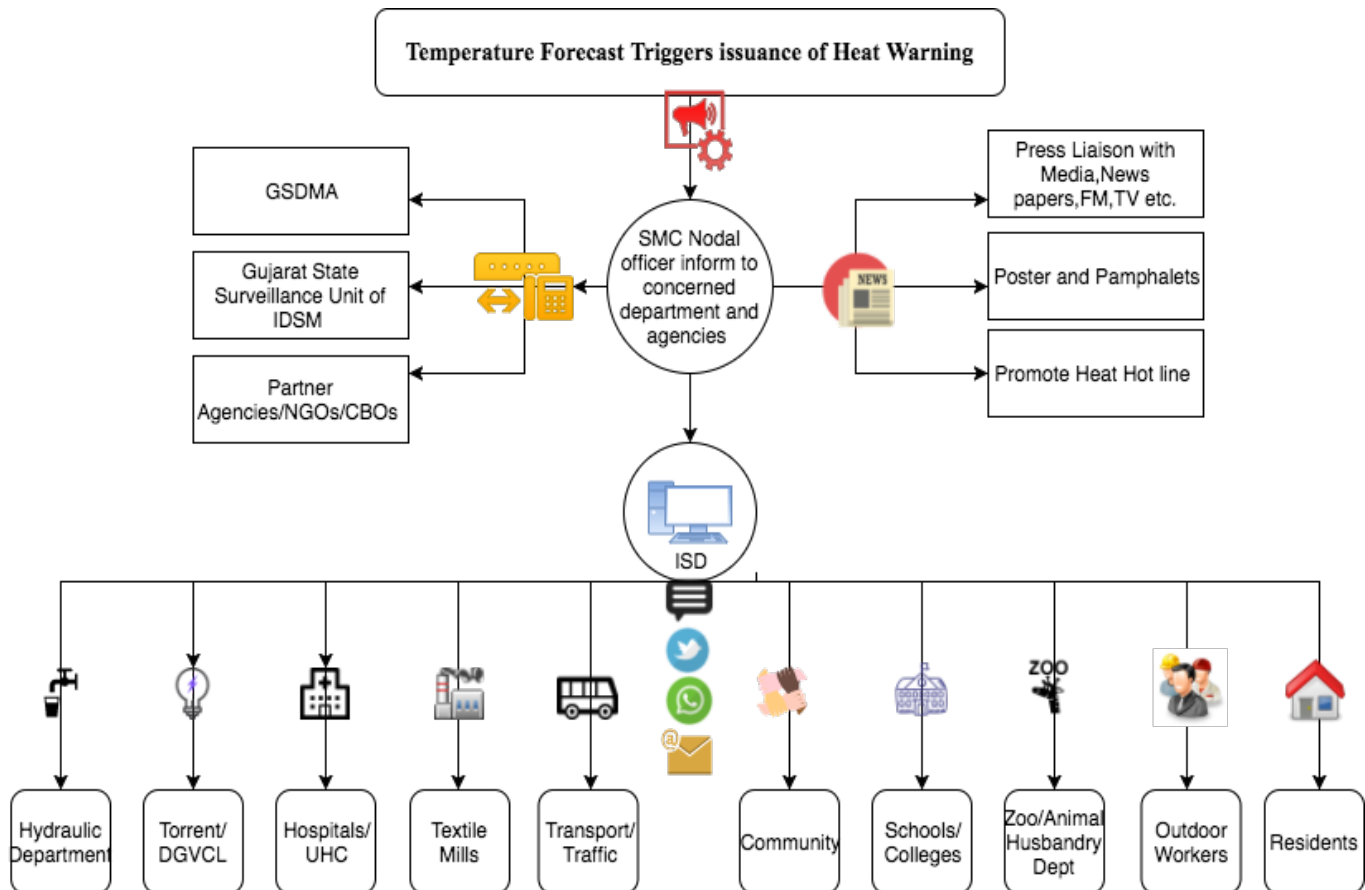
Monitoring and Response	Ministry of Health and Family Welfare	Surveillance ,deployment of Rapid Response Teams , specific care for vulnerable groups	Health Department	Surveillance ,deployment of Rapid Response Teams , specific care for vulnerable groups
Occupational Support and advisories	All Ministries/ Departments	Take necessary measures as suggested in Annexure 1, wherever applicable	All Departments	Take necessary measures as suggested in Annexure 1, wherever applicable
Media campaign and IEC activities	Ministry of Information and Broadcasting	Extensive IEC campaigns to create awareness through print, electronic and social media	Department of Information and Broadcasting/ SDMAs/ Commissioners of Relief/ State Govt/ Health Department	Extensive IEC campaigns to create awareness through print, electronic and social media
Documentation	Ministry of Health & Family Welfare through IDSP	Collecting Data from States as per Annexure 2 and maintaining national level data base.	Revenue Departments/ SDMAs/ DDMA's/ Health Deptt.	Collecting Data from States as per Annexure 2 and maintaining national level data base.
Long Term Measures	Ministry of Urban Development, Ministry of Environment Forests and Climate Change	Improving the forest coverage and green areas	Forest Department/ SDMAs and other concerned Department	Improving the forest coverage and green areas ⁸

