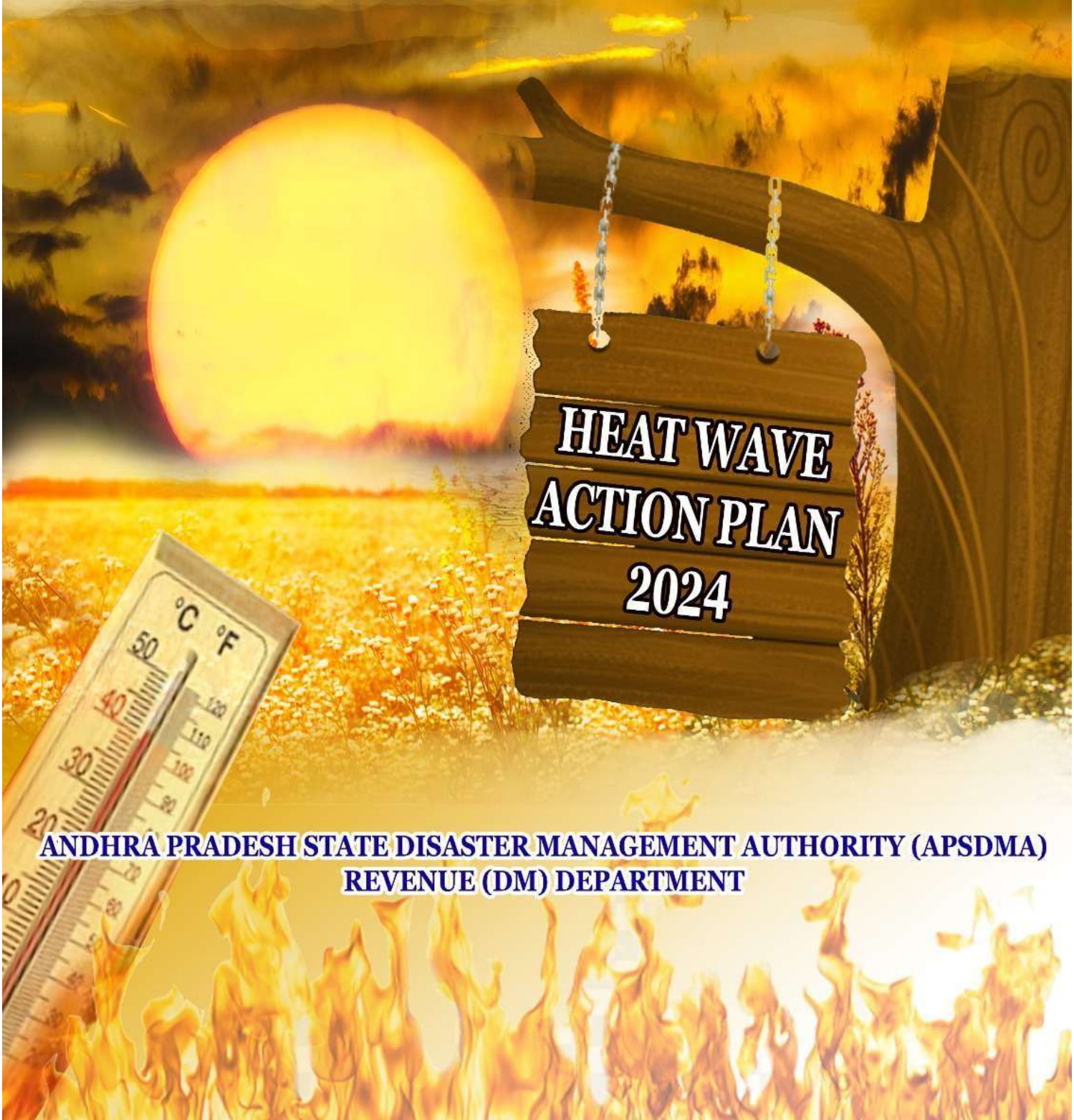
GOVERNMENT OF ANDHRA PRADESH



ANDHRA PRADESH STATE DISASTER MANAGEMENT AUTHORITY (APSDMA)
REVENUE (DM) DEPARTMENT

INDEX

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Foreword

The State of Andhra Pradesh is one of the heat-prone areas of the country. The State Level Climatic Monologue from the India Meteorological Department indicates a significantly increasing trend, at a 95% confidence level, in the temperature of the State. As a result, Heat Wave conditions have been alarming in the recent past, which can further aggravate in the future due to climate change and global warming. The humid conditions in the 12 coastal districts of the State add up to the effect of heat, creating more human discomfort in the State.

After the State experienced massive heat stroke casualties of 1369 in 2015, Andhra Pradesh State Disaster Management Authority (APSDMA) has been taking various proactive measures to mitigate the Heat wave effects, as a result of which there is an overall decreasing trend in the casualties. For example, for almost similar temperature and humidity conditions in 2017 and 2019, the deaths have reduced from 236 in 2017 to 28 in 2019 and zero deaths in 2020, 2021 and 2022, 3 deaths in 2023. Such a reduction in the casualties is due to the efforts by APSDMA in creating awareness programs through various means and by providing action plans to all the stakeholders following the National Disaster Management Authority (NDMA) guidelines. To further help the administrators, a new initiative of providing heat index and maximum temperature for all the Mandals has been taken to mitigate the heat wave conditions.

The present Heat Wave Action Plan (HAP-2024) is prepared to help the stakeholders, policy makers, administrators, field-level officers and the District Collectors of the 26 newly formed districts after the reorganization of the erstwhile 13 districts of the State in mitigating the heat effects. I wish for a successful implementation of the action plan to further reduce the casualties.

(Ronanki Kurmanath)

1.0 EXECUTIVE SUMMARY

Heat wave have emerged as one of India's most significant weather hazards. A Heat wave is a period of abnormally high and more than the normal maximum temperature between March and June. This is also called a "silent disaster" as it develops slowly and kills human beings and animals. The frequency of daily peak temperatures of longer duration has been increasing in recent years due to global warming. These extreme temperatures, combined with the existing atmospheric conditions such as humidity, wind speed and radiation, adversely affect people living in these regions, causing physiological stress, sometimes resulting in death.

According to the India Meteorological Department (IMD) report, the state average summer mean maximum temperatures have been increasing over Andaman and Nicobar, **Andhra Pradesh**, Goa, Himachal Pradesh, Karnataka, Kerala, Lakshadweep, Maharashtra, Mizoram, Rajasthan, Sikkim and Tamil Nadu. The annual Heat Wave normalized vulnerability index was computed based on Heatwave conditions and shown below (Figure 1).

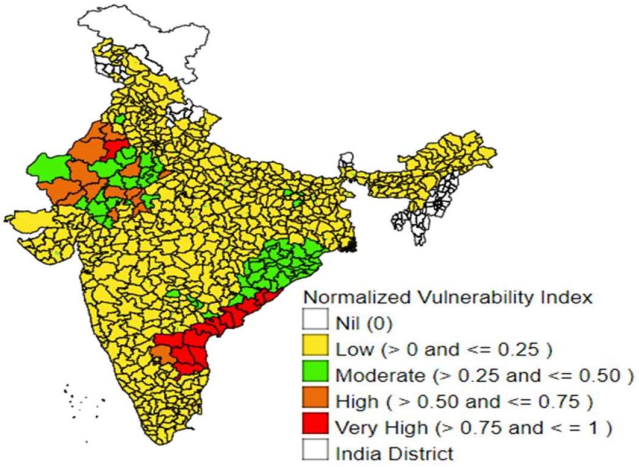


Fig 1: Heat Wave Normalized Vulnerability Index Annual

The extreme temperatures, high humidity, and resultant atmospheric conditions adversely affect people living in these regions, leading to physiological stress and sometimes even death. This unusual and uncomfortable hot weather can impact human and animal health and cause major disruption in community infrastructure such as power supply, public transport and other essential services. The Heat wave action plan is now formulated. It will enable administrators to take appropriate measures and action to be prepared for the Heat wave during March, April and May.

1.1 INTRODUCTION

The objective of the Heatwave Action Plan

The Heatwave Action Plan aims to provide a framework for implementing, coordinating and evaluating extreme Heat response activities in rural/urban areas that reduce the adverse impacts of extreme Heat. The plan calls for preparedness measures to protect human life/animal life from the Heat wave conditions. The Heat wave action plan is intended to mobilize departments and communities to mitigate the Heat wave conditions and to combat health hazards during the Heat Wave season. The NGOs and civil society shall also coordinate with departments to develop specific plans to reduce the impact of extreme Heat wave conditions in the cities/towns.

Considering 236 deaths in 2017, the State of Andhra Pradesh declared the Heat Wave a specific disaster (G.O.Ms. No 14, Revenue (DM II) Department Dated 17.08.2020). A three-member committee of Police, Revenue and Health Departments has been constituted to declare Heat wave deaths. An Amount of Rs. 4 lakhs will be paid as exgratia to the deceased family members.

Preparing a Heatwave plan

Most states, like Andhra Pradesh are affected during the Heat wave season. The actual deaths resulting from Heat wave are higher than the reported numbers. The booming service sector, with many vegetable vendors, auto repair mechanics, cab drivers, construction workers, roadside kiosk operators, etc., is particularly vulnerable to Heat wave conditions. Therefore, these workers, homeless people and elderly people constitute the majority of Heat wave causalities in India.

Vulnerability Assessment

- Identifying the vulnerable population helps design appropriate strategies and interventions at the community level.
- Physical vulnerability could be due to age, pregnancy, chronic disease, type of housing, occupation etc.,
- A qualitative technique can be used to explore the opportunities, challenges and innovations during summer.
- The possible vulnerable population can be but is not limited to pregnant/lactating women, elderly (>=60 years), children (<5 years), traffic police personnel, persons with disabilities, persons with chronic diseases, persons suffering from immune-compromised diseases and persons with debilitating conditions patients taking certain medications.

City-level medium/long-term measures

- Identification and evaluation of factors leading to the disproportionate increase in temperature within the city.
- Generating a Heat wave risk and vulnerability map for developing a strategic mitigation action plan.
- Meeting hot spots within the city and integrating them in vulnerability assessment.
- Measures to reduce the temperature in these hot spots by developing vertical gardens, small parks with a water fountain etc. must be developed.
- Coordination with different research and educational institutions for built environment assessment.
- Allocate part of research and development in the financial budget approvals for Heat wave action planning.
- Integrating the Heat action plan with the development plan. Development plans should focus on reducing the city's Heat and water stress.
- Adhering to building codes in the city.

Goals

Recurring/regular activities

- Putting up display boards for colour-coded Heat wave alerts and Dos and Don'ts in public places such as parks, hospitals etc.
- Multiple medium of communication (preferably in local languages) like TV, Radio and newspaper for awareness.
- Identify and reduce awareness by disseminating information using pamphlets, hoardings and LED displays on advertisement boards.
- Change in timings of schools, colleges, offices, markets etc.

Short Term:

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

Medium Term:

- LED display boards installed at District headquarters displaying real-time weather data about Rainfall, Temperature, Humidity and Wind Speed should be incorporated into precautionary measures for Disaster Management.
- Involving the Forest department in collating local coping and adaptation strategies, indigenous technologies such as vernacular building materials, construction of green buildings, Energy Conservation Building Code (ECBC) etc. related to Heat wave risk mitigation.
- New Heat wave criteria must be evolved based on gridded data with maximum and minimum temperatures to develop a scientific model to determine all causes of mortality.
- Identify "Heat hot spots" in Andhra Pradesh through appropriate tracing and modelling of meteorological data and promote the timely development and implementation of local Heat Wave action plans with strategic inter-agency coordination and a response that targets the most vulnerable groups.

Long Term:

- Focused capacity building – Heat wave mitigation management should be added to the school curriculum to sensitise children and local people.
- Training programs at the local level/community level for awareness among people.
- Integrate climate variability mitigation and adaptation efforts in the Heat wave Action Plan.
- Operational forecast of maximum temperature over AP in short, medium and extended range timescale is useful in giving Heat wave outlook.
- Upgradation of forecast system and associated equipment to provide Heatwave alerts a minimum of 2 to 3 weeks before the event.
- Evaluation of cascading effects of Heat waves over the flood, drought and hydrological models.
- Involvement of academia, collaboration, and more participation from higher educational institutes may be developed.

Key Strategies:

- Establish an Early Warning System and communication systems.
- Developing inter-agency response plans and coordination in the field.
- Preparedness at the local level for health eventualities.
- Health care system capacity building.
- Public awareness and community outreach.
- Collaboration with private, non-government and civil society.
- Assessing the impact feedback for reviewing and updating the Plan.

There is a strong and global scientific consensus that the climate is changing, and this change will cause an increase in average global temperatures, as well as the number and intensity of Heat waves. Heatwaves are a significant cause of death and morbidity worldwide, and the impacts of Heat events are likely to increase due to the changing frequency, severity, and intensity of Heat waves caused by climate change.

India has an opinion on the impact of climate change in terms of increased instances of Heat waves, which have become more intense over the years and have a devastating effect on human health, thereby increasing the number of Heat wave casualties. Heat waves have caused more deaths than any other natural disaster in Andhra Pradesh and represent a significant risk to public health. Many stations in northwest India, Ganjetic plains, Central India and East Coast India experienced continued Heat waves spells of more than 10 days, mainly during May and June. There has been an increasing tendency for extreme summer temperatures over most parts of the country in the last five decades. Heat wave season typically occurs from March-June and, in some rare cases, even extends up to July. In 2015 and 2016, severe Heat wave conditions prevailed in Andhra Pradesh in many districts.

Heat wave action plan of Andhra Pradesh:

Heat wave affected areas can be identified by 1. based on the criteria suggested by IMD using observed maximum daily temperature and its deviation from normal and 2. Based on thermal index computed in a combination of temperature and humidity and by taking the threshold values for Heat index based on bio-climatic charts suitable to areas in Andhra Pradesh region.

The Increased occurrences of summer Heat wave conditions in recent years are affecting human life. Prior information about the possible Heat wave conditions will help reduce the risk to human life. Besides helping take preventive action, government agencies should be vigilant and allow them to plan outreach activities to save the lives of the public.

The Heat wave analysis and alerts carried out and the role of SEOC-APSDMA is given in Annexure-I.

1.2. HEAT WAVE

What is a Heat wave?

A Heat wave is defined as an increased atmospheric temperature that leads to physiological stress, which sometimes can claim human life. Quantitatively Heat wave can be defined as any increase from the normal temperature. Again, depending on the deviation from the normal temperature, it can be a moderate or severe Heat wave. If the maximum temperature of any place continues to be 45°C for two consecutive days, it is called a Heat wave condition.

The human body can tolerate an environmental temperature of 37°C, whenever the environmental temperature increases above 37°C, the human body starts gaining Heat from the atmosphere. A person can suffer from Heat stress disorders even at 37 or 38 °C in high humidity and prolonged high temperatures.

As per the India Meteorological Department (IMD), the following criteria are used to declare a prevailing Heat wave condition.

i)	**Based on Departure from Normal** ➢ **Heat wave** **:** Departure from normal is **4.5 °C to 6.4 °C.** ➢ **Severe Heat wave:** Departure from normal is >**6.4 °C.**
ii)	**Based on Actual Maximum Temperature (For plains only)** ➢ **Heat wave** **:** When the actual maximum temperature is ≥ **45** °C for a day. ➢ **Severe Heat wave:** When the actual maximum temperature is ≥ **47 °C** for a day.
iii)	if the maximum temperature of a station reaches at least **40** °C or more (for plains)
iv)	if the maximum temperature of a station reaches at least 37 °C or more (for coastal areas)
v)	if the maximum temperature of a station reaches at least 30 °C or more (for hilly regions)
For (iii), (iv) and (v), the defined temperatures should prevail consecutively for 2 or more days.	

Since normal is available for Andhra Pradesh, APSDMA follows the first criteria mentioned above.

Color codes for Heat wave Alert:

IMD currently follows a single system of issuing warnings for the entire country through a colour-coded system, as given below.

The Heat waves are classified into different severity categories bearing on the temperatures with colour codes as given in Table 1:

Table 1. Classification of a Heat wave

Colour Code	Alert	Warning	Impact	Suggested Actions
Green (No action)	Normal Day	Maximum temperatures are near normal	Comfortable temperature. No cautionary action required.	Normal activity
Yellow Alert (Be updated)	Heat Alert	Heat wave conditions at isolated pockets persists for 2 days	Moderate temperature. Heat is tolerable for general public but moderate health concern for vulnerable people e.g. infants, elderly, people with chronic diseases	(a) Avoid heat exposure. (b) Wear lightweight, light-coloured, loose, cotton clothes. (c) Cover your head
Orange Alert (Be prepared)	Severe Heat Alert for the day	(i) Severe heat wave conditions persists for 2 days (ii) Through not severe, but heat wave persists for 4 days or more	High temperature. Increased likelihood of heat illness symptoms in people who are either exposed to sun for a prolonged period or doing heavy work. High health concern for vulnerable people e.g. infants, elderly, people with chronic diseases.	(a) Avoid heat exposure– keep cool. Avoid dehydration (b) Wear lightweight, light-coloured, loose, cotton clothes (c) Cover your head (d) Drink sufficient water- even if not thirsty (e) Use ORS, homemade drinks like lassi, torani (rice water), lemon water, buttermilk, etc. to keep yourself hydrated (f) Avoid alcohol, tea, coffee and carbonated soft drinks. which dehydrates the body (g) Take bath in cold water frequently. In case of SUNSTROKE: Lay the person in a cool place, under a shade. Wipe her/him with a wet cloth/wash the body frequently. Pour normal temperature water on the head. The main thing is to bring down the body temperature. Consult a Doctor immediately.
Red Alert (Take Action)	Extreme Heat Alert for the day	(i) Severe heat wave persists for more than 2 days. (ii) Total number of heat/severe heat wave days exceeding 6 days.	Very high likelihood of developing heat illness and heat stroke in all ages.	Along with suggested action for Orange Alert, Extreme care needed for vulnerable people.

