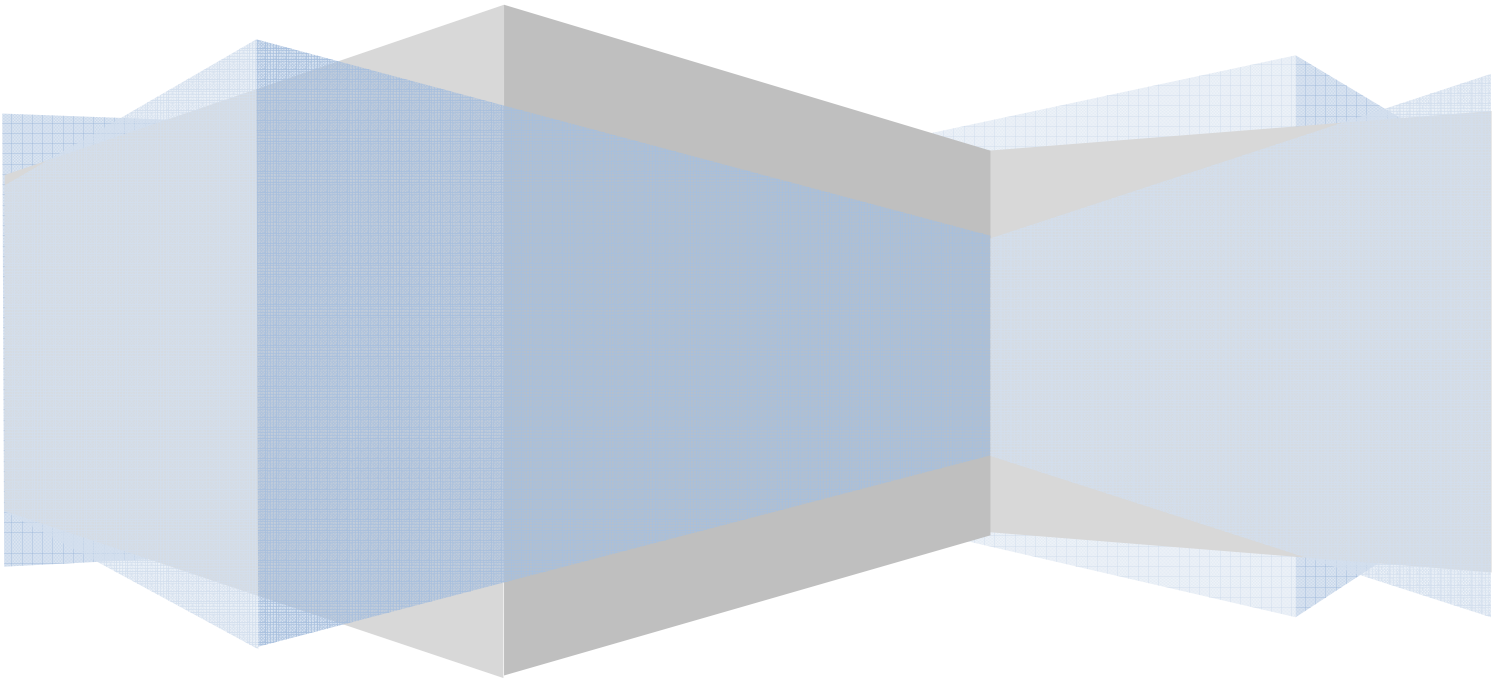
Heat Wave Action Plan-2016

HAZARIBAGH



In-case of Disaster, Contact

Deputy Commissioner	Fire Station	District Control Room
Hazaribagh	*Hazaribagh*	*Hazaribagh*
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Updated By-

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PREFACE

There is a strong and global scientific consensus that extreme heat waves will become more common worldwide because of the climate change and this change will cause an increase in average global temperatures. Heat-waves are a significant cause of death and morbidity across the world, and the impacts of heat events are likely to increase due to changing frequency, severity, and intensity of heat-waves caused by climate change. Since the beginning of the 21st century, this has increased by nearly a degree Centigrade. This weather pattern, coupled with the El-Nino effect, is increasing the temperatures in Asia. Further, high humidity compounds the effects of the temperatures being felt by human beings. Extreme heat can lead to dangerous, even deadly, consequences, including heat stress and heatstroke.

India too is feeling the impact of climate change in terms of increased instances of heat waves which are more intense in nature with each passing year, and have a devastating impact on human health thereby increasing the number of heat wave casualties. 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.

There has been an increasing trend of heat-wave in India over the past several years whereby several cities in India have been severely affected. The increased occurrences and severity of heat-wave is a wake-up call for all agencies to take necessary action also in Jharkhand for prevention, preparedness and community outreach to save the lives of the general public, livestock and wild life.

That is why the Heat Wave Action Plan of Hazaribagh has been prepared to spell out a standard action and operation mechanism for disaster management in district wide.