⁸ NDMA Heat Wave Action Guidelines



Communication Plan

4.2 Communication plan for the heat alert





Communication Plan

4.3 Concerned stakeholders and organisation's representative list for implementation of SHAP 2018

Sr	Name	Designation	Organisation	Contact
1	Mr. S.G.Bhati,IPS	Special CP	Traffic Police Surat	9978405086
2	Mr. Ketan Patel	Dy.Comm	Fire,SMC	9724345218
3	Mr. S.K.Acharya	CFO	Fire,SMC	9724345508
4	Dr. Hemant Desai	Dy.Comm	H&H,SMC	9724345014
5	Dr. Gayatri Jariwala	Asst.Comm	UCD,SMC	9724345486
6	Dr.Ashish Naik	MoH	H&H,SMC	9879517490
7	Dr.P.H. Umrigar	Dy.MoH	WZ,SMC	9925111997
8	Dr. M.N.Patel	Dy.MoH	CZ,SMC	9724345474
9	Dr. A.K.Shrof	Dy.MoH	NZ,SMC	9724345472
10	Dr. P. S. Patel	Dy.MoH	EZ,SMC	9099007977
11	Dr. S.S.Das	Dy.MoH	SZ,SMC	9724345454
12	Dr. K.I.Khatrri	Dy.MoH	SWZ,SMC	9724345471
13	Dr. A.P.Bhatt	Dy.MoH	SEZ,SMC	9724345477
14	Mr. K.H.Khatwani	Add.CE	Hyd.SMC	9724345206
15	Mr. Devang Patel	Exe. Asst	ISD,SMC	9724345597
16	Mr. Mehul Patel	Exe. Asst	Traffic Cell,SMC	9724345498
17	Dr. Praful Mehta	HoD	Market,SMC	9724345221
18	Dr. Bhaskar Raval	Pro VC	VNSGU	
19	Mr. S.P.Chauhan	Exe. Engi.	DGVCL,Surat	8980027803
20	Mr. Umesh Rathod	DEO	Surat	9909970218
21	Mr. Dharmesh Patel	Admin.Head	Education Dept.,SMC	9099008611
22	Dr. Kalpna Desai	Dean	SMIMER	9724345012
23	Dr. Pradeep B. Gupta	HoD	Emergency Medicine,GMC	
24	Mr. Snehal Patel	Founder	Surat Nature Club	9825110283
25	Mr. Darshan Patel	Founder	Prayas	9825119081
26	Dr. J P Varshney	HoD	Nandini Veterinary Hospital	9375763020
27	Ms. Karuna Jindal	Volunteer	Karuna for Animals	6312419925
28	Sanjivani Ambulance	Volunteer	Animal Ambulance	97371 44444
29	Dr. K.R. Modi	Dy. Director	Animal Husbandry Dept.	9904036146
30	Mr. Suresh Patel	President	CREDAI-Surat	9825095858
31	Ms.Nital Doshi	DPO	GSDMA-Surat	8780656017
32	Mr. Davesb Patel	Hon. Sec.	SGCCI	9825147200
33	Mr. Jitubhai Vakhariya	President	SGTPA,Pandesara	9825118711
34	Mr. Jayantbhai Choksi	President	Blind School Surat	
35	Shri Ajaybhai Pappaiya	Volunteer	Ashiyana Old Age Home	9374422065
36	Mr. Uzer Abdulrauf Mirza	Secretary	Surat Islam Yatimkhana Society	94278 20220



Communication Plan

4.4 Roles and Responsibilities of the implementation agencies

The SMC has appointed a Nodal Officer to head the Heat Action Plan. The appointed nodal officer is responsible for coordinating and communicating ahead of, and during, extreme heat events, and provide support staff through the Nodal Office as necessary. The Nodal Officer is considering adopting the following preparations under the 2017 Heat Action Plan

Phase 1 Preparedness: Pre-Heat Season (Annually from January to March)

SMC Nodal Officer:

- Convene key agency leaders to respond to extreme heat events.
- Reengage state and local agencies to facilitate internal communications.
- Organize preventative training and outreach efforts for health workers, link workers, school children, and the local community with the Health Department.
- Distribute multilingual pamphlets and posters with tips to prevent heat stress to hospitals, schools, and professional associations (see pamphlets attached).
- Create a list of the high-risk areas of the city vulnerable to heat waves for more focused activities on heat prevention.

Media and SMC Press Officer:

- Increase public communication including distributing the multilingual pamphlet and advertisements on heat stress prevention and tips for health protection during extreme heat events (see pamphlets and ads attached). Focus outreach efforts in identified high-risk areas.
- Provide information and heat communication materials developed by the SMC to the public.
- Increase the number of installed LED screens with rolling updated temperature forecasts available to the public.