1.3. HEAT INDEX:

The Heat index (HI) is an index that combines air temperature and relative humidity in shaded areas to posit a human-perceived equivalent temperature, such as how hot it would feel if the humidity were some other values in the shade. For example, when the temperature is 32 °C (90 °F) with 70% relative humidity, the Heat index is 41 °C (106 °F) (see table below). The Heat index is meant to describe experienced temperatures in the shade, but it does not consider Heating from direct sunlight, physical activity, or cooling from the wind. The four severity classes of the Heat indices are given in Table 2:The Heat index of a given combination of (dry-bulb) temperature and humidity is defined as the dry-bulb temperature, which would feel the same if the water vapour pressure were 1.6 kPa.

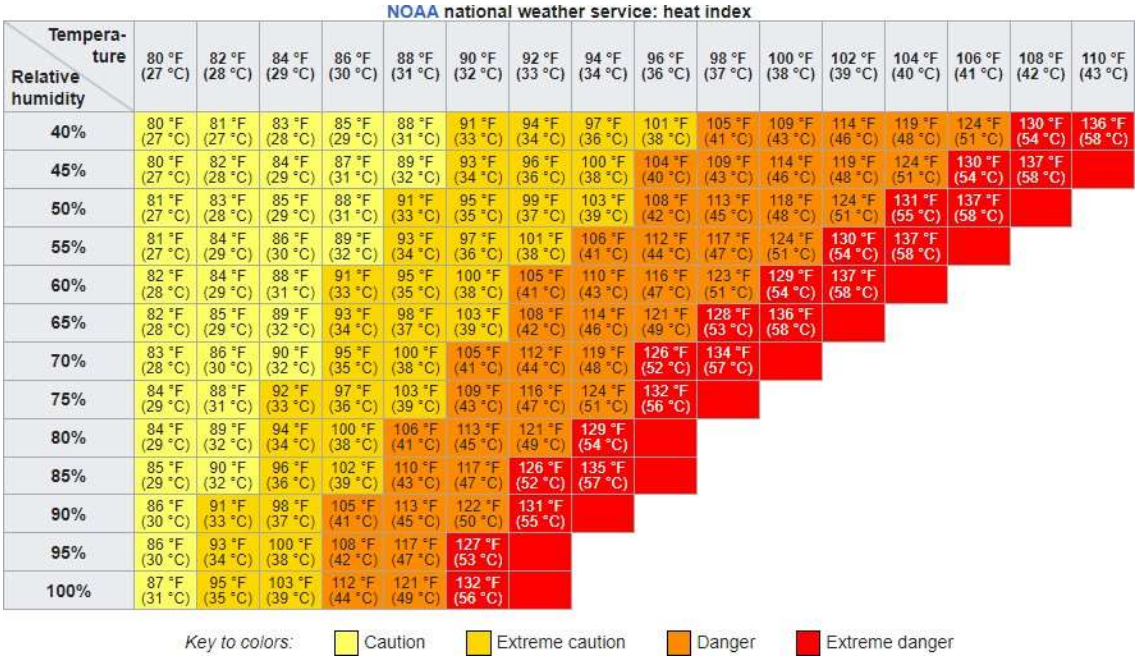


Fig 2: The Heat index combination of humidity and temperature

Table: 2. Classification of Heat Index (HI) and health impacts

Heat Index	Category	Health Effects
27–32 °C	Caution	Caution: fatigue is possible with prolonged exposure and activity. Continuing activity could result in Heat cramps.
32–41 °C	Extreme caution	Extreme caution: Heat cramps and Heat exhaustion are possible. Continuing activity could result in Heat stroke
41–54 °C	Danger	Danger: Heat cramps and Heat exhaustion are likely; Heat stroke is probable with continued activity
over 54 °C	Extreme danger	Extreme danger: Heat stroke is imminent

1.4 Heat Index Formula

The formula below approximates the Heat index in degrees Celsius using the NOAA National Weather Service.

$$HI=c_1+c_2T+c_3R+c_4TR+c_5T^2+c_6R^2+c_7T^2R+C_8TR^2+C_9T^2R^2$$

The following coefficients can be used to determine the Heat index when the temperature is given in degrees Celsius, where

- HI = Heat index (in degrees Celsius)
- *T* = ambient dry-bulb temperature (in degrees Celsius)
- *R* = relative humidity (percentage value between 0 and 100)

c_1 = -8.784694755 56, c_2 =1.611 394 11, c_3 = 2.338548 838 89,

c_4 = -0.146 116 05, c_5 = -0.012 308 094, c_6 = -0.016 424 827 7778,

c_7 = 2.211 732 x 10^{-3} c_8 = 7.2546 x 10^{-4}, c_9 = -3.582 x 10^{-6}.

1.5. History of Heat wave in Andhra Pradesh

The Government of Andhra Pradesh has a dense network of weather observations for continuously monitoring temperatures across the state. These data provide the spatial distribution of temperatures in real-time monitoring. Temperatures from the Numerical model help forecast Heat wave conditions that can be disseminated to all stakeholders. Since 2016, the Government of AP has adopted Heat wave action plan for monitoring Heat wave conditions based on observed temperature data in the past seven years. AP has experienced Heat waves almost every year with duration of the Heat wave period increasing in every part of the state. The highest Temperatures recorded in different districts during 2016-2023 are shown in Table 3:

Table 3: Season highest maximum temperatures during 2016-2023

S.No	Year	District	Mandal	Date	Seasonal Highest Max. Temperatures
1	2016	Prakasam	Veligandla	02.05.2016	48.6 °C
2	2017	Prakasam	Tanguturu	17.05.2017	47.8 °C
3	2018	Nellore	Marripadu,Dachepalle	31.05.2018	45.6 °C
4	2019	Krishna	Ibrahimpatnam	26.05.2019	47.3 °C
5	2020	Krishna	Pamidimukkala,	21.05.2020	47.8 °C
		Guntur	Bhattiprolu	21.05.2020	
		Prakasam	Kanigiri	23.05.2020	
6	2021	West Godavari	Pedapadu	31.03.2021	45.9 °C
7	2022	Tirupati	Gudur	01.05.2022	45.9 °C
8	2023	East Godavari	Rajamahendravaram Rural	16.05.2023	46.8 °C

Table 4: The district's highest temperatures recorded from March to June 2023 are given in Table.

.No	District	Mandal	Location	Date	Seasonal Highest Max. Temperatures
1	Srikakulam	Kothuru	Kothuru	16-May-23	46.5
2	Vizianagaram	Kothavalasa	Kantakapalle	16-Jun-23	46.3
3	Parvathipuram Manyam	Salur	Salur	18-Jun-23	45.7
4	Alluri Sitharama Raju	Kunavaram	Kondaigudem	09-Jun-23	45.2
5	Visakhapatnam	Padmanabham	Padmanabham	10-Jun-23	44.7
6	Anakapalli	Anakapalli	Anakapalle	16-Jun-23	46.1
7	Kakinada	Samalkota	Samalkota	16-Jun-23	46.8
8	Dr. B.R.Ambedkar Konaseema	Mandapeta	Mandapeta	16-May-23	46.3
9	East Godavari	Rajamahendravaram Rural	Dowleswaram	16-May-23	46.8
10	West Godavari	Tanuku	Tanuku	16-May-23	45.1
11	Eluru	Agiripalli	Edulagudem	16-May-23	46
12	Krishna	Koduru	Koduru	16-May-23	46.2
13	NTR	Vissannapeta	Putrela	16-May-23	45.9
14	Guntur	Tadikonda	Tadikonda	16-May-23	46.3
15	Bapatla	Amarthalur	Amruthalur	16-May-23	46.4
16	Palnadu	Narasaraopet	Ravipadu	17-May-23	45.9
17	Prakasam	Maddipadu	Gundlapalle	16-May-23	46.7
18	Sri Potti Sriramulu Nellore	Kondapuram	Kondapuram	15-May-23	46.4
19	Kurnool	Mantralayam	Mantralayam	19-Apr-23	44.9
20	Nandyal	Chagalamarri	Chagalamarri	19-May-23	46.2
21	Anantapur	Guntakal	Nagasamudram	19-Apr-23	43.9
22	Sri Sathya Sai	Tadimarri	Tadimarri	19-Apr-23	43.5
23	YSR Kadapa	Sidhout	Sidhout	19-May-23	45.2
24	Annamayya	Chitvel	Timmayagaripalle	17-May-23	44.3
25	Chittoor	Nindra	Nindra	20-May-23	44.7
26	Tirupati	Yerpedu	Pallam	17-May-23	46

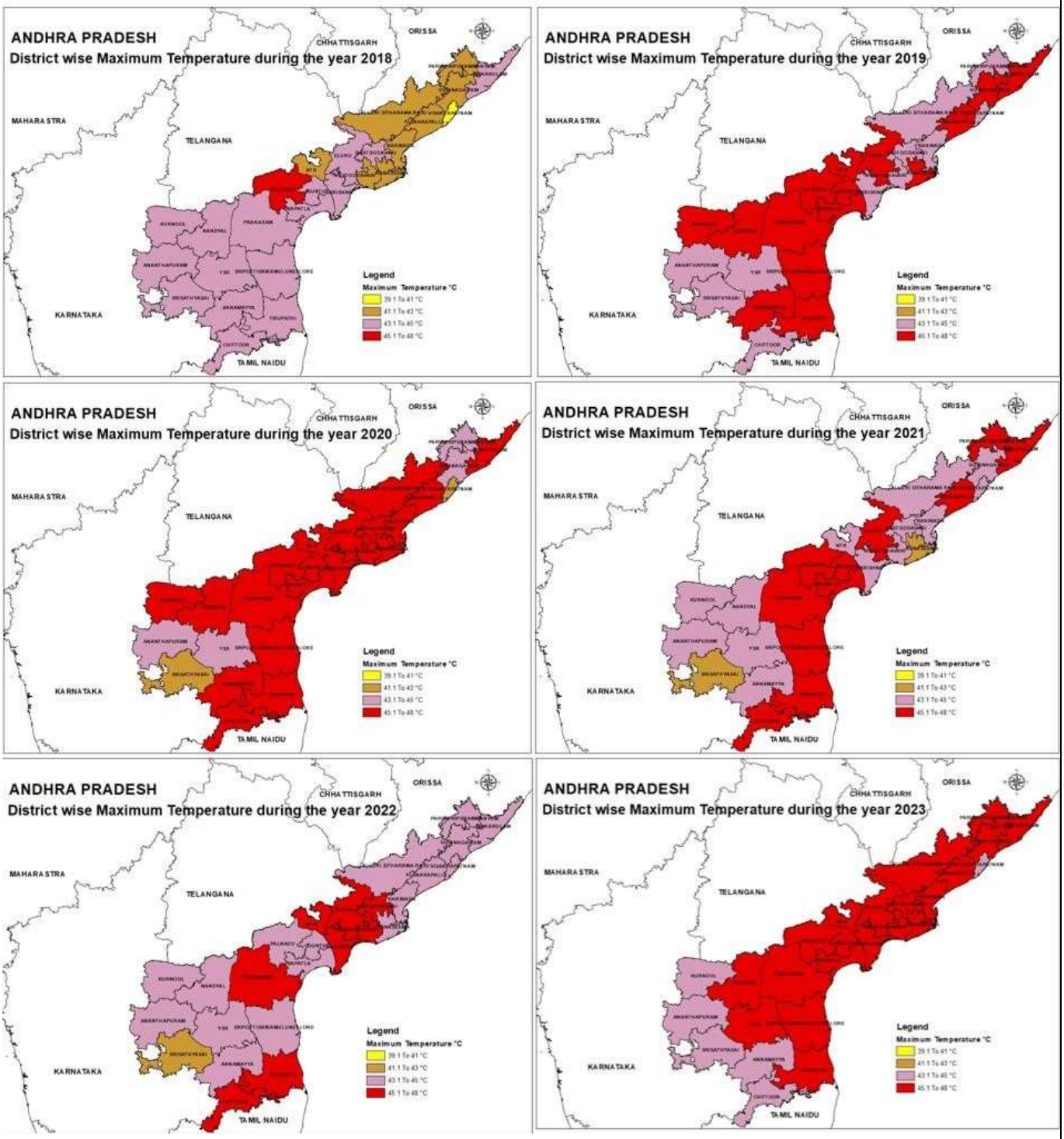


Fig 3: Last six years (2018-2023) district-wise maximum temperature recorded maps.

95th percentile:

Percentiles are used as an indicator of likely occurrence of particular event. The 95th percentile is a statistical measure used to analyze data distribution. It represents a value below which 95% of the data falls. In other words, only 5% of the data points are higher than this value. Percentiles are related to deciles and are expressed as a number out of 100 (similar to a percentage). The percentile refers to the ranking of a particular value relative to all of the values for that location. For example, if there are 100 years maximum temperatures for a location, **95th percentile** (is a number/value that is greater than 95% of the numbers in a given set) **represents the only 5% of the years, Maximum Temperature values are crossed out of 100 years.** Maximum Temperature thresholds are fixed based on Percentiles method for monitoring Heat Wave condition in the Andhra Pradesh State. For the last four years of Maximum Temperatures data from 2020 to 2023 has been considered and calculated Maximum Temperature thresholds for March, April and May months and presented in the Fig 5 to Fig. 7.

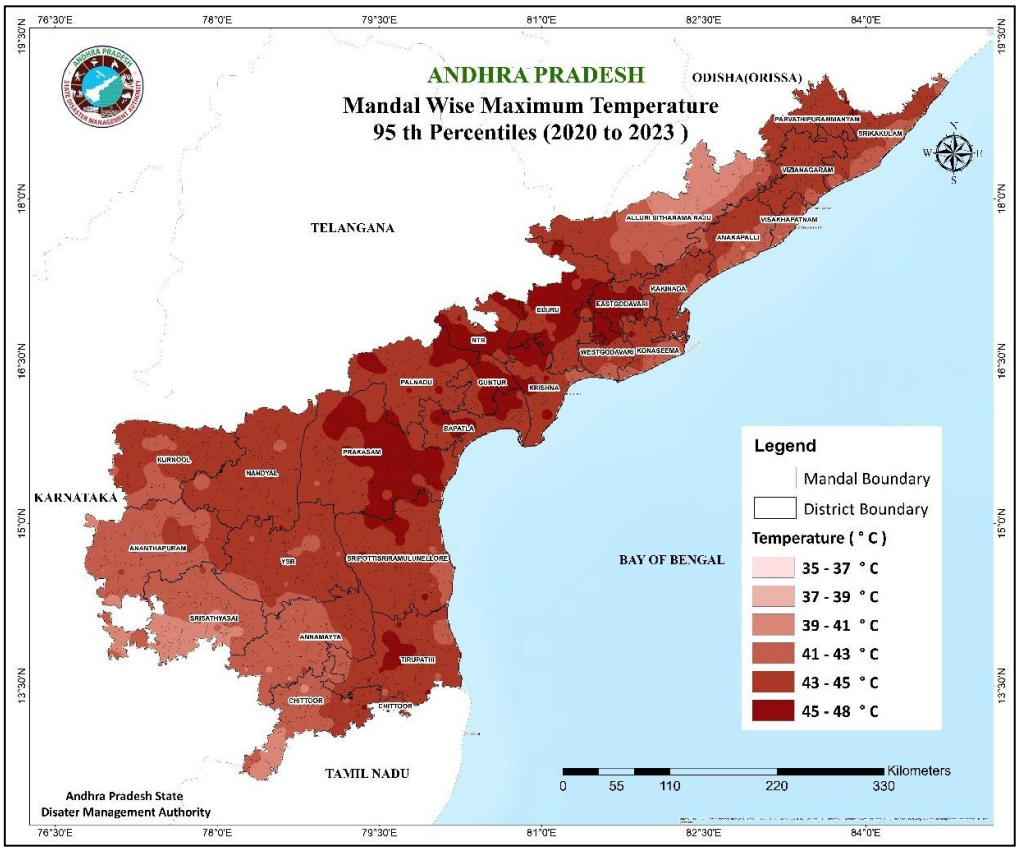


Fig 4: Mandal wise maximum temperature 95th Percentile map of Andhra Pradesh.