Shri Ravi Shankar Shukla (IAS)
(Deputy Commissioner-cum-Chairperson)
DDMA-Hazaribagh

1. Background & Status

1.1. Introduction

The World Meteorological Organization (WMO) statements on global climate during 2011 and 2012 indicate that the global temperatures are continuing to increase. Heat-waves are projected to increase in number, intensity and duration over the most land area in the 21st century. This is directly affecting the communities, undermining their livelihoods through gradual, insidious changes in temperature and rainfall patterns, and resulting in increased frequency and intensity of hazards such as floods, cyclones, droughts, unseasonal rains and hailstorms, causing extensive damage to crops and agro-rural economy.

The extreme temperatures combined with high humidity and resultant atmospheric conditions adversely affect people living in these regions leading to physiological stress, sometimes even death. This unusual and uncomfortable hot weather can impact human and animal health and also cause major disruption in community infrastructure such as power supply, public transport and other essential services.

Heat wave is also called a "silent disaster" as it develops slowly and kills and injures humans and animals nationwide. Higher daily peak temperatures of longer duration and more intense heat waves are becoming increasingly frequent globally due to climate change. India too is feeling the impact of climate change in terms of increased instances of heat wave with each passing year.

1.2. Definition[1]

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.

India Meteorological Department (IMD) criteria for Heat Wave and Severe Heat Wave:

- Heat wave is considered only after maximum temperate of a station reaches at least 40° C for plains and at least 30° C for hilly regions.
  - **I When normal maximum temperature of a station is < or = 40° C**
    Heat Wave- Departure from normal is 5º C to 6º C
    Severe Heat- Wave Departure from normal is 7º C or more
  - **II When normal maximum temperature of a station is > 40°C**
    Heat Wave- Departure from normal is 4º C to 5º C
    Severe Heat Wave- Departure from normal is 6º C or more
- When actual maximum temperature is 45° C or more, irrespective of normal maximum temperature, heat wave should be declared.
- Higher daily peak temperatures and longer, more intense heat waves are becomingly increasingly frequent globally due to climate change. India too is feeling the impact of climate change in terms of increased instances of heat waves which are more intense in nature with each passing year, and have a devastating impact on human health thereby increasing the number of heat wave casualties.

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:

Table 1: Temperature/ Humidity Index

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

	Caution		Extreme Caution		Danger		Extreme Danger

Source: Calculated °F to °C from NOAA□s National Weather Service

1.3. Heat wave in India:

Heat wave 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. The most notable amongst the recent ones are Hyderabad (Andhra Pradesh) 46 °C, Khammam 48 °C , Jharsuguda (Odisha) 45.4°C, Bhubaneshwar (Odisha) 44°C, Allahabad (Uttar Pradesh) 47.8°C , Delhi 46.4°C, Jashpur (Chattisgarh) 44.5°C, Kolkatta (West Bengal) 44.5°C, Gaya (Bihar) 46.3°C, Nagpur (Vidarbha region in Maharashtra) 47.1°C, Kalburgi (Karnataka) 44.1°C and Churu (Rajasthan) 48.0°C in 2015.

In Jharkhand Bokaro and Giridih, it was even hotter at 46 degree C, Dhanbad (45), Dumka (45), Jamshedpur (44.7), Palamau (44.2) and Hazaribagh (43) also reeled under severe heat wave conditions (***Press Trust of India | Ranchi May 24, 2012***)

In recent years, heat wave casualties have increased. Abnormally high temperatures were observed during April –June during 2010 to 2015 across the country. In India the heat wave took 3028 lives in 1998 and more than 2000 lives in 2002. In Odisha, heat wave caused 2042 deaths in 1998 and more than 1200 deaths in 2002 in southern India. In India heat-wave caused 22562 deaths since 1992 to 2015 at various states (Table 2). Heat wave also caused death of wildlife, birds, poultry in states and most of the zoos in India.

Table 2

Year	No. of Deaths
1992	612
1993	631
1994	773
1995	1677
1996	434
1997	393
1998	1016
1999	628
2000	534
2001	505
2002	720
2003	807
2004	756
2005	1075
2006	754
2007	932
2008	616
2009	1071
2010	1274
2011	793
2012	1247
2013	1216
2014	1677
2015	2422

1.4. Rational for Heat wave Action Plan (HAP)

Many states are affected during the Heat wave season, such as State of Andhra Pradesh, Telangana, Odisha, Gujarat, Rajasthan, Madhya Pradesh, Uttar Pradesh, Vidarbha region of Maharashtra, Bihar, Jharkhand and Delhi.

In 2015, daily maximum temperature exceeded the average maximum temperature by more than 6°C to 8°C, which resulted in death of 2422 people in India due to heat-wave.

There is a need of a coordinated multi-agency approach to the State/district's management of heat waves. At present, the problem of heat waves is being managed at an operational level but it needs to be managed at a strategic level. There is the need for clear roles and responsibilities in the management of heat waves, sufficient strategic monitoring, and greater clarity around triggers for activation and sharing of data across multiple systems and mapping or analysis of the extreme heat impacts across the community.