SMC Health Department and Medical Professionals:

- Enhance targeted training programs, capacity building efforts and communication on heat illness for medical staff at local hospitals and Urban Health Centres (UHCs), based on the Framework of SMC 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.
- Have hospitals update their admissions and emergency case records to track heat-related morbidity and mortality. Train hospitals to improve expedience of recording of cause of death certificates. Explore creation of simple, user-friendly means to track daily heat-related data and behavioural change impacts. The training could also include recording information, education & communication (IEC) efforts.
- Adopt heat-focused examination procedures at local hospitals and urban health centers.
- Purchase and distribute reusable soft plastic ice packs for the citywide UHCs, 108 emergency centres, ambulances and hospitals.
- Explore creation of ice pack dispensaries to increase access to vulnerable communities.



Communication Plan

SMC Labour & Employment Department:

- Organize training for employers, outdoor labourers and workers regarding health impacts of extreme heat and recommendations to protect themselves during high temperatures.
- Utilize maps of construction sites to identify more high-risk outdoor workers. Potentially overlay with irradiation map from IMD or heat island map. Conduct publicity campaigns during high-risk days to these specific areas.

108 Emergency Service:

- Create displays on ambulances during local events to build public awareness (see ad attached)
- Identify at-risk areas of vulnerable populations, in part by utilizing the list of high-risk areas.

Community Groups and Individuals:

- Lead child-friendly educational preventative trainings and distribute heat protection materials at local schools. For example, potentially design a “Teach the Teachers” workshop designed to equip teachers with knowledge with heat protection tips and materials that they can disseminate in classrooms on heat protection, and activities that can engage students on health dangers of extreme heat.
- Conduct training workshops and outreach sessions with community groups and mobilizers such as Mahila Arogya Samiti, Self-Employed Women's Association (SEWA), ASHA workers, aanganwadis, and municipal councils to help inform and get vulnerable communities more actively involved. Incorporate other sectors such as higher education, non-profits, and community leaders to increase reach to communities.
- Encourage individuals to discussion of the early signs of heat exhaustion with their local doctor or Urban Health Centre.
- Inform fellow community members about how to keep cool and protect oneself from heat.

Phase 2: During the Heat Season (Annually from March through July)

SMC Nodal Officer:

- Activate a heat alert and the local response citywide when extreme heat events are forecast by notifying the key agency leaders, SMC Deputy Municipal Commissioners and the Gujarat state agencies in accordance with the Communication Plan above.
- Monitor and increase the heat alert level when necessary to match the severity of the forecast and threshold established, and have the Municipal Commissioner convene a special meeting with key agency leaders.
- Activate “cooling centers,” such as temples, public buildings, malls, during a heat alert and/or SMC-run temporary night shelters for those without access to water and/or electricity.
- Expand access to shaded areas for outdoor workers, slum communities, and other vulnerable populations. For example, confirm that night shelters stay open all day for migratory populations during a heat alert.
- Hold a frequent, possibly daily, conference call to discuss reports and breaking developments during a heat alert, and ensure that communication channels remain operational.
- Identify and set up public displays of temperature and forecasts, such as LED electronic scrolling boards.
- Continue surveillance of temperature data and forecasts.
- Communicate the suspension of all non-essential uses of water (other than drinking, keeping cool) via the SMC Water Project’s protocol procedures during any water shortage.



Communication Plan

- Increase efforts to distribute fresh drinking water to the public. For example, expand potable water access during a heat alert at religious spaces including temples and mosques, BRTS transit stations, pouch handouts to the poor, and high-risk areas (identified by the mapping of high-risk areas).
- Communicate the local utility protocol to prioritize maintaining power to critical facilities (such as hospitals and UHCs).
- Notify the Steering Committee and relevant agencies when the heat alert is over.

Media and SMC Press Officer:

- Commence public messaging to the public about the dangers of heat-related illness with the SMC Nodal Officer via SMC press conferences.
- 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.
- Circulate warnings in bulk to the public via centralized email databases during a heat alert.
- Develop an SMS alert system to send direct messages to private practitioners in addition to the medical professionals at public hospitals and UHCs.
- 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.
- Explore other means of communications, such as broader use of social media, for example, Facebook and the WhatsApp mobile application.

SMC Health Department and Medical Professionals:

- Post heat-related illness prevention tips and how to stay cool around hospitals and UHCs (see poster attached).
- Ensure adequate medical supplies available.
- Produce weekly reports of the public health impact for SMC Nodal Officer during a heat alert.
- Increase staffing at hospitals and UHCs to attend to the influx of patients during a heat alert, if feasible.
- Increase link worker and community health worker outreach in at-risk neighbourhoods during a heat alert, if feasible.
- Have zonal health officer visit UHCs to confirm proper preparation has been made for heat related illness and conduct case audits during heat season.