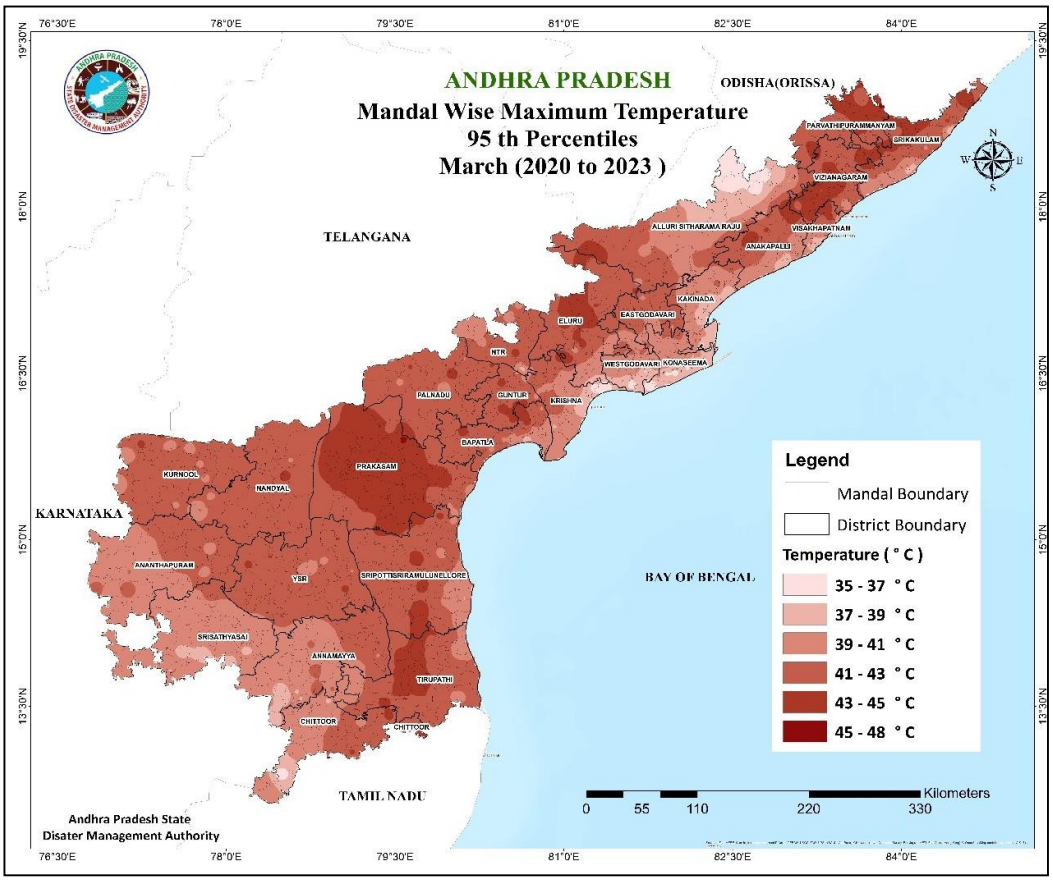


Fig 5: Mandal level 95th percentile maximum temperature map for March Month

Month wise spatial observations are given below:

March: Percentile values of maximum temperature thresholds are ranging from 35.1° C to 45.5°C over the state. The maximum temperature thresholds varying from 38.2°C to 45.9°C spreading across majority part of the area in state. Thresholds are ranging 43°C to 45°C over the parts of Prakasam and Kurnool districts.

April: Percentile values of maximum temperature thresholds are ranging from 40°C to 46°C over the state for April month. The maximum temperature thresholds varying from 40.7 °C to 45.9°C very high in Srikakulam, Palnadu, Prakasam, Nellore, Nandyal and Tirupathi with ranging from 45°C to 48°C.

May: Percentile values of maximum temperature thresholds are ranging from 42 °C to 47 °C over the state for May month. The maximum temperature thresholds are very low in Alluri Sitharama Raju , Visakhapatnam, Ananthapuramu, Sri Sathya Sai, Annamayya, Parts of Chittoor and rest of the districts of Andhra Pradesh with ranging from 44.5°C to 47°C.

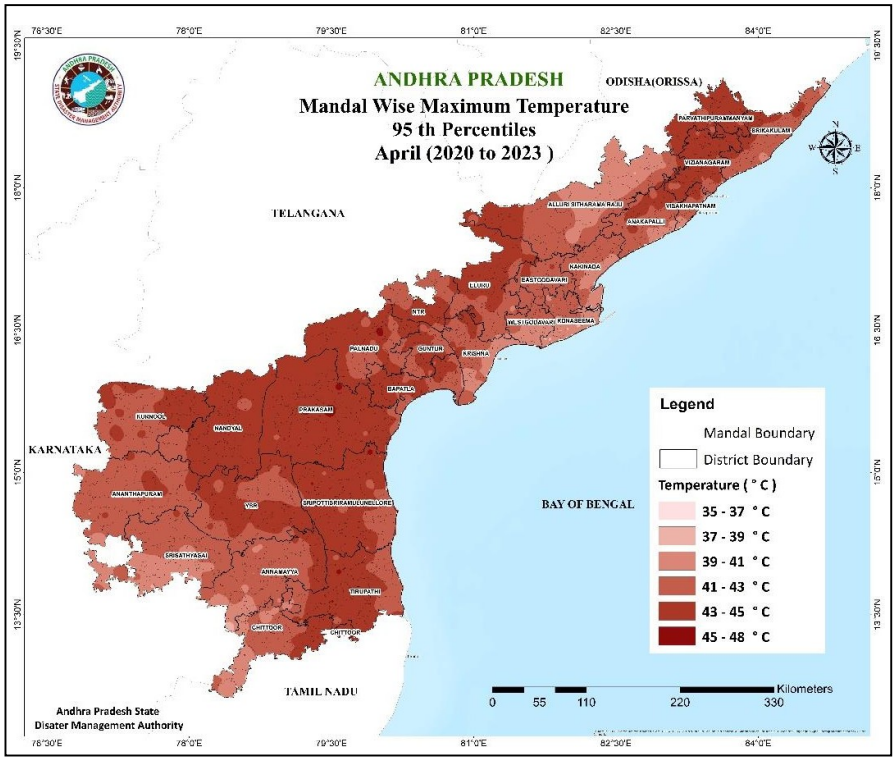


Fig 6: Mandal level 95th percentile maximum temperature map for April Month

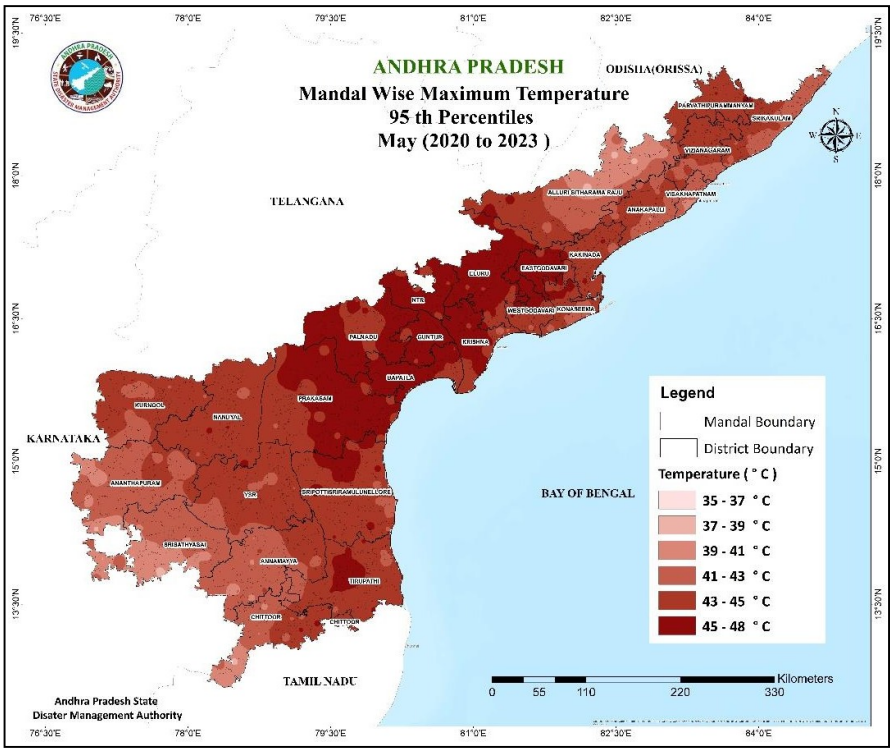
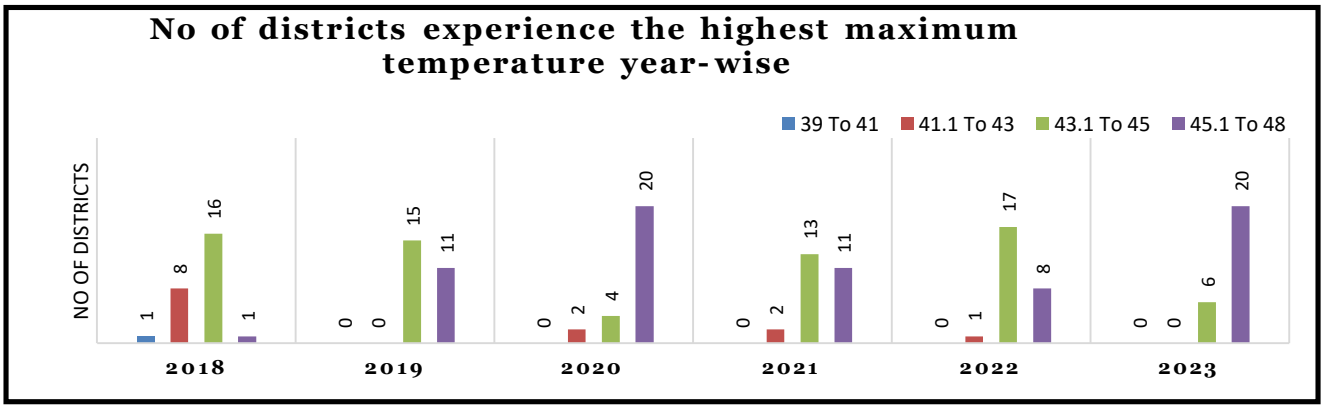


Fig 7: Mandal level 95th percentile maximum temperature map for May Month

Table 5: District-wise maximum temperatures recorded during the last six years (2018 to 2023)

S.No	DISTRICT	2018	2019	2020	2021	2022	2023
1	Srikakulam	43.4	46.6	45.6	45.4	44.4	46.5
2	Vizianagaram	43.0	46.8	44.5	45.0	44.1	46.3
3	Parvathipuram Manyam	43.2	43.8	45.0	45.6	44.7	46.1
4	Alluri Sitharama Raju	43.1	44.8	45.3	44.5	44.6	45.5
5	Visakhapatnam	41.2	43.4	42.2	44.8	43.3	44.8
6	Anakapalli	43.0	46.5	45.1	45.3	44.2	46.1
7	Kakinada	43.1	44.1	46.1	43.4	44.5	46.3
8	Dr. B.R. Ambedkar Konaseema	42.3	45.5	45.9	42.8	44.0	46.8
9	East Godavari	43.5	44.1	47.7	43.7	45.8	46.0
10	West Godavari	43.0	44.1	47.0	43.6	45.8	45.5
11	Eluru	43.7	47.0	47.1	45.9	45.6	46.3
12	Krishna	43.5	44	47.8	45.0	45.3	46.2
13	NTR	42.9	47.3	47.2	44.8	45.3	45.9
14	Guntur	43.7	46.2	47.4	45.5	43.3	46.8
15	Bapatla	44.9	46.0	47.8	45.2	43.9	46.4
16	Palnadu	45.4	46.7	47.3	45.6	44.1	45.9
17	Prakasam	44.9	47.2	47.8	45.9	45.2	46.7
18	Sri Potti Sriramulu Nellore	44.9	46.7	46.5	45.9	44.6	46.4
19	Kurnool	44.7	45.2	45.9	43.9	44.1	44.9
20	Nandyal	44.4	46.1	45.6	44.5	44.5	46.2
21	Ananthapuramu	43.8	44.9	43.8	43.3	44.4	43.9
22	Sri Sathya Sai	44.5	43.8	43.1	42.7	42.4	43.5
23	Y.S. R	44.6	43.8	44.8	43.9	43.8	45.2
24	Annamayya	44.6	45.4	45.1	43.4	43.4	44.3
25	Chittoor	44.7	44.6	45.8	45.4	45.1	44.7
26	Tirupati	44.7	47.2	46.9	45.6	45.9	46.0
Yearly Maximum		**45.4**	**47.3**	**47.8**	**45.9**	**45.9**	**46.8**



Andhra Pradesh State experienced high temperatures during the peak summer season. However, it was observed that during the years 2020 and 2023, the observed maximum temperatures were comparatively higher than the year 2018 maximum temperatures recorded over the state.

The evidence about the risks to the health condition of a human from Heat waves is extensive and consistent around the world. Excessive exposure to high temperatures can kill human beings and cattle. During the summer Heat waves of 2014, 2015, 2016 & 2017 in Andhra Pradesh, unprecedented high day and night-time temperatures resulted in 2776 deaths. After consistent collaboration efforts of the government of Andhra Pradesh through the implementation of a Heat wave action plan by the Andhra Pradesh State Disaster Management Authority and line departments, efforts on continuous monitoring and early warning messages and alerts on the adverse impacts of Heat wave has significantly reduced the deaths due to sunstroke in 2018, to a single digit of 08 deaths.

However, the deaths due to Heat stroke in 2019 have increased to a two-digit number (28) from 2018. The metrological conditions in 2017 and 2019 are almost similar, but the deaths have reduced from 236 in 2017 to 28 in 2019 and 3 in 2023. The deaths have decreased to 0 (zero) in 2020, 2021 and 2022 (Fig. 4 & Table 6). The decrease in fatalities in 2020 and 2021 is not purely due to the impact of Covid-19. To confirm this, a ratio of deaths in AP to all of India was computed (Table 6). This ratio has significantly decreased from 61 in 2017 to 0 in 2020 and 2021. Another important observation is that even though the deaths all over India have increased from 25 in 2018 to 226 in 2019, the ratio has decreased from 32 in 2018 to 12 in 2019. Thus, the decrease in deaths in AP is because of the impact of APSDMA efforts in mitigating the Heat wave conditions. Heat wave-prone mandal in Andhra Pradesh was provided in Figure -6.

Table 6: Result of innovative practices: Death reduction

Seasonal Values	2017	2018	2019	2020	2021	2022	2023
Temperature (Max)	46.7	43.16	46.4	47.8	45.9	45.9	46.8
Deaths (AP)	236	8	28	0	0	0	3
Deaths (All INDIA)	384	25	226	4	4	NA	NA
Percentage Share	61	32	12	0	0	NA	NA

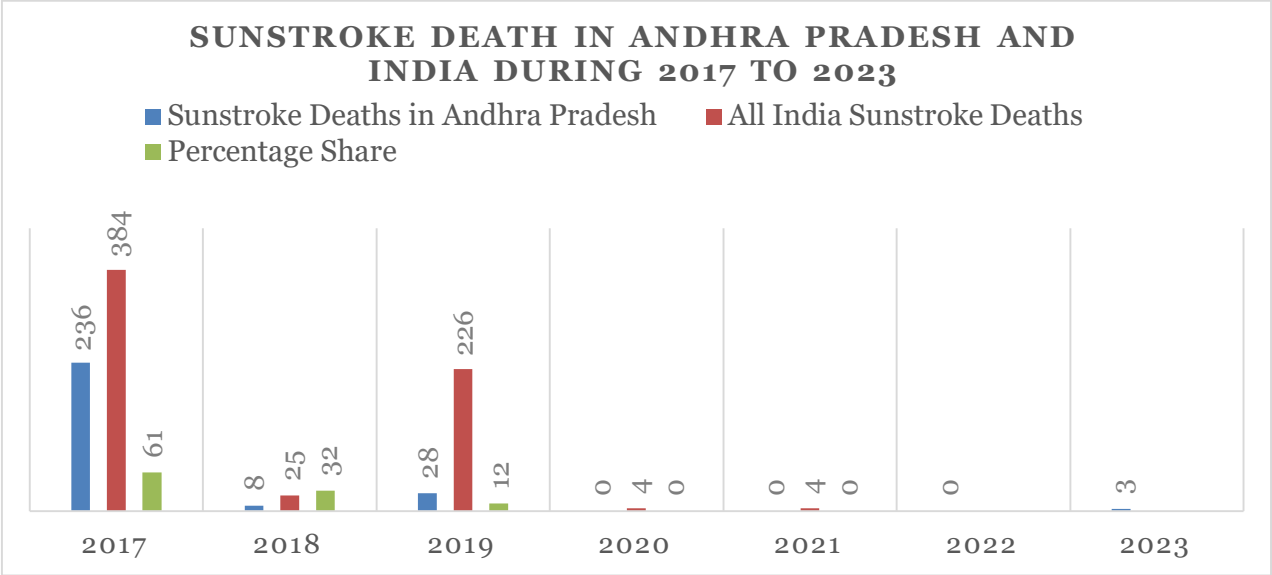
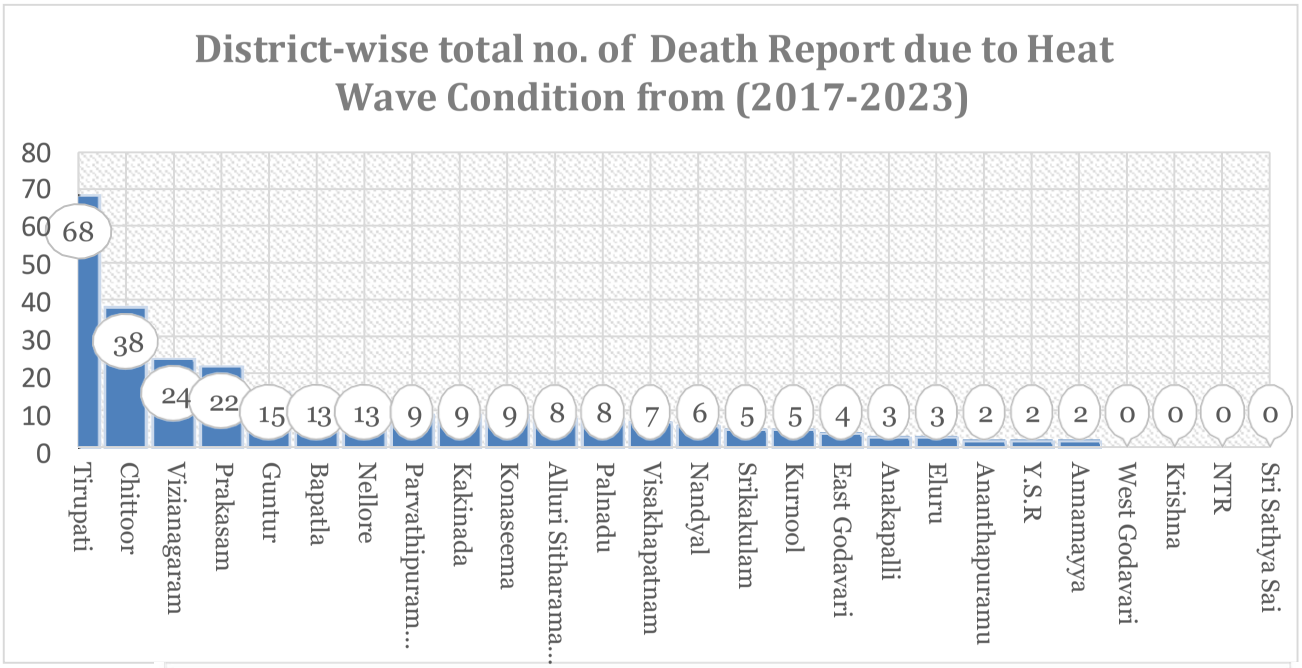


Figure 4: Heat-wave related deaths in Andhra Pradesh and India during 2017 – 2023.