It is time to devise a national level strategy and plan to combat this disaster. A comprehensive heat preparedness and response requires involvement from not only government authorities but also non-governmental organizations and civil society. The local authorities should carry out a vulnerability assessment in order to identify these areas.

2. Preparing a Heat Wave Plan

2.1. 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 them 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.

2.2. Objective of the Heat-wave Action Plan

The Heat-Wave Action plan aims to provide a framework for implementation, coordination and evaluation of extreme heat response activities in district that reduces the negative impact of extreme heat. The Plan's primary objective is to alert those populations at risk of heat-related illness in places where extreme heat conditions either exist or are imminent, and to take appropriate precautions, which are at high risk. So that Preventive heat management and the administrative action should be taken by the concerned ministries/departments.

2.3. Key strategies

The heat-wave action plan is intended to mobilize individuals and communities to help protect their neighbours, friends, relatives, and themselves against avoidable health problems during spells of very hot weather. Broadcast media and alerting agencies may also find this plan useful. Severe and extended heat-waves can also cause disruption to general, social and economic services. For this reason, Government agencies will have a critical role to play in preparing and responding to heat-waves at a local level, working closely with health and other related departments on long term strategic plan.

- ***Establish Early Warning System and Inter-Agency Coordination*** to alert residents on predicted high and extreme temperatures. Who will do what, when, and how is made clear to individuals and units of key departments, especially for health.
- ***Capacity building / training programme*** for health care professionals at local level to recognize and respond to heat-related illnesses, particularly during extreme heat events. These training programmes should focus on medical officers, paramedical staff and community health staff so that they can effectively prevent and manage heat-related medical issues to reduce mortality and morbidity.
- ***Public Awareness and community outreach*** Disseminating public awareness messages on how to protect against the extreme heat-wave through print, electronic and social media and Information, Education and Communication (IEC) materials such as pamphlets, posters and advertisements and Television Commercials (TVCs) on Do□s and Don□ts and treatment measures for heat related illnesses.
- ***Collaboration with non government and civil society*****:** Collaboration with non-governmental organizations and civil society organizations to improve bus stands, building temporary shelters, wherever necessary, improved water delivery systems in public areas and other innovative measures to tackle Heat wave conditions.
- Identifying vulnerable populations and the health risks specific to each group.
- Developing effective strategies, agency coordination and response planning that addresses heat-health risks.
- Heat Health Information Surveillance System—to monitor and assess the impact of heat waves on human health.
- Reducing Heat Exposure and Promoting Adaptive Measures by launching new efforts including mapping of high-risk areas, access to potable drinking water and cooling spaces during extreme heat days.
- Evaluating and updating the Heat Action Plan regularly.

3. Early Warning & Communications

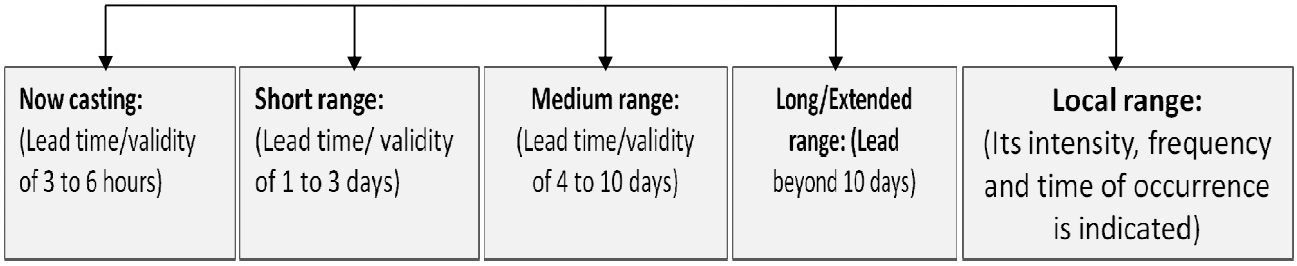
3.1.Early Warning and Indicators of heat-wave

Early warning systems can enhance the preparedness of decision-makers and their readiness to harness favourable 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.

3.2. Forecast and Issuance of Heat Alert or Heat Warning

- **India Meteorological Department (IMD):** The IMD is mandated to meteorological observations and provides current and forecast meteorological information for optimum operation of weather-sensitive activities. It provides warning against severe weather phenomena like tropical cyclones, dust storms, heavy rains and snow, cold and heat waves etc. 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:

Temperature Forecast: Specific Range, Time duration and area



- Public information services are necessary for disseminating information to the population in a timely and adequate manner. Communication with the media needs to be ongoing and aimed at providing enough coverage in informative programmes for topics related to protection from heat-waves.

- During heat-waves, daily announcements will be contain information on the daily temperatures, the consequences for the population's health of the same, the activities undertaken, recommendations for the public, and recommendations.