108 Emergency Service:

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

SMC Labor & Employment Department:

- Encourage employers to shift outdoor workers' schedules away from peak afternoon hours (1pm – 5pm) during a heat alert.
- Pilot project to provide emergency ice packs and heat-illness prevention materials to traffic police, BRTS transit staff and construction workers.



Communication Plan

Community Groups and Individuals:

- Keep cool and hydrated during the heat season by drinking water, staying out of the sun, and wearing light clothing.
- Check on vulnerable neighbors, particularly during a heat alert.
- Limit heavy work in direct sun or indoors if poorly ventilated, especially during a heat alert.

Phase 3: Post-Heat Season (Annually in July through September)

SMC Nodal Officer:

- Organize an annual Heat Action Plan evaluation meeting with key agency leaders and relevant stakeholders.
- Evaluate the Plan process based on performance and revise accordingly.
- Evaluate the reach and impact of the Plan and revise accordingly.
- Post the revised Plan to the SMC website ahead of the 2016 heat season for stakeholders.
- Build on the “Green Cover” activity to establish tree-plantation campaign in hotspot areas such as roadsides and during plantation festival in June. Incorporate student volunteers or incentivize builders to plant trees to help effect this effort.
- Discuss establishing cooling center facilities in high-risk areas around city.

SMC Health Department and Medical Professionals:

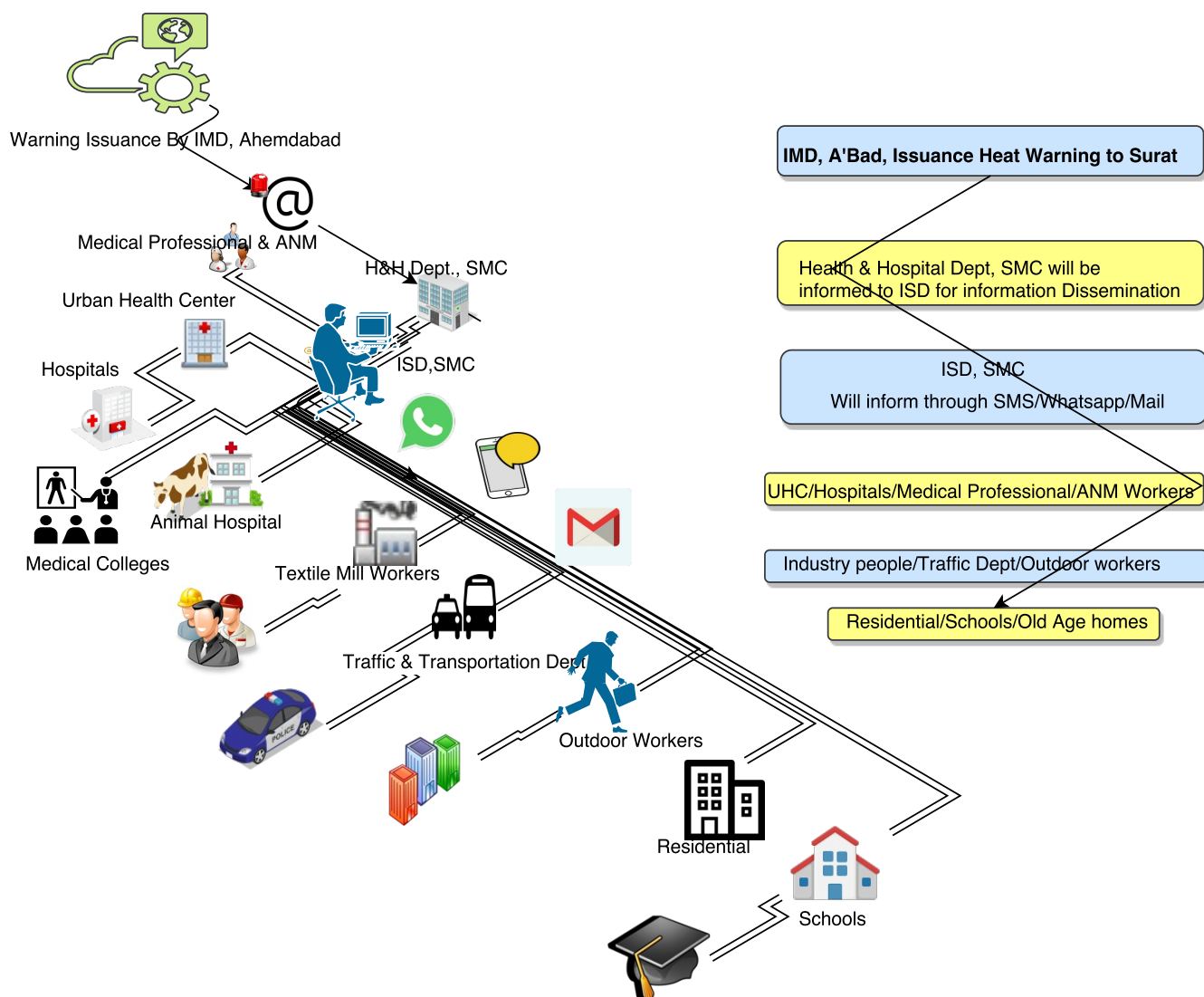
- Perform an epidemiological case review of heat-related mortalities during the summer.
- Conduct and gather epidemiological outcomes from the data on heat risk factors, illness and death, based on average daily temperatures.
- Incorporate data and findings into future versions of the Heat Action Plan.
- Measure mortality and morbidity rates based on data before and after the Plan’s interventions.