Table 6: Statement showing district wise/year wise no. of deaths that occurred during 2017 - 2023

Heat wave season (March – June)

S.No	Name of the District	No of Death Cases						
		2017	2018	2019	2020	2021	2022	2023
1	Srikakulam	4	0	1	0	0	0	0
2	Vizianagaram	19	1	4	0	0	0	0
3	Parvathipuram Manyam	8	1	0	0	0	0	0
4	Alluri Sitharama Raju	7	0	1	0	0	0	0
5	Visakhapatnam	7	0	0	0	0	0	0
6	Anakapalli	2	0	1	0	0	0	0
7	Kakinada	7	0	2	0	0	0	0
8	Dr. B.R.Ambedkar Konaseema	6	0	3	0	0	0	0
9	East Godavari	2	0	2	0	0	0	0
10	West Godavari	0	0	0	0	0	0	0
11	Eluru	2	0	1	0	0	0	0
12	Krishna	0	0	0	0	0	0	0
13	NTR	0	0	0	0	0	0	0
14	Guntur	15	0	0	0	0	0	0
15	Bapatla	13	0	0	0	0	0	0
16	Palnadu	8	0	0	0	0	0	0
17	Prakasam	20	0	0	0	0	0	2
18	Sri Potti Sriramulu Nellore	13	0	0	0	0	0	0
19	Kurnool	3	1	1	0	0	0	0
20	Nandyal	5	0	1	0	0	0	0
21	Ananthapuramu	0	2	0	0	0	0	0
22	Sri Sathya Sai	0	0	0	0	0	0	0
23	Y.S.R	0	1	1	0	0	0	0
24	Annamayya	1	1	0	0	0	0	0
25	Chittoor	28	1	8	0	0	0	1
26	Tirupati	66	0	2	0	0	0	0
Total		**236**	**8**	**28**	**0**	**0**	**0**	**3**



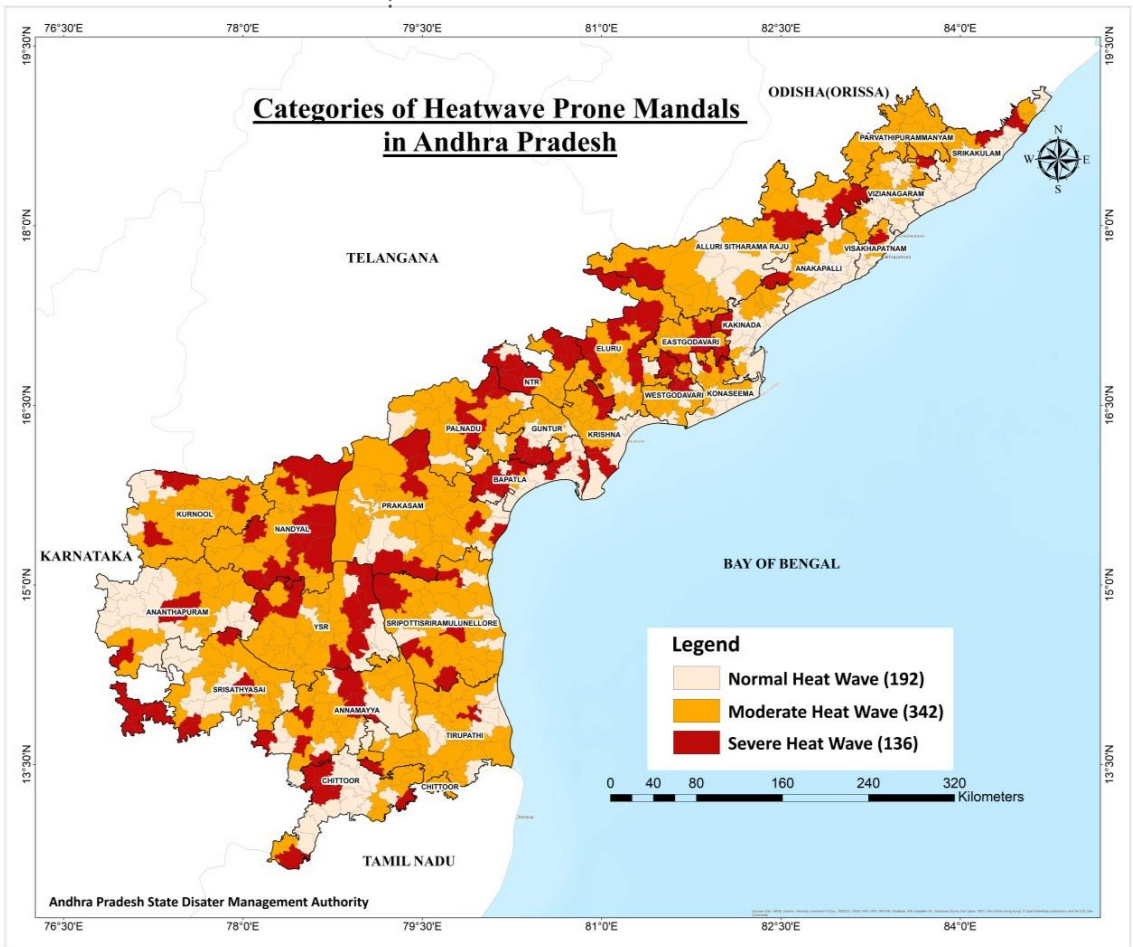


Figure -6: Heat wave prone mandals in Andhra Pradesh As per the IMD Heat wave Criteria based analysis seasonal normal.

2. NECESSITY OF HEAT WAVE ACTION PLAN

There is a need for a coordinated multi-agency approach to the state's management of Heat waves. At present, the problem of Heat waves is being managed at an operational level, but needs to be managed at a strategic level. There is a need for clear roles and responsibilities in managing 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.

Earlier, efforts of the State Government to reduce mortality and mitigate the suffering of the public due to Heat waves even after implementing some of the recommendations of the State Level Committee headed by Director General, TERI, New Delhi, (Early Warning System, and Public Awareness Campaigning etc.) have not proved sufficient measures. This may be seen from the fact that 448 deaths were reported due to Heat wave / Sun Stroke during summer-2014 which increased to 1369 in Summer-2015 and subsequently decreased to 723 in Summer -2016, 236 in Summer-2017, 08 in summer- 2018, 28 deaths in summer – 2019 and zero deaths in summer 2020 and 2022.

Taking cognizance of the serious situation arising out of the intense Heat waves on the public leading to high fatalities, the Government has issued orders constituting a committee with eleven (11) Principal Secretaries/Director rank officers as members under the Chairmanship of the Principal Secretary to Government, Revenue (Land & DM) to prepare a Comprehensive Heat wave Action Plan for Andhra Pradesh State vide G.O. Ms. No.14, Revenue (DM. II) Department, dt.03.12.2015.

The Committee, after deliberations on studying the Heat wave Action Plans of other states and best practices, prepared a Comprehensive Plan entitled 'The Andhra Pradesh State Heat wave Action Plan'.

2.1 KEY COMPONENTS OF THE PLAN

1. To monitor climate conditions and initiate an Early Warning System and Inter-Agency Coordination to alert stakeholders of predicted high and extreme temperatures.
2. Building Public Awareness and increasing Community Outreach to communicate the risks of Heat waves and implement practices to prevent Heat-related deaths and illnesses. Special efforts will be made to reach vulnerable populations through inter-personal communication and other outreach methods, including posters, brochures and information sheets.
3. Identifying vulnerable populations and the health risks specific to each group.
4. Developing effective strategies, agency coordination and response planning that addresses Heat-health risks.

5. Heat Health Information Surveillance System—to monitor and assess the impact of Heat waves on human health.
6. Capacity Building among Health Care Professionals to recognize and respond to Heat- related illnesses, particularly during extreme Heat events.
7. Reduce Heat exposure and promote adaptive measures by launching new efforts, including mapping high-risk areas and assessing potable drinking water and cooling spaces during extreme Heat days.
8. Collaboration with non-governmental organizations as to expand outreach and communication with the most vulnerable communities. We are evaluating and updating the Heat Action Plan regularly.

3. HEAT WAVE ALERT WARNING SYSTEMS (HWAWS)

Accurate and timely alert systems are essential for preparedness and mitigation of Heat wave. IMD information helps develop Heat wave warning systems (HWS), determine the threshold for action and communicate the risks to stakeholders.

IMD provides data pertaining to Heat waves, using day and night temperatures and their duration, which is posted on their website (http://www.imdhyderabad.gov.in/apsite/andhraindex.html).

The Government of Andhra Pradesh has installed 2387 automated weather stations (AWS) across the state. These weather stations report temperature and relative humidity on an hourly basis. The data from these stations are updated in real-time on the website http://apsdps.ap.gov.in/index.jsp.

In addition, Possible 'Heat wave' impact maps generated by IMD/Andhra Pradesh State Development Planning Society (APSDPS) & Andhra Pradesh State Disaster Management Authority (APSDMA) based on the simulations will be used as guidance for taking preventive measures by the concerned authorities, web site (https://apsdma.ap.gov.in/).

Mandal level advisories about possible Heat wave conditions in the next 48 hours will be generated and compared with the areas affected by Heat wave conditions. IMD NWP model data (3 km x 3km and 9 km x 9 km resolutions) have been used to prepare the mandal (sub-district) level advisories. These warnings, valid for the next two days, are issued around 04:00 PM daily and are provided to all concerned authorities so they can take suitable action on their end.

The processes carried out daily at State Emergency Operation Centre (SEOC) on Heat wave forecast, and the sample forecast given to the concerned departments are shown below. Three target groups were suggested to receive different, but coherent messages.

Table 7: Sample State Wise Heat Wave Bulletin

Government of Andhra Pradesh
Andhra Pradesh State Disaster Management Authority (APSDMA),
Revenue (DM) Department.

Heat wave Forecast 10.05.2023

Heat Wave (Based on Max Temperature & Using IMD Criteria)

Total Mandals	Observed AWS Data 10-05-2023			Forecast for Next 24hr 11-05-2023			Forecast for Next 48hr 12-05-2023		
	Severe Heat Wave	Heat wave	No Heat Wave	Severe Heat Wave	Heat wave	No Heat Wave	Severe Heat Wave	Heat wave	No Heat Wave
670	0	9	661	3	45	622	1	104	565
Based on Observed AWS data from APSDPS				Maximum Temperatures based on GFS Model simulation at IMD					

IMD criteria	Normal Temp <40°C	Normal Temp >40°C
Severe Heat wave	>7.0°C	>6.6°C
Heat wave	>5.5°C to 6.9°C	4.5°C to 6.5 °C
No Heat Wave	<= normal	<= normal

Heat Index sample report

Andhra Pradesh State Disaster Management Authority (APSDMA)
Mandal-wise Heat Index and (Max Temperature) Forecast

Date:10-May-2023

PARVATHIPURAMMANYAM District

Caution | Extreme Caution | Danger | Extreme Danger

Based on IMD-GFS Forecast

No	Mandal	HI_Trend	May_11	May_12	May_13	May_14
1	VEERAGHATTAM	↓ -16	64.0(43.4)	52.8(42.0)	64.3(42.3)	45.3(46.9)
2	GARUGUBILLI	↓ -20	53.8(43.5)	68.3(43.1)	44.7(43.5)	43.7(47.4)
3	BALIJIPETA	↓ -16	53.3(43.4)	70.6(42.6)	48.6(42.3)	46.1(47.2)
4	JIYYAMMAVALASA	↓ -20	53.0(43.2)	62.6(42.3)	45.3(43.2)	43.7(46.9)
5	SEETHAMPETA	↓ -20	52.5(42.4)	68.5(40.5)	43.5(41.1)	43.1(45.8)
6	PALAKONDA	↓ -4.8	52.0(42.6)	60.4(40.9)	54.7(41.0)	50.0(46.0)
7	KURUPAM	↓ -16	51.6(42.4)	56.8(41.6)	45.1(42.7)	43.4(46.1)
8	PARVATHIPURAM	↓ -20	50.7(42.2)	60.5(42.7)	41.3(43.0)	41.8(46.5)
9	BHAMINI	↓ -8	50.6(42.5)	54.1(41.1)	48.3(42.2)	44.3(45.8)
10	GUMMALAKSHMIPURAM	↓ -12	49.6(42.9)	48.9(42.0)	41.7(43.3)	42.1(46.8)
11	KOMARADA	↓ -16	49.5(42.5)	52.5(42.4)	40.8(43.2)	41.7(46.6)
12	MAKKUVA	↓ -16	48.0(41.0)	56.6(41.7)	39.9(41.7)	40.8(45.3)
13	PACHIPENTA	↓ -12	45.9(39.3)	52.0(39.7)	40.1(39.2)	40.0(43.6)
14	SALUR	↑ 0.4	39.0(38.9)	39.3(39.6)	39.2(39.7)	39.5(43.0)
15	SEETHANAGARAM	↑ 0.4	36.7(43.0)	37.5(43.1)	37.1(42.9)	37.2(47.3)

Public information services are necessary for disseminating information to the public promptly and adequately. Communication with the media needs to be an ongoing process aimed at providing enough coverage in informative topics related to protection from Heat-waves.

During Heat-wave season, daily announcements will contain information on the daily temperatures, the consequences of the health of the same, the activities undertaken and recommendations for the public. Heat wave monitoring cell activities at APSDMA-SEOC are listed in Annexure 1 to 2.

Common Alert Protocol (CAP)

Common Alerting Protocol (CAP) is Integrated Alert System- SACHET developed by Centre for Development of Telematics (C-DOT), the premier R&D centre of the Department of Telecommunications (DoT), Ministry of Communications, Government of India and National Disaster Management Authority (NDMA), Government of India. CAP platform evolved as technology-based solution across India to all the stake holders including Alert Generating Agencies, Alert Authorising Agencies and Alert Disseminating Agencies. India is 6th country to have nation-wide alert system. Disasters give no lead time and events are highly localized so warnings should be location specific, timely, efficient, actionable, and people-centric. NDMA's Integrated Public Alert System has been developed by C-DOT and provides a converged platform for the dissemination of targeted alerts and advisories to people living in disaster-prone areas in vernacular languages over all available communication media including SMS, Cell Broadcast, Radio, TV, Siren, social media, Web Portals and Mobile Applications.

The Common Alert Protocol (CAP) plays a crucial role in disaster management by providing a standardized framework for disseminating emergency alert and warning messages across different communication channels, such as emergency alert systems, mobile devices, social media, websites, and sirens. CAP facilitates seamless communication, interoperability, and coordination among different stakeholders involved in disaster response efforts. It also supports multilingual alerts, enabling the translation of messages into different languages to accommodate diverse populations and facilitate inclusive communication. By delivering timely and accurate information in a structured format, CAP enhances the effectiveness of disaster management and contributes to the overall resilience of communities in the face of emergencies.

AP-Alert

Utimaco's (former Celltick) Mass Alert Geo Emergency Notification (MAGEN) Command Post is a web-based tool that is used by the authorities for alerts creation, management & dissemination. It is the fastest and most cost-effective way to send messages to a mass number of mobile phone users in English & Telugu texts using telecom technologies. MAGEN Command Post functions as a powerful public announcement service to alert in emergency situations such as extreme weather conditions (approaching storms, floods) or disruptive situations of public. Authorities can also use channels to inform people about disruptive road congestion or hazardous weather conditions. The Alert dissemination happens in seconds using minimal bandwidth and are precision geo-target.

This platform has been deployed based on Cell Broadcast Service (CBS) for Wireless Emergency Alert Platform that comply with the entire Andhra Pradesh State Disaster Management Authority.