3.3. Identification of Color Signals for Heat Alert:

Red Alert (Severe Condition)	**Extreme Heat Alert for the Day**	**Normal Maximum Temp increase 6º C to more**
Orange Alert (Moderate Condition)	**Heat Alert Day**	**Normal Maximum Temp increase 4º C to 5º C**
Yellow Alert (Heat-wave Warning)	**Hot Day**	**Nearby Normal Maximum Temp.**
White (Normal)	**Normal Day**	**Below Normal Maximum Temp.**

4. Dealing with Heat Related Illness

4.1. Identification of Heat-Wave illness and recordings of casualties:

In the event of false reporting, the following procedures can be used for verifying and ascertaining the real cause of death.

- Recorded maximum temperature on the particular time periods and place.
- Recording incidents, panchnama or others witnesses, evidence or verbal – autopsy.
- Postmortem/medical checkup report with causes.
- Local authority or Local body enquiry/verification report.

4.2. Prevention of Heat Related Illness:

Heat-related illness is largely avoidable. The most crucial point of intervention concerns the use of appropriate prevention strategies by susceptible individuals. 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.

4.3.Acclimatization:

People at risk are those who have come from a cooler climate to a hot climate. When such visitors arrive during the heat wave season, they should be advised not to move out in open for a period of one week till the body is acclimatized to heat and should drink plenty of water. Acclimatization is achieved by gradual exposure to the hot environment during heat wave.

Table 3: Symptoms and First Aid for various Heat Disorders

Heat Disorder	Symptoms	First Aid
Sunburn	Skin redness and pain, 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 get 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 gentle massage to relieve spasm. Give sips of water. If nausea occurs, discontinue.
Heat Exhaustion	Heavy sweating, weakness, skin cold, pale, headache and clammy. Weak pulse. Normal temperature 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. Or call 108 and 102 for Ambulance
Heat Stroke (Sun Stroke)	High body temperature (106+F). Hot, dry skin. Rapid, strong pulse. Possible unconsciousness. 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 a cool bath or sponging to reduce body temperature. Use extreme caution. Remove clothing. Use fans and/or air conditioners. **DO NOT GIVE FLUIDS.**

5. Roles and Responsibilities for Managing Heat Wave

5.1. There needs to be greater clarity around the roles and responsibilities in the management of Heat wave, for that matter any disaster. Preparation and response to Heat wave is to be managed in an integrated manner for which clear leadership to anchor the process is necessary. A control agency leads the response to a particular type of emergency. Support agencies provide resources, such as personnel, essential services and materials, to support or assist a control agency or affected person.

5.2. Disaster Management Department is the control agency for the response to heat wave, and that other agencies, including the Department of Health, have a support role.

5.3. Commissioner / Director, Disaster Management as the Incident Controller and Nodal Officer for heat waves—is responsible for strategic management of the incident at the State Level. The District Collector is the Incident Controller and Nodal Officer at District Level.

5.4. Generally the Responsibilities of Incident Controller and Nodal Officer include:

- managing all response activities
- notifying support agencies
- establishing incident and emergency management teams
- collecting, analyzing and disseminating information regarding the emergency
- leading multi-agency response planning
- issuing timely information and warnings to the community
- Developing incident action plans.

5.5.Need for Data and Analysis

As Heat Wave is not a notified disaster at the National level, accurate information and data related to heat wave deaths and illnesses are not available. In order to prepare, and take necessary mitigative action we need data on the age group, sex and occupation of those who die of heat wave. We also need to collect data on whether the deaths occurred indoor or outdoor, and also about the economic status of the people who died. Hence, a format for collecting data is provided at Annexure 2.

5.6. Prevention, Preparedness and Mitigation Measures:

Prevention, preparedness and mitigation measures for various stakeholders are enumerated in the following Table.

Table 4: Roles and Responsibilities for Managing Heat Wave

Sl. No.	Tasks/ Activities	Agencies & Their Responsibilities	
		Agencies	Responsibility
1.	Preparation of Heat Wave Action Plan	SDMA/ DDMA/ Municipal Corporation and Local Bodies	Preparing a Heat Wave Action Plan and implementing.
2.	Early Warning	State Governments/ District Administration	To disseminate the information received from IMD to the public at large
3.	Mitigating Heat Wave	Public Health And Engineering Department	To construct shelters/ sheds, bus stands and provides drinking water points in cities, worksites.
		Department of Health	Stockpiling of ORS , creating Medical posts at places of mass gathering
4.	Preparation of Heat Wave Action Plan	SDMA/ DDMA/ Municipal Corporation	Preparing a Heat Wave Action Plan and implementing.

		and Local Bodies	
5.	Early Warning	State Governments/ District Administration	To disseminate the information received from IMD to the public at large
6.	Mitigating Heat Wave	Public Health And Engineering Department	To construct shelters/ sheds, bus stands and provides drinking water points in cities, worksites.
7.	Preparation of Heat Wave Action Plan	SDMA/ DDMA/ Municipal Corporation and Local Bodies	Preparing a Heat Wave Action Plan and implementing.
8.	Mitigating Heat Wave	Public Health And Engineering Department	To construct shelters/ sheds, bus stands and provides drinking water points in cities, worksites.
		Department of Health	Stockpiling of ORS , creating Medical posts at places of mass gathering
9.	Monitoring and Response	Health Department	• Surveillance • deployment of Rapid Response Teams • specific care for vulnerable groups
10.	Occupational Support and advisories	All Departments	Take necessary measures as suggested in Annexure 1, wherever applicable
11.	Media campaign and IEC activities	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
12.	Documentation	DDMA/SDMA	Collecting Data and Information as per Annexure 2
13.	Long Term Measures	Forest Department/ SDMAs and other Concerned Department	Improving the forest coverage and green areas

6. Implementation of Heat Action Plan

6.1. Successful implementation of a Heat Action Plan requires coordinated action between many diverse stakeholders, including Government Departments / Agencies, health care professionals including emergency medical personnel, health center staff, and hospital staff; and community groups.