Communication Plan



Communication path for Heat Warning System in Surat



4.5 Communication & Information Dissemination Path



Vulnerable Group

5. Focus on Vulnerable Group

5.1 Who Is Most at Risk from Extreme Heat?

Extreme heat can affect everyone. However, three key factors put some people at a higher risk than others:

Exposure: Some people are more exposed to high temperatures than others, such as those who spend long hours working or exercising outside, those who are homeless, or those who live in buildings without air conditioning.

Sensitivity: Some people are less tolerant of heat than others, such as infants, young children, pregnant women, older adults, and those with certain health conditions made worse by heat exposure. Certain medications can also affect the body's ability to regulate temperature. People can be more sensitive to heat if they are under the influence of alcohol or drugs that affect their ability to stay hydrated. Elderly individuals are also less likely to perceive being overheated, even though they are physiologically at greater risk.

Ability to respond and prepare: Some people are less able to avoid heat than others, such as those with limited incomes who cannot afford air conditioning or the electricity to use it, people with mobility issues that prevent them from seeking health care or going to a cooling center during a heat wave, or those with outdoor jobs. Some people are less motivated to leave their homes for cooler places due to unwillingness to leave pets, fear of crime, or concerns about being a burden to others.





Vulnerable Group

5.2 Vulnerable to Extreme Heat





Adaptation and Mitigation Plan

6. How to Protect Yourself from the Heat

Individuals should avoid exposure to extreme heat, intense sun, and high humidity whenever possible. However, if exposure is unavoidable, especially during work, there are a number of steps workers can take to reduce their risk of heat-related illness or injury. In addition to the general precautions listed above, workers should try to gradually build up to heavy work throughout the day with the heaviest work scheduled during the coolest parts of the day. Employees should take more breaks, preferably in the shade or a cool area, during extreme heat and humidity conditions. Outdoor workers should be particularly vigilant about water consumption by drinking water frequently (approximately one cup every 15-20 minutes) and ensuring they do not become thirsty. Outdoor workers should also be made aware that protective clothing or personal protective equipment may increase the risk of heat stress.

For employers with employees who work outdoors, there are many recommendations that can ease the risk of heat stress for employees. Employers should try to schedule maintenance and repair work during cooler months, and schedule particularly hot jobs for cooler parts of the day. Adjust work schedules to help acclimatize workers to hot conditions by exposing them for progressively longer periods to hot work environments. If possible, reduce the physical demands of workers, and use relief work or assign extra workers for physically demanding jobs. Employers should provide cool water or liquids, rest periods with water breaks, and cool areas for use during those break periods. Further, employers should provide heat stress training, and monitor workers who are at risk of heat stress.

Sun Exposure

Travelers and outdoor workers often face increased risk of overexposure to the sun, which can have serious health effects. UVA rays are present throughout the day, are the most significant cause of premature aging, and can contribute to skin cancer. UVB rays are most intense from 1000 to 1600, and are also most responsible for sunburn and skin cancer. UVC rays are filtered by the earth's ozone layer and generally do not reach the surface. Increased exposure to UV radiation occurs nearer the equator, during summer months, at higher elevations, and between 1000 and 1600. Reflection from snow, sand, and water also increases exposure. Symptoms of sunburn appear 3-5 hours after overexposure, worsen over the next 24-36 hours, and resolve in 3-5 days. Serious burns are painful, and the skin may become tender, swollen, and blistered. These symptoms may be accompanied by fever, headache, itching, and malaise. Skin peeling can occur 3-8 days after severe overexposure. Overexposure can also cause red, dry, painful eyes. It is also important to remember that many common medications can cause photosensitivity reactions, which increase the risk of severe sunburn. Such medications include acetazolamide, which is part of a variety of treatment regimens;

amiodarone for irregular heart beat; antibiotics such as fluoroquinolones, sulfonamides, and tetracyclines (especially doxycycline - a common antimalarial medication - and demeclocycline); furosemide for congestive heart failure; nonsteroidal anti-inflammatory drugs (NSAIDs) such as aspirin, ibuprofen, and naproxen; phenothiazine-based antipsychotics; sulfonyleurea-based treatments for type 2 diabetes; thiazide diuretics; and voriconazole antifungals. Individuals taking one or more of these medications - especially those with a history of photosensitivity - should take increased precautions to avoid overexposure or severe sunburn.