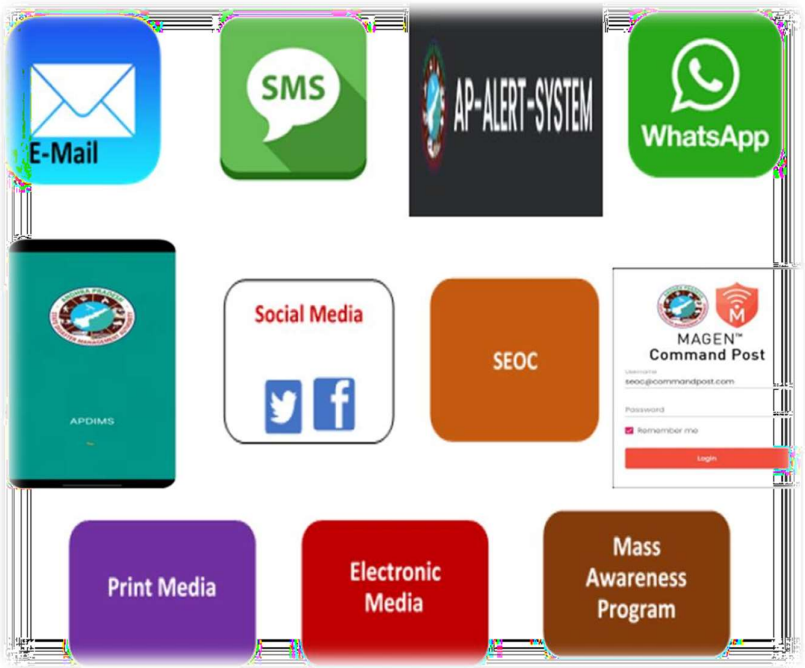
In the state of Andhra Pradesh, the AP Alert system was initiated in December 2022. Since then, emergency warning messages in both English and Telugu have been disseminated to all Airtel and BSNL service providers within the state

Andhra Pradesh Disaster Information Management System (APDIMS)

The Andhra Pradesh Disaster Management Information System (APDIMS) is a specific system implemented in the state to enhance disaster management efforts. It is a unified dashboard provides a unified platform for users to view the alerts at a real time across the state for various applications like Extreme Weather, Cyclone, Heatwave, Flood, Drought etc.

APDIMS is designed to facilitate the collection, analysis, and dissemination of critical information related to disasters and emergencies occurring within the state. APDIMS serves as a comprehensive platform for various stakeholders involved in disaster management, including government agencies, emergency response teams, and local communities. It integrates multiple components and functionalities to support effective disaster response and mitigation activities.

A mobile application is available for this system which will be helpful for field functionaries and public for dissemination of information and alerts.



Links for Information Education and Communication (IEC) Materials

1. YouTube playlist (English)

   https://www.youtube.com/playlist?list=PLOuQBh7LWB0jkqsur5Ce2xLjZwXXl7mTr

2. **https://ndma.gov.in/index.php/Resources/sign_videos/Early-warning-Heatwave**

3. **https://ndma.gov.in/Resources/sign_videos/heat-wave-preparedness**

4. **https://ndma.gov.in/Resources/awareness/heatwave**

5. **https://ndma.gov.in/Natural-Hazards/Heat-Wave/Dos-Donts**

Forecast and Issuance of Heat Alert or Heat warning

India Meteorological Department (IMD), Ministry of Earth Sciences, is the nodal agency for providing current and forecast weather information, including warnings for all weather-related hazards for optimum operation of weather-sensitive activities. It warns against severe weather phenomena like tropical cyclones, squally winds, heavy rainfall/snow, thunder-squall, hailstorm, dust storms, Heat waves, warm nights, fog, cold waves, cold nights, ground frost, etc. It also provides real-time data and weather prediction of maximum temperature, Heatwave warnings, extreme temperature, and heat alerts for vulnerable cities/rural areas.

A new system of exclusively heat-related warnings has been introduced with effect from 03 April 2017 by IMD. These warnings, valid for the next four days, are issued around 1600 hours IST daily and are provided to all concerned authorities (Departments of health, disaster management, Indian Red Cross and Indian Medical Association, NDMA etc.) for taking suitable action at their end. A bulletin in extended range with the outlook for the next two weeks (for all hazards, including Heat waves) is issued every Thursday (available at https://mausam.imd.gov.in/responsive/extendedRangeForecast.php).

In addition to the above, Climate Forecast System based forecasts maps of daily maximum temperatures and their departures from normal for the next 21 days (issued every Thursday) are also available on the IMD website;

(https://mausam.imd.gov.in/responsive/extendedRangeForecast.php&

In 2016, IMD introduced a system of issuing seasonal temperature outlooks for the next three months; for 2023, the seasonal outlook for the temperatures valid for March to May 2023 was issued on 01 March 2023. These seasonal outlooks are issued as a press release on the IMD website and through electronics and print media. These are also provided to 28 all concerned Chief Secretaries, Disaster Managers, and the health sector through the India Medical Association (IMA).

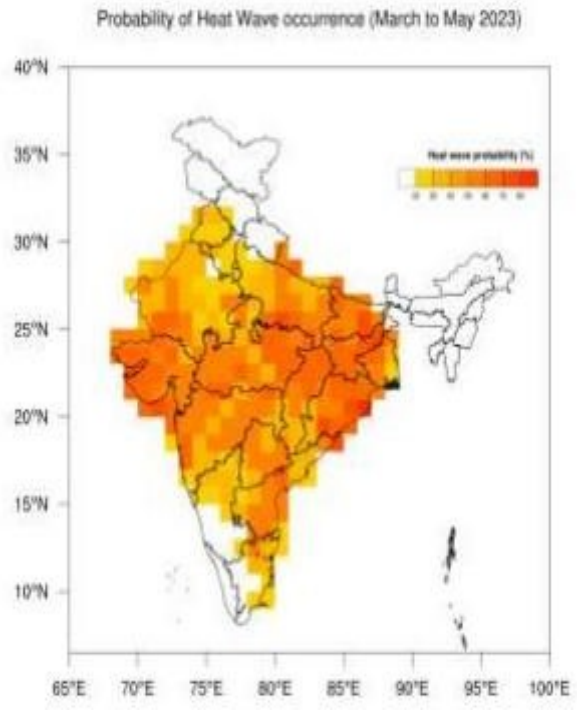
Temperature Forecast: Specific Range, Time duration and area

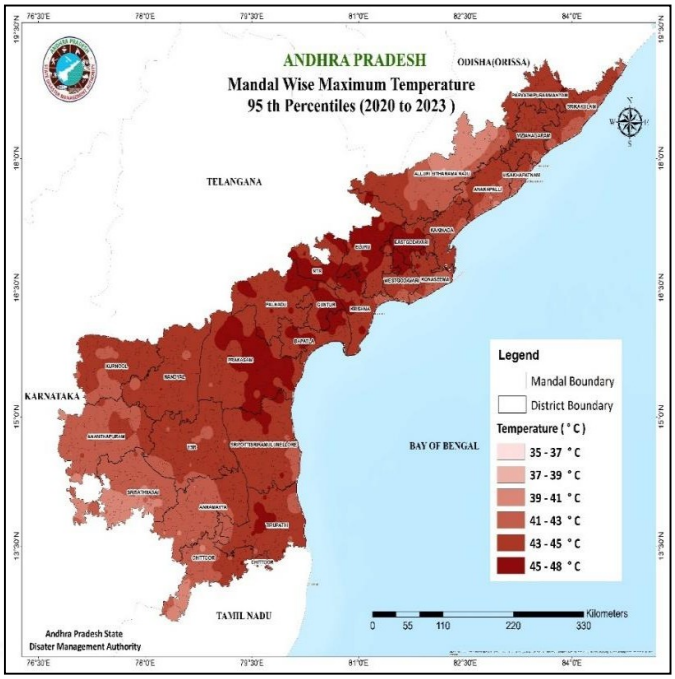
IMD issues forecasts and warnings for all weather-related hazards in the short to medium range (valid for the next five days) every day as a part of its multi-hazard early warning system. These warnings updated four times a day, are available at https://mausam.imd.gov.in/responsive/all_india_forcast_bulletin.php

The operational system of weather forecasts and warnings is summarised in the chart below:

According to IMD seasonal Outlook for maximum and minimum temperatures during March to May (MAM), 2023 issued on 01st March, 2023 Indicates for Andhra Pradesh State; the seasonal max & min temperatures are likely to be normal to below normal probabilities over North & South Interior Karnataka districts; Whereas, Coastal Karnataka districts are likely to have normal to above normal probabilities.

Heat Wave outlook for March to May season 2023 issued based on Multi Model Ensemble Forecasting System by IMD indicates; Majority of the South Coastal 7 District of Andhra Pradesh Districts are likely to have 60-70 % probability of Heat Wave during March-May; Whereas, probability of occurrence of the heat wave in the rest of the State is less likely.





4. ROLES AND RESPONSIBILITIES OF DEPARTMENTS / AGENCIES IN RESPONDING TO HEAT WAVES

Preparation and response to a Heat wave are 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.

Disaster Management Authority is the controlling agency for the response to Heat wave and the other agencies, including the Department of Health, and has a supporting role. The Commissioner of Disaster Management is the Incident Controller and Nodal Officer for strategic management of the incident at the State Level. The District Collector is the Incident controller and nodal officer at the district level, and the municipal commissioner is the nodal officer for respective municipalities.

Identification of Heat wave illnesses and recordings of casualties:

It is important to objectively identify of Heat wave illnesses and systematically record causalities resulting from Heat wave. States may form committees at the district level with members not below the rank of Assistant Civil Surgeon, Tahsildar, and Inspector of Police to enquire into the deaths due to Heat strokes / Heat waves for correct reporting. In order to do so, the following four factors need to be taken into account:

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

Generally, the responsibilities of the incident controller and nodal officer include the following:

- 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.

4.1 IMPLEMENTATION OF HEAT WAVE ACTION PLAN

Successful implementation of the Heat wave action plan requires coordinated action between many diverse stakeholders, including Government departments/agencies, health care professionals, emergency medical personnel, health centre staff, hospital staff and community groups.

Following forecasting a Heat wave event, immediate notification of the public and all those participating in the response is critical to ensure the plan is activated.

The Heat wave action Plan shall be implemented in 3 Phases annually.

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

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

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

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

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

In Phase – III concentration is on evaluation and updating of the plan. At the end of the summer season evaluate whether the Heat health action plan has worked. Continuous updating of the 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, preventive measures need to take into consideration. The additional threat from climate change may 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 Andhra Pradesh by analyzing temperature and mortality data by involving IMD, APSDPS, Medical & Health Department is necessary to evaluate and update the plan.

5. PHASE WISE RESPONSIBILITIES OF VARIOUS DEPARTMENTS / AGENCIES

5.1 Prevention, Preparedness and Mitigation Measures:

Cool Roofs to Provide Affordable Thermal Comfort: Urban residents living in slums have fewer options available to adapt to rising temperatures. This increases their vulnerability to Heat and results in greater adverse impacts of extreme Heat on these communities. In their issue brief "Rising Temperatures, Deadly Threat", the NRDC and IIPH Gandhinagar identified several specific factors that increase the vulnerability of slum residents to extreme Heat

- Higher Exposure to Extreme Heat: Slum residents are more likely to be exposed to Heat since they work primarily outside or in unventilated conditions, they live in homes constructed of Heat-trapping materials with tin or tarpaulin roofs, and their communities lack trees and shade.
- Greater Susceptibility to Health Effects of Extreme Heat: Lack of access to clean water, poor sanitation, over-crowding, malnutrition, and a high prevalence of undiagnosed/untreated chronic medical conditions due to poor access to healthcare heighten slum community members susceptibility to extreme Heat effects on health.
- Fewer Adaptation Options Available: Slum residents lack control over their home and work environments, with limited access to (and inability to afford) reliable electricity and cooling methods like fans, air coolers and air conditioning, insufficient access to cooling spaces, and a dearth of health information on which to act. All these factors reduce slum residents' opportunities to adapt to increasing temperatures.

An affordable solution is cool roofs. A cool roof is a white reflective roof that stays cool in the sun by minimizing Heat absorption and reflecting thermal radiation to help dissipate the solar Heat gain, Studies have shown that cool roofs can be up to 30°C cooler than conventional roofs, and can bring the indoor temperatures down by 3-5°C When implemented on a large scale, cool roofs can reduce the urban Heat Island effect in a city. Cool roofs include coatings and treatments such as lime-based whitewash, white trap, white China mosaic tiles and acrylic resin coating, and provide an affordable solution for providing thermal comfort.

Livestock preparedness during hot weather: Extreme Heat causes significant stress to livestock. There is a need to plan well for reducing the impacts of high temperatures on livestock keeping an eye on the weather forecasts, and developing a mitigation plan for high to extreme temperature can be effective in ensuring that the livestock has sufficient shade and water on hot days.

Table 7:1.1 Roles and responsibilities for Managing Heat wave

SN	Key Strategy	Task Activity	Center/State Agencies & their Responsibility			
			Center	Responsibility	State	Responsibility
Understanding Risk						
1.	Formulation of Policy, Plan and Guideline	Preparation of Heat action plan in coordination with all stakeholders	NDMA	Revision of National Guidelines for Preparation of Action Plan Prevention and Management of Heat wave	State Govt./ Dept. Of DM/ COR/ SDMAS/DDMAS ULB/PRIs	•Preparation/revision of Heat Action Plan based on NDMA revised Guidelines and local experiences
Interagency Coordination						
2	Early Warning & Coordination	Establish early warning system	IMD	• Strengthening of early warning system- with accurate and timely alert systems • Issue Heat wave alerts, warnings and weather forecasts of Short / Medium / Long range duration • Coordination with state agencies	State Government /CORs District Admin./DDMAS	•Real-time surveillance and evaluation of weather station. • To disseminate the information received from IMD to the public at large • Disseminate the Heat-health warning, determine the threshold for action and communicate the risks
			IITM	Extended range of forecast and Numerical Weather Prediction	State Government /CORs District Admin./DDMAS	Prepare SoP for Heat wave response based on district MAs Extended range of forecast and Numerical Weather Prediction
		Response & Relief	Ministries/ department concerned With Heat wave (List Annexed-5)	•Take necessary measures, wherever applicable •Flexible timing of market and offices •Provide occupational support and advisories	CORs/SDMAS/DDMAS/Ulbs/PRIS	•Coordination among all stakeholder with DMAs / LBs/PRIS clearly defined roles and responsibilities •Flexible timing of market and offices •Take necessary measures, wherever applicable

						•Collaboration with non-government and civil society • Provide occupational support and advisories • Special care for vulnerable groups – Childers, Disabled, women and old aged.
		Monitoring of Medical preparedness	Moh & FW	• develop a monitoring Mechanism • Provision of funds for Heat action mitigation plans •Surveillance of Heat wave impact • development of Medical teams	State Government /CORs District Admin./DDMAS/health dept.	•Develop monitoring mechanism for implementation of Heat action plan •Provision of funds for Heat action mitigation plans •Deployment of rapid medical response teams.
Investing in DRR – Non – Structural measures						
3.	Preparedness and Mitigation Measure	Preparedness Measure	Ministries/ departments Concerned with Heatwave (list annexed-5)	•Appointment of Nodal officer at each Ministry/Department •Develop a strategy for preparedness measures •Issue necessary directions for preparedness	State Government /CORS/ District Admin./DDMAS /ULBS PRIS	•Appointment of Nodal officer at each level (state, district, tehsil and block, department etc.) •Implementation of Heat Action Plan •Issue necessary directions for preparedness
			MHA	•Issue directives to state police department for distributions of Cool jacket for traffic police personnel	State Government / Dept of Home	•Ensure shade for on duty traffic police, as they are more exposed to Heat wave and distribution of Cool jacket for traffic police personnel
			NDMA	•Review preparedness & mitigation measures in Heat prone states.	CORs/SDMA/ DDAMAS / District Admin./ nation ULBs/PRIS	•Heat wave should be included in annual disaster event/ calendar.