6.2. Following the forecasting of an heat event, immediate notification of the public and all those participating in the response is critical to ensure the plan is activated.

6.3. The Heat Action Plan shall be implemented in 3 Phases annually.

Phase-I: – Pre -Heat Season (January to February)

Pre-Heat Season is devoted to develop early warning systems, communication plan of alerts to the general public, health care professionals and voluntary groups (care givers) with emphasis on training and capacity building of these groups.

Phase-II: - During the Heat Season (March to July)

High alert, continuous monitoring of the situation, coordination with all the departments / agencies concerned on one hand and general public & media on the other hand is the focus of this phase.

Phase-III: – Post -Heat Season (August to December)

In Phase – III concentration is on evaluation and updation of the plan. It is important at the end of the summer to evaluate whether the heat health action plan has worked. Continuous updation of plan is a necessity. Global climate change is projected to further increase the frequency, intensity and duration of heat-waves and attributable deaths. Public health prevention measures need to take into consideration the additional threat from climate change and be adjusted over time. Measures that are effective now, might not be effective anymore in future decades to come. Development of appropriate Heat Index suitable for District by analyzing temperature and mortality data by involving various agencies is necessary to evaluate and update the plan.

7. Phase wise Responsibilities of Various Departments / Agencies

7.1. Phase-I: - Pre Heat season (January to February)

I. Incident Controller / Nodal Officer at State Level and Nodal Officer at District Level

i. Preparation of a list of High risk areas in the State / District vulnerable to Heat waves for more focus in planning to mitigate adverse affects of Heat wave.
ii. Identification of vulnerable groups of population.
iii. Convene meetings with the concerned Departments/ Agencies/ NGOs involved in response mechanism to Heat waves to review the action plan periodically.
iv. Designation of a single officer as point of contact for each department.
v. Organize training for health workers, link workers, school children, and the local community in preventive measures and treatment protocol involving the Medical & Health Department
vi. Distribute pamphlets and posters with tips to prevent heat stress in local language to hospitals, schools, and professional associations.
vii. Establish Heat Action Web Page on Disaster Management / District Web site.

II. The Information and Public Relations (I & PR) Department

i. Identification of areas to post warnings and information during heat season.
ii. Securing advertisement / scrolling slots for announcements regarding Heat waves.
iii. Designing information and awareness material in the form of pamphlets, posters etc. On Heat waves in local language for distribution to the general public, especially focusing on identified high risk areas in the State and vulnerable groups of population.

III. Medical & Health Department and Medical Professionals

i. Designing and initiating targeted training programs, capacity building efforts and communication on heat illness for medical staff at Public Health Centres (PHCs) / local hospitals and Urban Health Centres (UHCs), including nursing staff, paramedics, field staff and link workers (ANMs, ASHA Workers, Aarogya Mitras etc.), while paying special attention to the susceptibility of particular wards.
ii. Updation of admissions and emergency case records in Hospitals to track heat-related morbidity and mortality and also to create simple, user-friendly means to track daily heat-related data and behavioral change impacts. Train hospitals to record information on education & communication (IEC) efforts and to ensure recording of cause of death in death certificates.
iii. Adopt heat-focused examination procedures at local hospitals and urban health centers.
iv. Developing of SMS facility to reach the field level staff during emergency periods.
v. Checking of inventories of medical supplies including ORS powder in PHCs and other Local Hospitals.
vi. Purchase and distribute reusable soft plastic ice packs for the citywide UHCs, 108 emergency centres, ambulances and hospitals.
vii. Explore creation of ice pack dispensaries to increase access to vulnerable communities in high risk areas.
viii. **To provide following services through 108 / 104 Emergency Service**
    a) Ensure adequate supply of IV fluids.
    b) Prepare handouts for paramedics about heat related illness.
    c) Create displays on ambulances to build public awareness during major local events.
    d) Identifying routes to high risk areas and to reach vulnerable sections of population in shortest time possible by utilizing the list of high-risk areas.

IV. MA & UD Department / Corporations / Municipalities & Panchayat Raj Department / Panchayats

i. High Risk Area mapping and identification of vulnerable groups particularly destitute, homeless, beggar homes and old age homes to concentrate on mitigation efforts during heat alert period.
ii. Identification of areas to provide shelters and drinking water during heat alert period.
iii. Urban forestry, avenue plantation and encouraging roof gardens to increase the green cover in Urban areas to reduce heat levels.
iv. Special care in restricting outdoor activities and functions during heat period.
v. Identification of NGOs / Rotary Clubs / Lions Clubs and Corporate houses (under Corporate Social Responsibility) to provide shelters, drinking water, medical supplies and temporary homes during heat days.