The media can play an essential awareness-building role by sharing news about health threats, and increases public protection by running ads and providing local resources information.



Adaptation and Mitigation Plan

6.2 Why is heat wave a problem?

Heat affects everybody! A normal body temperature for adults is around 37°C. When you are sick, you may get a fever with symptoms such as headache, sweating, or fatigue. Much like a fever, extreme heat stresses your body's ability to maintain its normal temperature and can result in similar symptoms.

The most common health effects (or symptoms) caused by extreme heat include the following:

1. Stress due to heat:

This doesn't define any age or health condition. Heat wave can develop stress and can disturb one's mental and physical health. Our body can easily cope up with a temperature of around 37 degrees Celsius but rise in temperature leads to sweat and increases blood circulation to the skin's surface. This process gives a cooling effect. But when our body fails to combat heat exposure, it develops heat-related symptoms. Relax and try to go under normal weather condition like under a shade if you are outdoors.

2. Heat syncope:

Heat syncope or fainting is another symptom of being affected by heat wave. This is the result of exertion in hot climate condition. In this condition, body tries to cool itself but exertion causes the blood vessels to dilate to such an extent that blood flow to the brain is reduced.

3. Body cramps:

One may also feel painful cramps in the leg or abdomen muscles. If you have indulged in an activity and feel cramps, immediately stop your movement and consume salted drinks. This helps in replenishing fluid volume.

4. Heat exhaustion:

Heat exhaustion is the consequence of extreme reduction of blood plasma. A person affected with heat exhaustion may feel weakness, nausea, hypotension, headache, rapid heartbeats, and vomiting. If you encounter a person who is affected with heat exhaustion, loosen his/ her clothes or rub his skin with cool water. Heat exhaustion, if left untreated could lead to heat stroke, which is the most serious form of heat-related illness.

5. Heat stroke:

This is the most severe medical condition. Heat stroke can result when the body's temperature goes up to 40. Heat stroke shows signs as headache, dizziness, and weakness, which can be followed by confusion or euphoria and a sudden loss of consciousness. A person suffering from heat stroke may have hallucinations, and unconscious patients may even suffer seizures. An individual suffering from heat stroke should receive medical attention immediately. Those who work in outdoor settings are directly affected by extreme temperature particularly during peak hours (11am-5pm). It also affects people who do not take measures to keep their body cool during summer. Also, when someone parks his car outside, the inside temperature of the car spikes and when the person gets back in the car, it can prove harmful.



Adaptation and Mitigation Plan

6. Heart and Heat:

when the weather is hot your body sweats to cool down, but this means that you lose more fluid than usual from your body. This can drop your blood pressure and make your heart beat faster. Dehydration increases blood viscosity and increases the chances of clogging of the circulatory system. Hot, humid weather can be especially hard for people with a history of heart ailment. The combination of increased blood flow to the skin and dehydration may drop blood pressure enough to cause dizziness or falls. If you have coronary heart disease, you may start to experience angina or your angina worsens during hot weather, because hot weather increases the workload on your heart and the demand for oxygen, especially when you are more active. Most healthy people tolerate these changes without missing a beat. Elderly people especially those with damaged or weakened hearts are more prone to get into trouble because of hot summers.

Also, young children have more difficulty in regulating their temperature and so can be more at risk from extreme temperatures.

Extreme heat is especially dangerous because people might not recognize their symptoms as signs of a more serious condition. For example, symptoms like sweating or fatigue may just appear to be normal reactions to a hot day. People may be in more danger if they experience symptoms that alter their decision-making, limit their ability to care for themselves, or make them more prone to accidents. If untreated, heat related illnesses can worsen and eventually lead to death. Heat can also contribute to premature death from health impacts other than those listed above. This is because extreme heat can worsen chronic conditions such as cardiovascular disease, respiratory disease, and diabetes.



Adaptation and Mitigation Plan

6.3 Know the Symptoms of Heat Related Illness

Know the Symptoms of Heat-Related Illnesses

	SYMPTOMS		TREATMENT
HEAT CRAMPS	<ul style="list-style-type: none">• Heavy sweating• Painful muscle cramps or spasms		<ul style="list-style-type: none">• Stop activity for a few hours.• Move to a cooler location.• Drink water, clear juice, or a sports beverage.• Seek medical attention if cramps do not subside within one hour.
HEAT EXHAUSTION	<ul style="list-style-type: none">• Heavy sweating• Weakness• Fatigue• Headache• Dizziness• Nausea or vomiting• Fainting• Irritability• Thirst• Decreased urine output		<ul style="list-style-type: none">• Move to an air-conditioned environment.• Lie down.• Loosen clothing or change into lightweight clothing.• Sip cool, non-alcoholic beverages.• Take a cool shower or bath, or apply cool, wet cloths to as much of the body as possible.• Seek medical attention if symptoms worsen or last longer than one hour, or if the victim has heart problems or high blood pressure.
HEAT STROKE	<ul style="list-style-type: none">• Very high body temperature• Altered mental state• Throbbing headache• Confusion• Nausea• Dizziness• Hot, dry skin or profuse sweating• Unconsciousness		<ul style="list-style-type: none">• Call 911 immediately and follow the operator's directions—this is a medical emergency.• Reduce the person's body temperature with whatever methods you can: wrap the person in cool cloths, immerse them in a cool bath, or spray them with cool hose water.• After administering cooling methods, move the person to a cooler place.• Do NOT give liquids.• If there is uncontrollable muscle twitching, keep the victim safe, but do not place any objects in his or her mouth.• If there is vomiting, turn the victim on his or her side to keep the airway open.