				•Interministerial coordination for preparedness activities		•Interstate collaboration for sharing experiences and data •Reviewing preparedness & mitigation measures
		Short and medium-term Mitigation measures	MoH& FW	•Issue directives for hospital preparedness &mitigation measures to states •Formulation of Schemes and program for Heat-health safety •Ensure monitoring mechanism for Heat health preparedness at state level	State govt./Dept.of health	•Prepare hospital preparedness plans •preparedness of the Heat health and social care system •Ensuring 24X7 Heat health facilities with adequate provision of basic medicine like ORS, Glucose etc. • dissemination of health plan by organizing awareness campaigns.
			MoEF& CC	•Develop framework for tracking and modeling of Heat hot spot based on IMD data. •Directives to maintain water • bodies in the forest area for wild animals & birds. •Advisory for plantation in fallow land available with different ministries	Dept. of Forest in coordination with other department	•Identify "hot-spots" using framework for tracking and modeling based on IMD data. •Maintain water bodies in the forest area for wild animals & birds. •Afforestation and plantation •Prevention of forest fire
			MoRD and MoPR	•instruction on mainstreaming Heat health precautionary measures, including re-scheduling of working hours and reduce piece rate, in all schemes and programmes,	State Govt./ Dep. of Rural development and Panchayati Raj	•Implementation of structure for non?? screaming heart health precautionary measures, including rescheduling of waiting hours and reduce piece rate, in all schemes and programmes. •Ensure shed for resting and drinking water

						facilities for workers at all work place,
			Min. of jal Shakti	•Issue instructions for ensuring availability of drinking water facilities.	State Govt./ Department of Drinking water	•Ensure drinking water facility •Identify vulnerable places and ensure drinking water facilities. •Repair/maintenance of mechanical/electrical fault of tube wells, ponds, jorhat, on priority basis to ensure water storage. •Suitable arrangement for drinking water supply and promptly respond to water scarcity. •Ensure drinking water facilities at all common place and nearby habitation,
			Min. of HRD	•Direction to states to re- scheduling of schools timingor closure of the schools as per Heat wave situation •Instruction for ensuring cool places in all educational institutions. •Encourage research on Heat wave related issues through universities	State Govt./ Education department	•Rescheduling of school timing and vacation as per Heat wave situation. •Ensuring cool places for all educational institutions, and availability of water facilities •Ensure that students avoid outdoor physical activities during the summer in schools. • Research on Heat wave related issues through universities

			Min. of Labour and Employment	• Directives to all stales, construction companies, industries for precautionary measures to be taken during Heat wave season. •Direction for rescheduling of working hours. •Necessary arrangement to regulate piece rate and requirement /urgency for undertaking physical work during summer.	State govt./ Dept. of Labour/Dept of Social Welfare	•Implement the direct ion for Heat waveseason •Rescheduling of working hours for employees in different sectors. •Ensure drinking water facilities at work places •Coordinate with Health department and ensure regular health checkup of the workers and provide emergency ice packs and Heat illness prevention materials to construction workers.
			MoA &FM/MoAH&D	•Advisory to Sates for awareness generation about farmers/animal-health related issues arising from Heatwave. •Advisory to States to ensure availability of necessary veterinary medicine, equipments.	State Govt / Dept. of Ag.&AH	•Follow the advisory on Heat wave •Shelter for livestock and animal husbandry should be maintained. •Pre-positioning of adequate veterinary medicines and supplies. •Update contingency plan regarding provision of drinking water for animals.
			MoHUA	•Issue advisory to all ULBs in Heat wave vulnerable states for preparedness, mitigation & management of Heat wave. •Give directives to construct shelter, shed at public Places provide access to public parks during Heat wave	State Governments/ District Admin./ DDAMAS, UDD/ULBS	•Open parks/open areas during daytime for providing spaces with shade •Sprinkling of water on roads •Construct shelter, shed at public place, provide access to public parks during Heatwave season. • Promote cool roofs initiative such as paint

						roof while, create green roofs and walls, and plant trees in neighborhood to keep them cool
			MoRT& H	•directive for protection of roads from melting and take precautionary measures	State Government / Dept. of Transport	•To ensure 1) Shelter/Sheds at bus stops, 2) frequency of transportation, 3) drinking water facilities at bus stop. •Enable better emergency transport system for affected people to health care facilities with adequate equipment's.
			Min of Power	•Advisory to all states as well as power generation, transmission, distribution and supply though DISCOM including repair & maintenance work for uninterrupted power supply •Rescheduling load shedding	Department of Power/DISCOM	•Ensure repair & maintenance work for uninterrupted power supply before and during the summer. •Re-scheduling load shedding
			Min. og Railways	•Repair/maintenance of mechanical/ electrical system on priority basis including fan and cooling system. •Ensure drinking water facilities in trains and railway stations.	All General Managers of Zone and Divisional Railways Manager Metro Rail Corporation in states	•Repair/maintenance of mechanical electrical system on priority basis including fan and cooling system •Ensure drinking water facilities in trains and railway stations.
			Dept. Of Sc. & Technology	•R&D activities to promote utilization of S&T in the field of Heat wave risk reduction.	State Govt./ CORs/ Dept. of Sc.& Technology	•To develop application / App related to awareness generation, quick information sharing on the Heat wave Risk Reduction.

						•R&D activities to promote utilization of S&T in the field of Heat wave risk reduction •Promote research on Heat wave related issues

Investing in DRR – Structural Measures						
		Long term Mitigation measures	MoRD/MoHUA	•Long term planning for Heat resilient infrastructure • Directives to states to promote cool roofs technology and use other similar Heat reducing technology •Mixed land use planning may be adopted to address Heat wave affected cities •Heat appropriate planning of new building (consideration e.g. in architecture, width height ratio, street development, orientation and site) in urban and rural areas. •Capacity building of structural engineers, civil engineers and architects for construction of green building, maintenance and safety of the structures.	State Govt./ CORs and concerned department	•Long term planning for Heat resilience infrastructure •Promote cool roofs technology and use other similar Heat reducing technology •Ensure implementation of mixed use planning adopted in Heat wave affected cities •Heat appropriate planning of new buildings (consideration e.g. in architecture, width/height ratio, street development, orientation and site) in urban and rural areas. •Ensure capacity building of structural engineers, civil engineers and architects for construction of green building, maintenance and fire safety of the structures. •Ensure to construction of green building, environment and building code related to Heat wave risk mitigation
			Ministry of Consumer Affairs, Food and Public Distribution	•Issue directives to states for to implement National Building Code of India 2016 Part - IV "Fire & Life Safety" in their building bye-laws	State Govt/ UDD/ ULBS/PRIS	• Ensure implementation of latest National Building Code of India 2016 Part – IV “Fire & Life Safety” in their building bye-laws

			MoEF&CC	•Issue directives to states for construction of green building, Energy Conservation Building Code (ECBC) related to Heat wave risk mitigation. •policy Formulation to increase forest Coverage and green area in view of increasing Heat wave risks. •Afforestation and mass plantation	State govt. /CORS/ Dept. of Forest	•Ensure construction of green building, Energy Conservation Building Code (ECBC) related to Heat wave risk mitigation •Increase forest coverage and green area •Afforestation and mass plantation •Coordinate with Transport Department and Road Construction department for Plantation of trees at roadside, barren land and other areas. •prevention of forest fire and control measures.
			MoA& FW	Advisory for short duration and Heat resisting crops	State Govt. / Dept OF Agriculture	•Promote short duration and Heat resisting crops
Capacity Development						
4	Capacity building and Training	Capacity building	NIDM with MoH& FW/MoHRD and other concerned Minstries / departments as per annexure -5	•Develop training module for different qualification at different level •Preparation of capacity Building plan and implementation Coordination with different ministries / Department for Capacity building activity. •Conduct capacity building and Training program as per domain and expertise of Ministries/ Department	State Govt./Cors/SDMAs/SIDMs state ATIs with dept. of Health and Education	•Develop Training module and conduct proper training program for different stakeholders •Heat wave management should be added in school curriculum to sensitize school children and local people. • Conduct capacity building and training program as per domain and expertise department.
			MoHUA	•Capacity building of Structural engineers, Civil engineers and architects for construction of green building, maintenance and fire safety of the structures	State Govt./ CORs/PWD, Municipal corporation, urban local bodies	•Capacity building of Structural engineers, civil engineers and architects for construction of green building, maintenance and fire safety of the structures • Long term mitigation measures construction of green building, Environment and building code related to Heat wave risk mitigation.

5.	Public awareness and Community outreach	Media campaign and IEC activity	MoHUA/MoRD/MoH&FW/NDMA and other concerned ministries / department as per annexure – 5	•IEC Campaign to create awareness through print media, electronic media, social media etc. •issue advisories from time to time	CORs/SDMAs District admin/ information and public relations dept. and other concerned Departments	•IEC campaign to create awareness through print media, electronic media, social media etc. • display board with color coding for Heat wave alert •Display dos and don'ts in the public area's hospitals, parks, etc. •Develop of mobile application for faster spread of Heat related issues, alertness, space for shelters and drinking water.
6.	Data collection and documentation		Ministry of Health & family welfare through IDSP	•Establish as data monitoring cell and collecting data from sates and maintaining national –level data base • Standardized collection of granular data •Development of a proper data sharing among all stakeholders	CoRs/SDMAs/DDMAs/Health Dept. through Nodal Officers	•Establishment a data monitoring cell and collect data from district and maintain state level data base •A standardized collection of granular data •standard protocol for death investigation. •adopt uniform process for registration of casualties/ deaths due to Heat wave based on the post mortem report, death count type of disease, time and duration.

5.2 Duties & Responsibilities of the departments during Pre-Heat wave Season

I. Revenue Department

Incident Controller / Nodal Officer - Commissioner Disaster Management & Ex-Officio Secretary - Nodal Officer for State

District Collector – Nodal officer for District

Municipal Commissioner –Nodal Officer for Respective Municipalities.

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

II. I & PR Department

i. Identification of areas to post warnings and information during Heat wave 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 public, especially focusing on identified high risk areas in the State and vulnerable groups of population and areas.

III. Medical & Health Department and Medical Professionals

- 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 Centers (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.

- Updating 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.
- Adopt Heat-focused examination procedures at local hospitals and urban health centers.
- Developing of SMS facility to reach the field level staff during emergency periods.
- Checking of inventories of medical supplies including ORS powder in PHCs and other Local Hospitals.
- Purchase and distribute reusable soft plastic ice packs for the citywide UHCs, 108 emergency centers, ambulances and hospitals.
- Explore creation of ice pack dispensaries to increase access to vulnerable communities in high risk areas.
- To provide following services through 108 / 104 Emergency Service
    a. Ensure adequate supply of I.V. 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/ RWS

- 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.
- Identification of areas to provide shelters and drinking water during Heat alert period.
- Urban forestry, avenue plantation and encouraging roof gardens to increase the green cover in urban areas to reduce Heat levels.
- Special care in restricting outdoor activities and functions during Heat period.
- 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

- Organize training for employers, outdoor labourers and workers on health impacts of extreme Heat and protective measures to be taken during high temperature periods.
- 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.
- Preparing a list of factory medical officers, contractors and house side non-factory workers to include in Heat alert and action communication.
- Heat illness orientation planning for factory medical officers.

VI. Rural Development Department

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

VII. Animal Husbandry Department

- Preparation of Posters & pamphlets with tips to take care of cattle and poultry during Heat waves.
- Publicity of protective measures to save cattle and poultry during Heat periods through District heads and Farmer Training Centers.
- Checking inventory of necessary medicines for treatment of cattle and poultry. Preparation of plans to provide drinking water for cattle in case of scarcity.

VIII. Transport Department & APSRTC

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

IX. Information & Technology (IT) Department

- 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 e-pragathi.
- Mapping of Risk areas and discrimination of warnings and alerts to all
- Stakeholders automatically through web, IVRS and mobile applications.
- Prepare map on web interface with a color-coding system.

X. Education Department

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

XI. Fire Department

- To check the readiness of vehicles and firefighting equipment to face any fire emergency.

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

- Conduct training programmes, workshops and outreach sessions with community / Self-help groups and mobilize DWACRA groups, Mahila Arogya Samiti, ASHA workers, Anganwadi's, and Ward Committees in Municipalities to help inform and get vulnerable communities more actively involved in mitigating Heat wave consequences.
- Identification of NGOs, Voluntary Organizations in reaching out to the Public, especially vulnerable groups.
- Encourage discussions for finding early signs of Heat exhaustion with local doctor or Health Centre.
- Inform fellow community members about how to keep cool and protect oneself from Heat.

XIII. Village/Ward Secretariat Department

- The Village/ward volunteers should actively participate in curbing the hazards due to Heat wave.
- They have to conduct awareness among the public on health issues due to Heat wave by providing pamphlets, videos and all relevant IEC material.

5.3 Duties & Responsibilities of the departments during the Heat wave Season.

I. Incident Controller / Nodal Officer

- CDM & EOS- Nodal Officer for State
- District Collector – Nodal officer for District
- Commissioner (Municipal) –Nodal Officer for Respective Municipalities
- Issue of **Heat alert** when extreme Heat events are forecast by IMD and observations from APSDPS. All key Departments / Agencies, SEOC, DEOC etc. in accordance with the Communication Plan may be notified. Periodicity to be depend upon the severity forecasted.
- Monitor and increase the **Heat alert** level to match the severity of the forecast and established threshold.
- Hold regular (daily, if necessary) conferences to discuss reports and fresh developments during a **Heat alert**. Special meetings with key agencies may be convened.
- To ensure that communication channels with all Stakeholders are functional and operating.
- Ensure presence of staff and availability of required supplies with each Department, including fresh drinking water.
- Communicate locations of emergency facilities and cooling centers / shaded areas with each Department / Organization.
- Inform power supply, Companies to prioritize maintaining power to critical facilities (such as hospitals and UHCs).
- Notify all the stakeholders when the **Heat alert** is over.

II. I & PR Department

i. Release of messages to the 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, Face book etc. to increase outreach of the messages.

III. Medical & Health Department and Medical Professionals

- Display of Heat-related illness prevention tips and how to stay cool around hospitals, PHCs and UHCs.
- Equip all hospitals/ PHCS/ UHCs with additional supplies of medicines and material. Ensure adoption of Heat illness treatment and prevention protocols.
- Deploy additional staff at hospitals and PHCs/UHCs to attend to the influx of patients during a Heat alert, if feasible.
- Keep emergency wards ready in all PHCs / UHCs and Hospitals
- Increase outreach of community health workers in at-risk neighbourhoods during a Heat alert, if feasible.
- Report Heatstroke patients to the nodal officer on daily basis and generate weekly
- Reports on public health impacts of Heat wave for the nodal officer, during a Heat alert. Expedite recording of cause of death in death certificates.
- 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.

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 / RWS

- Disseminate SMS text messages to warn residents of high-risk areas and vulnerable sections of population during a **Heat alert**.

- Set up electronic scrolling boards to display temperature and forecasts at junctions and other public places.

- 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.
- Expand access to shaded areas for outdoor workers, slum communities, and other vulnerable sections of population.
- Keep open the parks for a longer duration during evenings.
- All non-essential uses of water (other than drinking, keeping cool) may be suspended, if necessary.
- Distribution of fresh drinking water to the public by opening water centers (Chalivendrams) at people congregation points like market places, labouradda, Bus stations etc. Water may be distributed through pouches to the poor in the identified high-risk areas.
- Actively involve NGOs, lions club, rotary club and corporate houses in providing shelter and drinking water facilities.

V. Labour & Employment Department

- Encourage employers to shift outdoor workers schedules away from peak afternoon hours (12 – 4pm) during a Heat alert.
- To ensure to provide emergency ice packs and Heat-illness prevention materials to construction workers.
- 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

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

VII. Animal Husbandry Department

- Display posters and distribute pamphlets on the precautionary measures to be taken to safeguard cattle and poultry birds during Heat period in villages and important junctions.
- Ensure adequate stock of medicines in all veterinary hospitals.

- Ensure visit of field staff during Heat wave to villages for follow up action in treatment of cattle / poultry birds.

VIII. Transport Department & APSRTC

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

IX. Information and Technology (IT) Department

- Send real time information through dash board/ interface on all activities related to Heat wave.
- Activate dash board.
- Activate Heat wave APP
- Generate reports encompassing all activities undertaken during Heat wave alert to use for evaluation of systems and action plan.

X. Education Department

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

XI. Fire Department

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

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

- Take all precautions to avoid Heat related illness.
- 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.

XIII. Village/Ward Secretariat Department

- The village/ward volunteers are to take necessary steps in addressing the public not to go outside in peak temperature of the day
- To ensure to arrange shelters for the public with the help of panchayat / municipal administration authorities to combat Heat wave.
- To ensure to arrange chalivendrams, medical Heath camps, drinking water supply to the public during Heat wave season.

5.4 Duties & Responsibilities of the departments during Post -Heat wave Season.

I. Incident Controller / Nodal Officer

CDM & EOS - Nodal Officer for State District Collector – Nodal officer for District Commissioner (Municipal) –Nodal Officer for Respective Municipalities

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

II. I & PR DEPARTMENT

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

III. Medical & 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.
- Measure mortality and morbidity rates based on data before and after the Plan's interventions.
- Incorporate data and findings into future versions of the Heat wave action plan.
- Participate in annual evaluation of Heat wave action plan review the revised Heat wave action plan.
- Review the revised Heat wave action plan.
- To ensure 108 / 104 emergency service
- Provide data to key agency / department.

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

- Collect data related to implementation of action plan and provide feedback to key agency / department**.**
- Participate in annual evaluation of Heat wave action plan. Review the revised Heat wave 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.

VI. Village/Ward Secretariat Department

The village/ward volunteers are expected to consolidate and update the daily report on Heat wave prescribed format communicated by SEOC and hand over to Panchayat/ward/ Municipal authorities.

6. HEAT ILLNESS – TREATMENT PROTOCOL

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

1. Initial patient assessment primary survey (airway, beathing, circulation, disability, exposure), vital signs including temperature
2. Consider Heat illness in differential diagnosis if:

a) Presented with suggestive symptoms and signs
b) Patient bas one or more of the following risk factors:
   i. Extremes of age (infants, elderly)
   ii. Debilitation/physical deconditioning, overweight or obese
   iii. Lack of acclimatization to environmental Heat (recent arrival, early is 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. Beat 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. If temperature is 40°C or above, initiate IV rehydration and immediately transport to emergency department for stabilization. Impact of Heat waves on health is summarized in Table 7 and the vulnerable groups affected are shown in Table 8.