V. Labour & Employment Department

i. Organize training for employers, outdoor labourers and workers on health impacts of extreme heat and protective measures to be taken during high temperature periods.
ii. Utilize maps of construction sites and outdoor work spots preferably overlaying with irradiation map from IMD or heat island map to identify more high-risk outdoor workers and to conduct publicity campaigns during high-risk days.
iii. Preparing a list of factory medical officers, contractors and house side non-factory workers to include in heat alert and action communication.
iv. Heat illness orientation planning for factory medical officers.

VI. Rural Development Department

i. Collecting information on the works sanctioned under MGNREGS programme and other schemes in High risk areas to plan for mitigation effort during heat period.
ii. To ensure shade and supply of adequate drinking water at work spots.

VII. Animal Husbandry Department

i. Preparation of Posters & pamphlets with tips to take care of cattle and poultry during heat waves.

ii. Publicity of protective measures to save cattle and poultry during heat periods through District heads and Farmers Training Centers.
iii. Checking inventory of necessary medicines for treatment of cattle and poultry.
iv. Preparation of plans to provide drinking water for cattle in case of scarcity.

VIII. Transport Department

i. Obtaining lists of risk areas and review of Bus timings and available shelters in the high risk areas.
ii. Planning for shade / shelter, drinking water and fans in the waiting areas of passengers.
iii. Review plan with cab operator / auto / transport associations and also Highway patrol
iv. Display of precautionary measures (Do's and don'ts) on busses, autos, in bus stations & auto stands and distribution of pamphlets to passengers.
v. Planning to provide ORS, Ice packets etc. and medical services in Bus stations.

IX. Information & Technology (IT) Department

i. Development of Disaster and Emergency Management System which includes Heat waves and prepare a Dash board to monitor heat wave scenario and its impact constantly through electronic media/device.
ii. Mapping of Risk areas and discrimination of warnings and alerts to all stakeholders automatically through web, IVRS and mobile applications.
iii. Prepare map on web interface with color coding system.

X. Education Department

i. Designing child-friendly educational preventative trainings and distribute heat protection materials at local schools.
ii. Training of school teachers to equip them with knowledge of heat protection tips and activities which they can disseminate in classrooms.
iii. Scheduling of examinations before starting of Heat period normally.

XI. Fire Department

i. To check the readiness of vehicles and fire fighting equipment to face any emergency.

XII. Community groups / Self help groups / ward level committees / NGOs

i. Conduct training programmes, workshops and outreach sessions with community / Self help groups and mobilizers such as ASHA workers, Anganwadis, and Ward Committees in Municipalities to help inform and get vulnerable communities more actively involved.
ii. Identification of NGOs, Voluntary Organizations in reaching out to the Public, especially Vulnerable groups.
iii. Encourage discussions for finding early signs of heat exhaustion with local doctor or Health Centre.
iv. Inform fellow community members about how to keep cool and protect oneself from heat.

7.2. Phase-II: - During the Heat Season (March to July)

I. Incident Controller / Nodal Officer at State Level and Nodal Officer at District Level

i. Issue of **heat alert** when extreme heat events are forecast by IMD. All key Departments / Agencies, SEOC, DEOC etc. in accordance with the Communication Plan may be notified.
ii. Monitor and increase the **heat alert** level to match the severity of the forecast and established threshold.
iii. Hold regular (daily, if necessary) conference to discuss reports and fresh developments during a **heat alert**. Special meetings with key agencies may be convened.
iv. To ensure that communication channels with all Stakeholders are functional and operating.
v. Ensure presence of staff and availability of required supplies with each Department, including fresh drinking water.
vi. Communicate locations of emergency facilities and cooling centres / shaded areas with each Department / Organization.

vii. Inform power supply Companies to prioritize maintaining power to critical facilities (such as hospitals and UHCs).
viii. Notify all the stakeholders when the **heat alert** is over.

II. I & PR Department

i. Release of messages to the general public and vulnerable groups about the risks and dangers of heat-related illness by the nodal officer at the State and District levels through press conferences.
ii. Wide circulation of Heat wave alerts through SMS or WhatsApp in collaboration with private sector Telecom companies in addition to traditional media during a heat alert.
iii. Circulate heat alerts in bulk to the public via centralized email databases.
iv. To send SMS alert messages directly to private practitioners in addition to the medical professionals at PHCs and UHCs.
v. Utilize local radio and FM broadcasts to disseminate heat protection tips and high temperature warnings to the vulnerable sections of populations.
vi. Using social media like Twitter, Facebook etc. to increase outreach of the messages.