Source: CDC, 2012³



Adaptation and Mitigation Plan

6.4 What Can I Do to Reduce My Risk Before an Extreme Heat Event?

Extreme heat events are on the rise, but there are things you can do now—in your own home, workplace, or neighborhood—to reduce your current and future risks. Here are some ideas (also see “For More Information” below):

1. 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 neighbors 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.

2. 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 athletic 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.

3. Plant a green roof.

20 Green roofs are gardens planted on rooftops that provide shade and reduce the temperature of the roof surface, as well as the surrounding air. On hot summer days, green roofs can actually be cooler than the air. Many kinds of buildings—commercial, residential, and industrial—can support green roofs, and green roofs can be especially useful in cities to counter the urban heat island effect. Consider building your own at home, work, or school!

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.

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.

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.



Adaptation and Mitigation Plan

7. Replace your old air conditioner.

Old or damaged window-unit air conditioners are inefficient, meaning you're paying more money for less actual cooling ability. Don't wait until the next heat wave—when supplies are likely to be low and prices high—to replace an inefficient or broken air conditioner; purchase an efficient unit before you need it.

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!

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.

10. Determine whether there are resources for support in your community.

Some agencies can provide air conditioners to those who cannot afford them or subsidies for purchases. In some areas, utility companies are not permitted to suspend power for non-payment during heat events. Some groups may provide support for paying utility bills or transportation to cooling centers. Check online or ask your local representatives whether these services are available in your community.

The Heat Is On... Get Ready, Get Set, Go!

As the climate warms in the city and around the world, extreme heat is on the rise. You will very likely experience more frequent, more severe, and longer heat waves in the years ahead. Exposure to elevated heat levels can be a hazard to your health—whether you live in a city, town, or rural area.

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

- **Get ready:** Take steps now to prepare your home, workplace, and community for future heat events.
- **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 neighbors, or outdoor workers.



Adaptation and Mitigation Plan

6.5 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

- ❖ 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
- ❖ Wear lightweight, light-coloured, loose, and porous cotton clothes. Use protective goggles, umbrella/hat, shoes or chappals while going out in sun.
- ❖ 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.
- ❖ Use ORS, homemade drinks like lassi, torani (rice water), lemon water, buttermilk, etc. which help to re-hydrate the body.
- ❖ 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.
- ❖ Keep your home cool, use curtains, shutters or sunshade and open windows at night.
- ❖ Use fans, damp clothing and take bath in cold water frequently.
- ❖ 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.

Don'ts

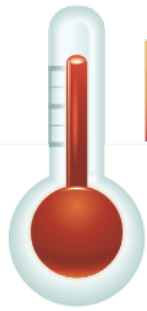
- ❖ Do not leave children or pets in parked vehicles.
- ❖ Avoid going out in the sun, especially between 12.00 noon and 3.00 p.m.
- ❖ Avoid wearing dark, heavy or tight clothing.
- ❖ Avoid strenuous activities when the outside temperature is high.
- ❖ Avoid working outside between 12 noon and 3 p.m.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



Adaptation and Mitigation Plan

6.6 First Aid for Heat-Related Illness

Conditions	Symptoms	First Aid
Sunburn	Skin redness and pain, possible swelling, blisters, fever, headaches	<ul style="list-style-type: none"> - Take a shower using soap to remove oils that may block pores, preventing the body from cooling naturally. - Apply dry, sterile dressings to any blisters, and get medical attention.
Heat Cramps	Painful spasms, usually in leg and abdominal muscles; heavy sweating	<ul style="list-style-type: none"> - Get the victim to a cooler location. - Lightly stretch and gently massage affected muscles to relieve spasms. - Give sips of up to a half glass of cool water every 15 minutes. - Discontinue liquids, if victim is nauseated.
Heat Exhaustion	Heavy sweating but skin may be cool, pale, or flushed. Weak pulse. Normal body temperature is possible, but temperature will likely rise. Fainting or dizziness, nausea, vomiting, exhaustion, and headaches are possible.	<ul style="list-style-type: none"> - Get victim to lie down in a cool place. - Loosen or remove clothing. - Apply cool, wet clothes. - Fan or move victim to air-conditioned place. - Give sips of water if victim is conscious. - Be sure water is consumed slowly. - Give half glass of cool water every 15 minutes. - Discontinue water if victim is nauseated. - Seek immediate medical attention if vomiting occurs.
Heat Stroke (a severe medical emergency)	High body temperature (40°C+); hot, red, dry skin; rapid, weak pulse; and rapid shallow breathing. Victim will probably not sweat unless victim was sweating from recent strenuous activity. Possible unconsciousness.	<ul style="list-style-type: none"> - Call emergency medical services, or get the victim to a hospital immediately. Delay can be fatal. - Move victim to a cooler environment. - Removing clothing - Try a cool bath, sponging, or wet sheet to reduce body temperature. - Watch for breathing problems. - Use extreme caution. - Use fans and air conditioners.