Table 6: Range of Heat Illness - Typical Presentations - symptoms, sign and prognosis

Clinical Entity	Age Range	Setting	Cardinal Symptoms	Cardinal / Important Signs	Pertinent Negative findings	Prognosis
Heat rash / prickly Heat/ Miliaria	All, but frequently children	Hot environment ; +/- insulating clothing or swaddling (wrap in tight clothes)	Itchy rash with small red bumps at pores in the skin. Seen in setting of Heat exposure; bumps can sometimes be filled with clear or white fluid	Diffused red color skin or vesicular rash, itching of the skin without visible eruption	Not focally distributed like a contact dermatitis	Full recovery with elimination of exposure and supportive care
Heat Cramps	All	Hot environment, typically with exertion, +/- insulating clothing	Painful spasms of large and frequently used muscle groups	Uncomfortable appearance, may have difficulty fully extending affected limbs/joints	No contaminated wounds/tetanus exposure; no seizure activity	Full recovery with elimination of exposure and supportive care
Heat exhaustion	All	Hot environment ; +/- exertion; +/- insulating clothing or swaddling (wrap in a tight clothes)	Feeling overhead, lightheadedness, exhausted and weak, unsteady, feeling of vomiting, sweaty and thirsty, inability to continue activities	Sweaty/diaphoretic; flushed skin; hot skin; normal core temperature; +/- dazed, +/- generalized weakness, slight disorientation	No coincidental signs and symptoms of infection; no focal weakness; no difficulty in swallowing food or speech; no overdose history	Full recovery with elimination of exposure and supportive care; progression to Heat syncope / stroke if continued exposure
Heat syncope	Typically adults	Hot environment ; +/- exertion; +/- insulating clothing or swaddling (wrap in a tight clothes)	Feeling hot and weak; lightheadedness loss of consciousness	Brief, generalized loss of consciousness in hot setting, short period of disorientation, if any	No seizure activity, no loss of bowel or bladder continence, no focal weakness, no difficulties in food swallowing or speech	Full recovery with elimination of exposure and supportive care; progression to Heat stroke if continued exposure
Heat Stroke	All	Hot environment +/- exertion; +/- insulating clothing or swaddling (wrap in a tight clothes)	Severe over Heating; profound weakness; disorientation, not fully alert, convulsion, or other altered mental status	Flushed, dry skin (not always), core temp > 40 °C or 104°F; altered mental Status with disorientation, incoherent behavior, coma, convulsion; tachycardia; +/- hypotension	No coincidental signs and symptoms of infection; no focal weakness; no difficulties in swallowing food or speech, no overdose history	25-50% mortality even with aggressive care; significant morbidity even if survives

Table 8: vulnerable groups of population

S.No	Vulnerable Groups
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 preexisting medical conditions (e.g., cardiovascular and respiratory illness, diabetes), people on certain medication
7	People with limited mobility, impairment of thermoregulatory capacity and reduced ability to perceive
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 centers (PHCs).
5. Lack of access to urgent medical attention at local levels (in villages).
6. No access to shaded areas and cooling 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.

7. CONCLUSION

Increased occurrences of summer Heat wave conditions in recent years are threating to the human and cattle life. Prior information about the possible Heat wave conditions will help in reducing the risk to human life and also helps in taking precautionary action and also the government agencies to be vigilant and allow them to plan outreach activities to save the lives of the public.
All the departments / agencies shall take necessary timely action to implement the Heat wave action plan to mitigate the adverse effects of Heat wave.

As a consequence, collaboration efforts of the Government of Andhra Pradesh through implementation of Heat wave action plan by Andhra Pradesh State Disaster Management Authority, and line departments, efforts on continuous monitoring and early warning has significantly reduced the death of sunstroke in the year 2019, to a two digit of 28 deaths in 2019 and zero deaths in 2020, 2021 and 2022.

Although the meteorological conditions were almost the same in 2017 and 2019, the deaths have reduced 384 in 2017 to 28 in 2019. Most importantly, the deaths have reduced to zero in 2020, 2021 and 2022. This is certainly not due to the Covid-19 situation because there were deaths all over India. This is primarily because of the efforts of APSDMA like awareness programs at Mandal/Village level, coordination meetings with line departments in mitigation the Heat wave efforts.

9. Achievements:

- The Implementation of Heat wave action plan, collaboration efforts with line departments and continuous monitoring and early warnings of the Heat wave, significantly reduce the deaths due to sunstroke from 236 in 2017 to 0 (zero) during 2020-2022.

The print media and the presentation of APSDMA on Heatwave has drawn the attention of NDMA with following paper clippings.

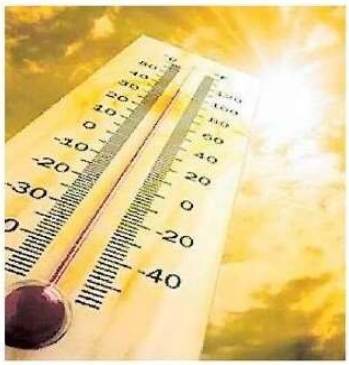
సాక్షి

రాష్ట్రం భగభగ

అన్ని ప్రాంతాల్లో అధిక ఉష్ణోగ్రతలు

- తుపాను ప్రభావంతో గాలిలో తగ్గిపోయిన తేమ శాతం
- అందుకే తీవ్ర ఉక్కపోత, ఎండలు..
- ఇంకా నాలుగైదు రోజులు ఇలాగే కొనసాగే అవకాశం

అనేకచోట్ల 42 నుంచి 44 డిగ్రీలు నమోదు



సాక్షి, అమరావతి/సాక్షి, విశాఖపట్నం : రాష్ట్రంలో ఎండలు తీవ్ర ప్రతాపం చూపుతున్నాయి. ఆదివారం రాష్ట్రవ్యాప్తంగా ఎండలు భగభగమండగా కోస్తా జిల్లాల్లో వాటి ప్రభావం ఇంకా ఎక్కువ కనిపించింది. అనేక ప్రాంతాల్లో 42 నుంచి 44 డిగ్రీల మేర ఉష్ణోగ్రతలు నమోదయ్యాయి. ఉ.11 గంటలకే చాలా ప్రాంతాల్లో 40–41 డిగ్రీల ఉష్ణోగ్రతలు నమోదవడంతో ప్రజలు బయటకురావడానికే బెంబేలెత్తిపోయారు. కృష్ణా, ఎన్టీఆర్, ఏలూరు, తూర్పు గోదావరి, గుంటూరు, పల్నాడు, కాకినాడ, ప్రకాశం జిల్లాల్లో ఎండ తీవ్రత ఎక్కువగా కనిపించింది. ఈ జిల్లాల్లో దాదాపు అన్నిచోట్లా 40–44 డిగ్రీల మేర ఉష్ణోగ్రతలు నమో దయ్యాయి. అనకాపల్లి, విశాఖ జిల్లాలు మినహా మిగిలిన అన్ని జిల్లాల్లో అత్యధిక ఉష్ణోగ్రతలు 40 డిగ్రీలకు పైనే నమోదయ్యాయి. ఎన్టీఆర్ జిల్లా చిల్లకల్లులో అత్యధికంగా 44.8 డిగ్రీలు నమోదైంది. ఏలూరు జిల్లా పంగిడిగూడెంలో 44.7, కామవరపుకోటలో 44.5, ఎన్టీఆర్ జిల్లా చందర్లపాడులో 44.4, ఏలూరు జిల్లా రాజుపోతేపల్లిలో 44.3 డిగ్రీల ఉష్ణోగ్రతలు నమోదయ్యాయి.

మోకా తుపాను ప్రభావమే

మోకా తుపాను ప్రభావంవల్లే రాష్ట్రంలో ఉష్ణోగ్రతలు పెరిగినట్లు వాతావరణ శాస్త్రవేత్తలు చెబుతున్నారు. బంగాళాఖాతం నుంచి ఏపీకి వీచే గాలులను తుపాను లాగేసుకున్నట్లు అంచనా వేస్తున్నారు. దీంతో మన ప్రాంతంలో గాలిలో తేమ శాతం తగ్గిపోయింది. కేవలం తేమలేని పొడిగాలులు వీస్తుండడంతో తీవ్రమైన ఉక్కపోత, ఎండ తీవ్రత ఎక్కువగా ఉంటోంది. రాజస్థాన్, మహారాష్ట్ర వైపు నుంచి వచ్చే గాలుల్లో తేమ శాతం లేకపోవడంతో ఉక్కపోత, ఎండ తీవ్రత ఇంకా పెరిగింది. తుపాను ప్రభావం తగ్గేవరకు అంటే నాలుగైదు రోజుల వరకు ఇదే పరిస్థితి ఉంటుందని.. ఎండల తీవ్రత కొనసాగుతుందని వాతావరణ శాఖాధికారులు తెలిపారు.

జిల్లాల వారీగా నమోదైన అత్యధిక ఉష్ణోగ్రతలు..

జిల్లా	మండలం	ప్రదేశం	ఉష్ణోగ్రత
ఎన్టీఆర్	జగ్గయ్యపేట	చిల్లకల్లు	44.8
ఏలూరు	ద్వారకా తిరుమల	పంగిడిగూడెం	44.7
పల్నాడు	నరసరావుపేట	కాకాని	44.1
కృష్ణా	గుడ్లవల్లేరు	కవుతరం	43.8
బాపట్ల	పర్చూరు	పర్చూరు	43.7
తూర్పుగోదావరి	గోకవరం	గోకవరం	43.3
ప్రకాశం	కురిచేడు	కురిచేడు	43.3
అల్లూరి	కూనవరం	కొండాయిగూడెం	43.2
గుంటూరు	దుగ్గిరాల	దుగ్గిరాల	43
పశ్చిమ గోదావరి	పోడూరు	పోడూరు	42.8
నంద్యాల	దోర్నిపాడు	దోర్నిపాడు	42.4
అంబేద్కర్ కోనసీమ	కే గంగవరం	శివాల	42.3
తిరుపతి	సత్యవేడు	సత్యవేడు	42.1
వైఎస్సార్	కడప	కడప టౌన్	41.9
నెల్లూరు	వెంకటాచలం	కసుమూరు	41.9
పార్వతీపురం మన్యం	సాలూరు	సాలూరు	41.7
కర్నూలు	మంత్రాలయం	మంత్రాలయం	41.4
విజయనగరం	వంజర	వంజర	41.1
అనంతపురం	శింగనమల	తరిమెల	40.6
కాకినాడ	గండేపల్లి	గండేపల్లి	40.5
చిత్తూరు	నిండ్ర	నిండ్ర	40.4
శ్రీకాకుళం	జి.సిగడం	జి.సిగడం	40.3
అన్నమయ్య	నందలూరు	చిన్నయాగరపల్లి	40.1
శ్రీసత్యసాయి	ధర్మవరం	ధర్మవరం	40.0
అనకాపల్లి	దేవరపల్లి	దేవరపల్లి	39.1
విశాఖ	పద్మనాభం	పద్మనాభం	38.8

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Source : https://epaper.sakshi.com/

ఈనాడు
epaper.eenadu.net

ఎండ.. ప్రచండం

నేడు 127 మండలాల్లో తీవ్ర వడగాలులు

ఈనాడు, అమరావతి: రాష్ట్రంలో గరిష్ఠ ఉష్ణోగ్రతలు ఆదివారం 45 డిగ్రీల వరకు చేరాయి. వడగాలుల తీవ్రత అధికమైంది. సోమవారం 127 మండలాల్లో తీవ్ర వడగాలు వీచే అవకాశం ఉంది. ఆదివారం రాష్ట్రంలోనే అత్యధికంగా.. ఎన్టీఆర్ జిల్లా జగ్గయ్యపేట మండలం చిల్లకల్లులో 44.8, ఏలూరు జిల్లా ద్వారకాతిరుమల మండలం పంగిడిగూడెంలో 44.7, పల్నాడు జిల్లా నర సరావుపేట మండలం కాకాని, రావిపాడులో 44.1 డిగ్రీల చొప్పున నమోదయ్యాయి. కృష్ణా, బాపట్ల, తూర్పుగోదావరి, అల్లూరి సీతారామరాజు, ప్రకాశం, గుంటూరు, నంద్యాల, పశ్చిమగోదావరి జిల్లాల్లోనూ 44 డిగ్రీల వరకు ఉష్ణోగ్రతలు ఉన్నాయి.

■ సోమవారం రాష్ట్రంలోని 127 మండలాల్లో తీవ్ర వడగాలులు, 173 మండలాల్లో వడగాలులు వీచే అవకాశం ఉందని విపత్తుల నిర్వహణ సంస్థ తెలిపింది. పార్వతీపురం మన్యం, అల్లూరి సీతారామరాజు, విశాఖ, అనకాపల్లి, తూర్పుగోదావరి, కాకినాడ, అంబేద్కర్ కోన సీమ, ఏలూరు, పశ్చిమగోదావరి, కృష్ణా, ఎన్టీఆర్, గుంటూరు, బాపట్ల, పల్నాడు జిల్లాల్లో తీవ్ర వడగాలులు వీచే అవకాశం ఉంది. మంగళవారం 92 మండలాల్లో వడగాలులు, 190 మండలాల్లో తీవ్ర వడగాలులు ఉంటాయని సంస్థ ఎండీ అంబేద్కర్ తెలిపారు.

■ సోమవారం విజయనగరం, పార్వతీపురం మన్యం, అల్లూరి, అనకాపల్లి, కాకినాడ, అంబేద్కర్ కోన సీమ, ఉభయగోదావరి, ఏలూరు, కృష్ణా, ఎన్టీఆర్, గుంటూరు, బాపట్ల, పల్నాడు, ప్రకాశం, ఎస్‌పీఎస్‌ఆర్ నెల్లూరు జిల్లాల్లో ఉష్ణోగ్రతలు 45-47 డిగ్రీల వరకు నమోదయ్యే అవకాశం ఉంది.

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THE HINDU

Andhra Pradesh

State reels under sweltering heat as mercury touches 45°C

127 mandals are likely to experience severe heatwave conditions today, according to APSDMA forecast; it warns that the maximum temperatures may go up to 47 degrees Celsius

The Hindu Bureau
VIJAYAWADA

Andhra Pradesh reeled under extreme weather conditions on May 14 (Sunday) as the mercury levels touched the 45 degrees Celsius mark for the first time this summer.

Jangamaheswara Puram in Palnadu district recorded the highest maximum temperature of 45 degrees Celsius, according to the India Meteorological Department (IMD). Many areas in the coastal and Rayalaseema regions recorded maximum temperatures above 40 degrees Celsius and above. Garikapadu recorded 43.6 degrees Celsius, followed by Bapatla (43° Celsius), Nandigama (42.8° Celsius), Amaravati (42.6° Celsius), Gannavaram-Vijayawada (42.4° Celsius), Nandyal (42° Celsius), Venkatramanna Gudem, West Godavari (41.9° Celsius), Machilipatnam (41.8° Celsius), Ongole (41.8° Celsius), Kalavacharla (41.6° Celsius), Kavali (41.4° Celsius), Tirupati (41.2° Celsius), Anantapur (40.3° Celsius), Kadapa (40.6° Celsius), Kurnool (40.6° Celsius), Darsi (40.8° Celsius), Utkuru (40.6° Celsius) and Nellore (40° Celsius).

A fruit vendor covers her head with a cardboard box to protect herself from the heat in Vijayawada. The city recorded 42.4° Celsius on Sunday. G.N. RAO

According to the Andhra Pradesh State Disaster Management Authority, only 34 mandals in 12 districts experienced heatwave conditions on May 14 (Sunday), contrary to the forecast issued on Saturday that more than 309 mandals were likely to witness heatwave or severe heatwave conditions.

On Monday (May 15), 127 mandals in all the coastal districts and a few districts in Rayalaseema region may experience severe heatwave conditions and 173 mandals across the State are likely to experience heatwave conditions.

On Tuesday (May 16), 92 mandals are likely to experience severe heatwave conditions and 190 mandals are likely to experience heatwave conditions. The APSDMA has warned that the maximum temperatures may rise to 47 ° Celsius in coastal districts on May 15 (Monday).

Meanwhile, many automatic weather stations under the purview of Andhra Pradesh Planning Development Society recorded maximum temperatures of 44 degrees Celsius and above on May 14 (Sunday).

9. Suggestions to mitigate the Heat wave disasters:

The following suggestions can be incorporated in reducing the Heat wave events in future-need support from NDMA.

- Provide shelters next to open places
- Generate more awareness among public by
  - Reaching the people through school children
  - Including a Heatwave chapter in the school curriculum
  - Reactivate the NDMA/Govt. directive given to the BSNL and private mobile operators to send the SMS free of charge.
  - Utilize Indian Meteorological Society local chapter services to draw public awareness.
- Convert hotspot areas to green belts
- Reduce Global worming by
  - Bringing the sun inside, by adding natural light
  - Using green building concept
  - Conserving energy by using sustainable resources such as
    - ✓ Solar energy
    - ✓ Wind energy
    - ✓ Tidal energy
    - ✓ Wave energy
    - ✓ Ocean thermal energy conversion projects

Annexure 1: Summary of Consolidated Report on Heat wave Season – 2023

Consolidated Report on Heat Wave Season - Andhra Pradesh (As on 18.06.2023)

Sl.No	Item	Total
1	**No. of Deaths reported by Collectors due to Sunstroke**	
a	Male	2
b	Female	1
c	Children	0
2	**Drinking Water Camps (Chalivendrams) - Total (a+b+c)**	11,378
a	Established by Government Departments	3,494
b	Established by Local bodies	5,139
c	Established by NGOs & others	2.745
3	**Shelters Provided (a+b+c)**	3656
a	No. of shelters provided by local panchayats / Municipalities	1470
b	No. of shelters provided by departments / organizations (at work places)	1753
c	No. of shelters provided by NGOs / Voluntary organizations etc.,	433
4	**Campaign of Precautionary Measures (do's & don'ts)**	3,29,342
a	No of advertisements given (Papers, Cinema halls)	172
b	No. of scrolling's made (TV- Local Channels)	130
c	No. of Hordings/ Posters displayed	1143
d	No. of Pamphlets distributed	3,27,897
5	**Medical & Health-Heat illness cases**	
a	No. of sunstroke cases	74
b	No. of Death Cases reported by Medical & Health Dept. due to Sunstroke	3
c	No. of awareness camps Conducted	2,20,066
d	No. of People Attended at camps	27,70,940
e	No. of ORS packets distributed	1,483,254

ANNEXURE 2: ROLE OF SEOC – APSDMA

During the Heat wave season (March - May), the SEOC – APSDMA efficiently activates the Heat wave Monitoring cell and disseminating system.