III. Medical & Health Department and Medical Professionals

i. Display of heat-related illness prevention tips and how to stay cool around hospitals, PHCs and UHCs.
ii. Equip all hospitals/ PHCS/ UHCs with additional supplies of medicines and material.
iii. Ensure adoption of Heat illness treatment and prevention protocols.
iv. Deploy additional staff at hospitals and PHCs/UHCs to attend to the influx of patients during a heat alert, if feasible.
v. Keep emergency wards ready in all PHCs / UHCs and Hospitals
vi. Increase outreach of community health workers in at-risk neighbourhoods during a heat alert, if feasible.
vii. Report Heatstroke patients to Nodal Officer on daily basis and generate weekly reports on public health impacts of Heat wave for Nodal Officer, during a heat alert.
viii. Expedite recording of cause of death in death certificates.
ix. Ensure that Regional Health Officers visit PHCs / UHCs to confirm that proper preparation has been made for heat related illness and conduct case audits during heat season.
x. **Ensure that 108 /104 EMERGENCY SERVICE:**
    a) Activate dynamic strategic deployment plan for ambulances.
    b) Adequate supply of ice packs, IV fluids and medicines.
    c) Keep accurate records of pre-hospital care.
    d) Adequate staff on duty and restrict leave if necessary.

IV. MA & UD Department / Corporations / Municipalities & Panchayat Raj Department / Panchayats

i. Disseminate SMS text messages to warn residents of high risk areas and vulnerable sections of population during a **heat alert**.
ii. Set up electronic scrolling boards to display temperature and forecasts at junctions and other public places.
iii. Activate "cooling centers," such as public buildings, malls, temples, schools and State Government or Local body, run temporary night shelters for those without house or access to water and/or electricity at home.
iv. Expand access to shaded areas for outdoor workers, slum communities, and other vulnerable sections of population.
v. Keep open the parks for a longer duration during evenings.
vi. All non-essential uses of water (other than drinking, keeping cool) may be suspended, if necessary.
vii. Distribution of fresh drinking water to the public by opening water centres at people congregation points like market places, labour addas, Buss stations etc. Water may be distributed through pouches to the poor in the identified high-risk areas.

viii. Actively involve NGOs, Lions Club, Rotary Club and Corporate houses in providing shelter and drinking water facilities.

V. Labour & Employment Department

i. Encourage employers to shift outdoor workers schedules away from peak afternoon hours (12 – 4pm) during a heat alert.
ii. To ensure to provide emergency ice packs and heat-illness prevention materials to construction workers.
iii. Ensure provision of shelters/ cooling areas, water and supply of emergency medicines like ORS, IV fluids etc. at work sites by employers.

VI. Rural Development Department

i. Reschedule of working hours to avoid intense heat timings in all the works sanctioned under MGNREGS.
ii. Provision of water and shelters / cooling areas wherever necessary.

VII. Animal Husbandry Department

i. Display posters and distribute pamphlets on the precautionary measures to betaken to safeguard cattle and poultry birds during heat period in villages and important junctions.
ii. Ensure adequate stock of medicines in all veterinary hospitals.
iii. Ensure visit of field staff during heat wave to villages for follow up action in treatment of cattle / poultry birds.

VIII. Transport Department

i. Display posters & distribute pamphlets on prevention of heat related illness in bus stands, auto stands etc.
ii. Ensure availability of shade / shelters, drinking water, ORS packets etc., in bus stands, auto stands etc.
iii. Establish Health teams at major bus stands / Terminals and other public places
iv. Ensure availability of water and ORS packets in long distance buses.
v. Do not run buses as par as possible during peak hours (12-4 pm) when Heat wave is declared.

IX. Information and Technology (IT) Department

i. Send real time information through Dash board/ interface on all activities related to Heat wave.
ii. Activate Dash board/ Interface in e-pragathi.
iii. Activate Heat Wave APP
iv. Generate reports encompassing all activities undertaken during heat wave alert to use for evaluation of systems and action plan.

X. Education Department

i. Ensure supply of water for students and teachers if school is functioning.
ii. If school is not functioning, permit use of school premises as shelter during day time.

XI. Fire Department

i. Ensure presence of staff during heat alert period, if necessary by restricting leaves.
ii. Ensure functioning of communication equipment to receive messages / alerts of occurrence of fire.
iii. Ensure adequate supply of water and foam to fight fire.

XII. Community groups / Self help groups / ward level committees / NGOs

i. Take all precautions to avoid Heat related illness.
ii. Keep cool and hydrated during the heat season by drinking water, staying out of the sun, and wearing light clothing.
iii. Check on vulnerable neighbours, particularly during a heat alert.
iv. Limit heavy work in direct sun or indoors, if poorly ventilated, especially during a heat alert.

7.3. Phase-III: – Post -Heat Season (August to December)

I. Incident Controller / Nodal Officer at State Level and Nodal Officer at District Level

i. Review of quantitative and qualitative data for process evaluation and improvements.
ii. Annual evaluation of Heat Action Plan by organizing a meeting with key Departments / agencies and relevant stakeholders.
iii. Evaluate the Plan process basing on the reach and impact.
iv. Revision of Plan basing on the performance feedback.
v. Revision and posting of Revised Action Plan online well ahead of summer season next year for information of all stakeholders.