BEAT THE HEAT: Extreme Heat

Heat-related deaths are preventable

WHAT:

Extreme heat or heat waves occur when the temperature reaches extremely high levels or when the combination of heat and humidity causes the air to become oppressive.

WHO:



Children

More males than females are affected



Older adults



Outside workers



People with disabilities

WHERE:



Houses with little to no AC



Construction workites



Cars

HOW to AVOID:



Stay hydrated with water, avoid sugary beverages



Stay cool in an air conditioned area



Wear lightweight, light-colored, loose-fitting clothes



During extreme heat the temperature in your car could be deadly!

Outside Temperature 80°



Time Elapsed: 20 minutes



Time Elapsed: 40 minutes



Time Elapsed: 60 minutes

HEAT ALERTS: Know the difference.

HEAT OUTLOOK

Minor

Excessive heat event in 3 to 7 days

HEAT WATCHES

Excessive heat event in 12 to 48 hours

HEAT WARNING/ADVISORY

Major

Excessive heat event in next 36 hours



Keep Your Cool

Safety tips for working outdoors in the sun and extreme heat

When you work outdoors in summer, you must take steps to protect yourself from heat-related illness and the sun's harmful ultraviolet radiation (UV).



DRINK UP

Thirsty or not, drink plenty of water – a cup every 15 to 20 minutes. Avoid caffeine or alcohol which can dehydrate you.



ACCLIMATIZE

It takes time to adjust to working in heat. Work with your supervisor to gradually increase your work load and heat exposure.



COVER UP AND PROTECT

Wear light, loose-fitting clothing, UV rated sunglasses, and a wide-brim hat. Apply sunscreen with a Sun Protection Factor (SPF) of at least 30 and UVA / UVB protection. Re-apply every 2 hours and after sweating.



SHIELD FROM SUN

Set up shade structures or use umbrellas, buildings, or trees to shield you from the rays of the sun. You can get sunburn on a cloudy day.



TIME IT RIGHT

Avoid the sun and strenuous tasks between 11:00 a.m. and 4:00 p.m. when the sun's rays are strongest.



COOL OFF

Take breaks to rest and cool off in the shade or in air-conditioned buildings or vehicles. Don't over-exert yourself.



Adaptation and Mitigation Plan

6.7 Heat Stress for Workers

PROTECT YOUR WORKERS FROM HEAT STRESS

Develop an acclimatization plan

Acclimatization is the result of beneficial physiological adaptations (e.g., increased sweating efficiency and stabilization of the circulation) that occur after gradual increased exposure to a hot environment.

TIP 1

Gradually increase the time spent in hot environmental conditions over a 7–14 day period.

TIP 2

For new workers, the schedule should be no more than 20% exposure to heat on day 1 and an increase of no more than 20% exposure on each additional day.

TIP 3

For workers who have had previous experience with the job, the acclimatization schedule should be no more than:

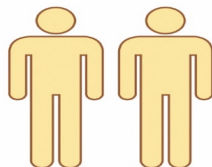
DAY 1	DAY 2	DAY 3	DAY 4
50% EXPOSURE	60% EXPOSURE	80% EXPOSURE	100% EXPOSURE



Set up a buddy system

Check your workers routinely to make sure...

- ☒ they make use of readily available water and shade.
- ☒ they don't have heat-related symptoms.



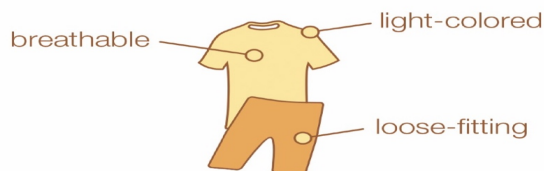
Schedule and encourage frequent rest breaks...

...with water breaks in shaded or air-conditioned recovery areas.



Emphasize the need for appropriate clothing

Encourage workers to wear clothing that is...



Cotton clothing can be soaked in water to aid cooling.

 Be aware that protective clothing or **personal protective equipment** may increase the risk of heat stress.



Encourage workers to drink plenty of fluids...

...such as drinking small amounts of water before becoming thirsty.

During moderate activity in moderately hot conditions, workers should drink about...



**1 cup every
15 to 20 minutes.**