II. I & PR DEPARTMENT

i. Evaluate reach of advertising / public messages and other means of communication like social media (face book, twitter etc.) to target groups.
ii. Participate in annual evaluation in Heat Action Plan.
iii. Review the revised Heat Action Plan.

III. Medical & Health Department and Medical Professionals

i. Perform an epidemiological case review of heat-related mortalities during the summer.
ii. Conduct and gather epidemiological outcomes from the data on heat risk factors, illness and death, based on average daily temperatures.
iii. Measure mortality and morbidity rates based on data before and after the Plan's interventions.
iv. Incorporate data and findings into future versions of the Heat Action Plan.
v. Participate in annual evaluation of Heat Action Plan review the revised Heat Action Plan.
vi. Review the revised Heat Action Plan.
vii. To ensure 108 / 104 Emergency Service
   a) Provide data to key Agency / Department.
   b) Participate in annual evaluation of Heat Action Plan review the revised Heat Action Plan.
   c) Review the revised Heat Action Plan.

IV. MA & UD / Panchayat Raj Department/Local bodies, Labour & Employment Department, Rural Development Department, IT Department, School Education Department, Animal Husbandry Department, Transport Department

i. Collect data related to implementation of Action Plan and provide feedback to key agency / department**.**
ii. Participate in annual evaluation of Heat Action Plan.
iii. Review the revised Heat Action Plan.

V. Community groups / Self help groups / ward level committees / NGOs

Reach the unreached and educate the community on a continuous basis, in addition to providing feedback on the outreach and impact of Heat wave Action Plan to the Key Departments / Agencies / Nodal Officers at State and District Levels.

8. Conclusion

All the departments / agencies shall take necessary timely action to implement the Heat Wave action plan to mitigate the adverse effects of heat wave.

EMERGENCY TREATMENT

If Heat Stroke is suspected, call 108 immediately. While waiting for the ambulance:

- Take the person's temperature
- If possible move the affected person to somewhere cooler / shaded area
- Give a cool shower by sprinkling with water or Wrapping in a damp sheet and using a fan to create an air circulation
- Encourage to drink fluids, if they are conscious
- Do not give aspirin or paracetamol

Heat Illness – Treatment Protocol

General Treatment protocol applicable to all patients in any setting, where there is a potential concern for heat illness with slight variations according to the setting (EMS, health center, clinic, hospital emergency department, etc.).

1. Initial patient assessment – primary survey (airway, breathing, circulation, disability, exposure), vital signs, including temperature.
2. Consider heat illness in differential diagnosis if:
    a. Presenting with suggestive symptoms and signs (see table in Health Impacts of Heat Waves).
    b. Patient has one or more of the following risk factors:
        i. Extremes of age (infants, elderly)
        ii. Debilitation/physical de-conditioning, 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 environmental 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 skin.
    c. Use fan to blow cool air onto moist skin.
5. If temperature lower than 40°C, repeat assessment every 5 minutes; if improving, attempt to orally hydrate (clear liquids, ORS can be used but not necessary; cool liquids better than cold)and observe.
6. If temperature is 40°C or above, initiate IV rehydration and immediately transport to emergency department for stabilization.

VULNERBLE GROUPS OF POPULATION

1. Young children
2. Pregnant Women & Nursing mothers
3. Older people mainly above the age of 60
4. Below Poverty Line (BPL) families with no or poor housing conditions
5. Infirm, isolated, and destitute
6. People with pre existing medical conditions (e.g., cardiovascular and respiratory illness, diabetes), people on certain medications
7. People with limited mobility, impairment of thermoregulatory capacity and reduced ability to perceive changes in temperature

8. People engaged in outdoor occupations

Reasons for inadequate coping

1. Not knowing the issue of heat alerts.
2. Lack of awareness of precautionary measures (Dos & Don'ts).
3. Not knowing Symptoms of Heat related illness and immediate treatment.
4. Lack of proper connectivity to Primary Health Centres (PHCs).
5. Lack of access to urgent medical attention at local levels (in villages).
6. No access to shaded areas and cooing places.
7. Non availability of adequate water.
8. No knowledge of Services available etc.

Special care for vulnerable population groups

- Once people at risk have been identified special care and interventions need to be implemented through the local health care and social services.
- It is important that those who are susceptible can be easily identified for outreach services. Possible methods of identification include local community groups and social services and active registration of individuals with a general practitioner or social services.

Annexure-1

Do's and Dont's

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 News paper 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.

DONT's

- 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.

Annexure 2

District	Details Death reported in 20--									
	Age Group	Urban		Rural		Economic Status		Location of Death		Occupation of the Deceased	Remarks
		Male	Female	Male	Female	APL	BPL	Indoor	Outdoor		
Block	< 1 year										
	1-4 years										
	5-9 years										
	10-14 years										
	15-24 years										
	25-34 years										
	35-44 years										
	45-54 years										
	55-64 years										
	65-74 years										
	75-84 years										
	85+										