Pre activity timeline of Heat wave Monitoring Cell (12 hrs in advance)

Step 1: (Data receiving @2:00 PM)

ARD at SEOC receive IMD GFS Model Output data from India Meteorological Department through file transfer protocol (FTP) Server which is installed at SEOC.

Step 2: (Data Processing @3:00 PM)

The data processing and downscaling the India Meteorological Department provided IMD GFS data to mandal level by ARD team.

Step 3: (Data Verification @ 4:00PM)

Data prepared by ARD is sent to APSDPS & IMD-Amaravathi for quality and verification purpose, if any issues regarding forecasted data then repeat the previous step within 30 minutes.

Step 4: (Dissemination @5:00PM)

activates the dissemination system through phone call, Email, Social media, SMS messages at SEOC.

Real-time activity of Heat wave Monitoring Cell

- The SEOC operators continuously monitor the AWS station temperature observations between 11:00 AM to 4:00 PM. In case of any exceeded temperatures (> 41°C) recorded from AWS stations then SEOC operators will make phone call to concerned Mandal MROs to get the ground reality.
- ARD team at SEOC will do data validation of forecasted data with AWS observational data for further improvement of forecast.
- SEOC data gathering team takes feedback from concerned state level officials regarding Heat wave conditions.

The Disseminating System at SEOC-APSDMA

1. **Via Phone call:**

   SEOC operators make phone call to Heat wave prone district D-sections and also Heat wave prone mandal MROs in order to alert them in advance and request to take precautionary measures to the public in view of available forecast of Heat wave.

2. **Via Email:**

   Passing the Heat wave forecast information to all district collectors, DRO's, D-Section and I&PR.

3. **Via Social Media:**

   Information dissemination to Heat wave prone mandal MRO/VRO and Concerned Line departments through various available social media.

4. **Via SMS Messages:**

   On other hand, SEOC also send the information through short messages services to concern mandal MRO and VRO/VRA in advance.

ANNEXURE 3: DISTRICT WISE HEAT WAVE CONSOLIDATED SHEET

Sl.No	Item	Srikakulam	Vizianagaram	Parvathipuram	Visakhapatnam	Alluri Sitharamaraju	Anakapalli	Kakinada	East Godavari	Konaseema	West Godavari	Eluru
1	2	3	4	5	6	7	8	9	10	11	12	13
1	**Temperature** (in ° Celsius)											
a	Today Maximum Temperature in Dist.											
b	Season Maximum Highest Temperature Recorded in Mandal - 2022											
c	Season Maximum Highest Temperature with Location in Mandal - 2022											
d	Previous Highest Maximum Temperature Recorded in Mandal - 2021											
e	Previous Highest Maximum Temperature with Location in Mandal - 2021											
2	**No. of Deaths reported by Collectors due to Sunstroke**											
a	Male											
b	Female											
c	Children											
3	**Drinking Water Camps (Chalivendrams) - Total (a+b+c)**											
a	Established by Government Departments											
b	Established by Local bodies											
c	Established by NGOs & others											
4	**Shelters Provided**											
a	No. of shelters provided by local panchayats / Municipalities											
b	No. of shelters provided by departments / organizations (at work places)											
c	No. of shelters provided by NGOs / Voluntary organizations etc.,											
5	**Campaign of Precautionary Measures (do's & don'ts)**											
a	No of advertisements given (Papers, Cinema halls)											
b	No. of scrollings made (TV- Local Channels)											
c	No. of Hordings/ Posters displayed											
d	No. of Pamphlets distributed											
6	**Medical & Health-Heat illness cases**											
a	No. of sunstroke cases											
b	No. of Death Cases reported by Medical & Health Dept. due to Sunstroke											
c	No. of awareness camps Conducted											
d	No.of People Attended at camps											
e	No. of ORS packets distributed											
7	Total Expenditure incurred on any mitigation measures related to Heat Waves. (Rs.in lakhs)											
8	Recent received data from collectorate with Authorized signature on date											

Sl.No	Item	Krishna	N T R	Guntur	Palanadu	Bapatla	Prakasam	Nellore	Tirupati	Chittoor	Annamaiya	YSR	Sri Satya Sai	Ananthapuram	Nandyal	Kurnool	Total
1	2	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
1	**Temperature** (in ° Celsius)																
a	Today Maximum Temperature in Dist.																
b	Season Maximum Highest Temperature Recorded in Mandal - 2022																
c	Season Maximum Highest Temperature with Location in Mandal - 2022																
d	Previous Highest Maximum Temperature Recorded in Mandal - 2021																
e	Previous Highest Maximum Temperature with Location in Mandal - 2021																
2	**No. of Deaths reported by Collectors due to Sunstroke**																
a	Male																
b	Female																
c	Children																
3	**Drinking Water Camps (Chalivendrams) - Total (a+b+c)**																
a	Established by Government Departments																
b	Established by Local bodies																
c	Established by NGOs & others																
4	**Shelters Provided**																
a	No. of shelters provided by local panchayats / Municipalities																
b	No. of shelters provided by departments / organizations (at work places)																
c	No. of shelters provided by NGOs / Voluntary organizations etc.,																
5	**Campaign of Precautionary Measures (do's & don'ts)**																
a	No of advertisements given (Papers, Cinema halls)																
b	No. of scrollings made (TV- Local Channels)																
c	No. of Hordings/ Posters displayed																
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6	**Medical & Health-Heat illness cases**																
a	No. of sunstroke cases																
b	No. of Death Cases reported by Medical & Health Dept. due to Sunstroke																
c	No. of awareness camps Conducted																
d	No.of People Attended at camps																
e	No. of ORS packets distributed																
7	Total Expenditure incurred on any mitigation measures related to Heat Waves. (Rs.in lakhs)																
8	Recent received data from collectorate with Authorized signature on date																

ANNEXURE 4: Heat wave Do's and Don'ts

Heat wave: Dos & Dont's

Heat Wave conditions can result in physiological strain, which could even result in death.

To minimise the impact during the Heat wave and to prevent serious ailment or death because of Heat stroke, you can take the following measures:

- Avoid going out in the sun, especially between 12.00 noon and 3.00 p.m.
- Drink sufficient water and as often as possible, even if not thirsty
- Wear lightweight, light-colored, loose, and porous cotton clothes. Use protective goggles, umbrella/hat, shoes or chappals while going out in sun.
- Avoid strenuous activities when the outside temperature is high. Avoid working outside between 12 noon and 3 p.m.
- While travelling, carry water with you.
- Avoid alcohol, tea, coffee and carbonated soft drinks, which dehydrates the body.
- Avoid high-protein food and do not eat stale food.
- If you work outside, use a hat or an umbrella and also use a damp cloth on your head, neck, face and limbs
- Do not leave children or pets in parked vehicles
- If you feel faint or ill, see a doctor immediately.
- Use ORS, homemade drinks like lassi, to rani (rice water), lemon water, buttermilk, etc. which helps to re-hydrate the body.
- 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.

Tips For Treatment of a Person Affected by A Sunstroke:

- Lay the person in a cool place, under a shade. Wipe her/him with a wet cloth/wash the body frequently. Pour normal temperature water on the head. The main thing is to bring down the body temperature.
- Give the person ORS to drink or lemon sarbat/torani or whatever is useful to rehydrate the body.
- Take the person immediately to the nearest health centre. The patient needs immediate hospitalisation, as Heat strokes could be fatal.

Acclimatisation

People at risk are those who have come from a cooler climate to a hot climate. You may have such a person(s) visiting your family during the Heat wave season. They should not move about in open field 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.

ANNEXURE 5: DO& DONT'S POSTER

ఆంధ్రప్రదేశ్ రాష్ట్ర విపత్తుల నిర్వహణ సంస్థ

ANDHRA PRADESH STATE DISASTER MANAGEMENT AUTHORITY

ఎండతీవ్రతకు గురికాకుండా తీసుకోవాల్సిన జాగ్రత్తలు

వడదెబ్బ లక్షణాలు : తలనొప్పి, తల తిరగడం, తీవ్రమైన జ్వరం కలిగియుండటం మత్తు నిద్ర, ఫిట్స్, పాక్షిక లేదా పూర్తి అపస్మారక స్థితి.

- ✔ స్థానిక వాతావరణ సమాచారం తెలుసుకుంటూ అప్రమత్తంగా ఉండండి. టీవి చూడండి, రేడియో వార్తలు వినండి, వార్తాపత్రికలు చదవండి.
- ✔ నెత్తికి టోపి పెట్టుకోండి లేదా రుమాలు కట్టుకోండి, తెలుపురంగు గల కాటన్ వస్త్రాలను ధరించండి. అదే విధంగా మీ కళ్ళ రక్షణ కోసం సన్‌గ్లాసెస్ ఉపయోగించండి.

- ✔ వీలైనంత వరకు ఇంట్లో ఉండటానికి ప్రయత్నించండి. దాహం వేయకపోయిన తరుచుగా నీటిని తాగండి.
- ✔ ఉప్పు కలిపిన మజ్జిగ, గ్లూకోజు, ఓఆర్ఎస్ కలిపిన నీటిని తాగవచ్చును.
- ✔ వడదెబ్బకు గురైన వారు సాధారణ స్థితికి రానిచో, దగ్గరలోని ప్రాధమిక ఆరోగ్య కేంద్రానికి తరలించండి.
- ✔ ఎండలో నుంచి వచ్చిన వెంటనే నీరు గాని, నిమ్మరసముగాని, కొబ్బరినీరు గాని తాగాలి.
- ✔ తీవ్రమైన ఎండలో బయటికి వచ్చినప్పుడు తలతిరుగుట, వాంతులు ఇతర అనారోగ్య సమస్యలు ఏర్పడితే వెంటనే దగ్గరలోని వైద్యుణ్ణి సంప్రదించండి.

- ✔ ఇంటి వాతావరణం చల్లగా ఉంచుకోండి. ఫ్యాను వాడండి. చల్లని నీరుతో స్నానం చేయండి.
- ✔ తక్కువ ఖర్చుతో కూడిన చల్లదనం కోసం ఇంటిపై కప్పులపై వైట్ పెయింట్, కూల్ రూఫ్ టెక్నాలజీ, క్రాస్ వెంటిలేషన్, థర్మోకోల్ ఇన్సులేషన్‌ను ఉపయోగించండి.
- ✔ మేడపైన మొక్కలు, ఇంట్లోని మొక్కలు (ఇండోర్ ప్లాంట్స్) భవనాన్ని చల్లగా ఉంచుతాయి అదే విధంగా ఉష్ణతాపాన్ని తగ్గిస్తాయి.

ఎండ తీవ్రంగాఉన్నప్పుడు చేయకూడనివి

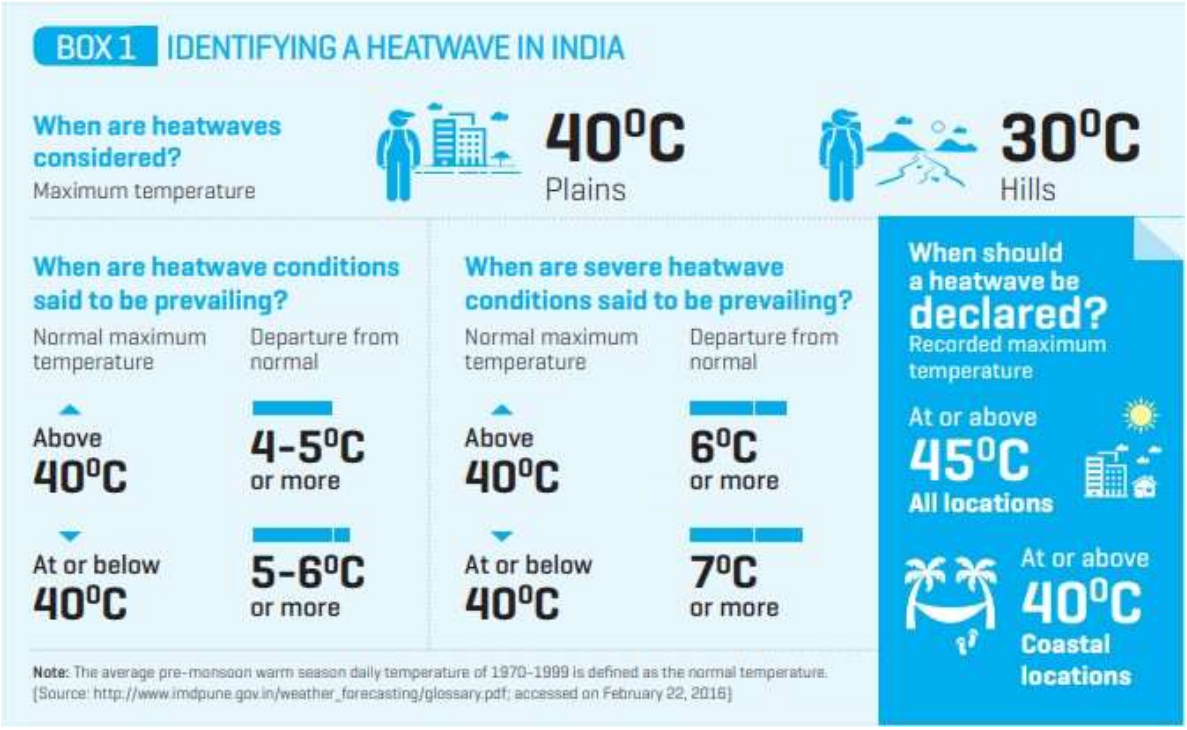
- ✖ ఎండలో గొడుగు లేకుండా తిరగరాదు. వేసవికాలంలో నలుపురంగు, మందంగా ఉండే దుస్తులు ధరించరాదు మధ్యాహ్నం తరువాత (12 గంటల నుండి సాయంత్రం 3 గంటల మధ్యకాలంలో) బయట ఎక్కువ శారీరక శ్రమతో కూడిన పనిచేయరాదు.
- ✖ బాలింతలు, చిన్నపిల్లలు, వృద్ధులు ఎండ ఎక్కువగా ఉన్నప్పుడు బయట తిరగరాదు. వీరిపై ఎండ ప్రభావం త్వరగా చూపే అవకాశం ఉంది.
- ✖ శరీరాన్ని డీహైడ్రేట్ చేసే ఆల్కాహాల్, టీ, కాఫీ మరియు కార్బోనేటేడ్ శీతల పానీయాలు మానుకోండి. అధిక ప్రోటీన్, ఉప్పు, కారం, నూనె ఉండే పదార్థాలను తీసుకోవద్దు.
- ✖ ప్రకాశించే బల్బులను వాడటం మానుకోండి, అవి అనవసరమైన వేడిని విడుదల చేస్తాయి.

కమిషనర్,
విపత్తుల నిర్వహణ శాఖ వారిచే జారీచేయటమైనది.

ANNEXURE 6: CHALLIVENDRAM CAMPS ORGANISED IN 26 DISTRICTS OF THE STATE OF AP IN 2023


REDMI NOTE 8 PRO
AI QUAD CAMERA

ANNEXURE 7: PICTORICAL REPRESENTATION OF IDENTIFYING HEAT WAVE



(Source: Road Map for planning Heat wave management in India)

ANNEXURE 8: Format A: Death reported due to Heat wave (State report to NDMA)

Name of the State: **Year:** **Reporting Period:** **Date of Reporting:**

District		**Location**						**Occupation**					**Economic**		
		Urban		**Rural**		**Total**		**Farmers**	**Labours**	**Hawkers**	**Others**	**Total**	**BPL**	**APL**	**Total**
	Age Group	**M**	**F**	**M**	**F**	**M**	**F**								
District 1	0-6 years														
	7-18 years														
	19-35 years														
	36-60 years														
	61 > above														
	Sub Total														
District 2	0-6 years														
	7-18 years														
	19-35 years														
	36-60 years														
	61 > above														
	Sub Total														
Total State															

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

Name and designation of the reporting officer:

Signature with Date

ANNEXURE 9: Format A: Details of the death reported due to Heat-Wave (record kept with State government)

S.No.	Name and Address	Age	Sex (M/F)	Occupation	Place of death	Date and time of death	Max Temp recorded (Rectal and Oral)	Death reported during Heat wave period or Not	List of Chronic diseases present (Ask the family members)	Date and time of post mortem (If conducted)	Date and time of joint enquiry conducted with a revenue authority	Cause of death	Remarks	
													Related to post mortem	Related to Joint enquiry
1														
2														
3														
4														

Name and designation of the reporting officer:

Signature with Date

ANNEXURE 10: **Format A**

DAILY REPORT OF HEAT STROKE CASES AND DEATHS (District report to State government)

S.No.	Village	PHC	Block/City	Name & Son/Daughter / Wife of	Urban(U) Rural (R)	BPL Y/N	Age/Sex	Date of attack of Heat Stroke	Any Antecedent illness	Cause of death	Death confirmed by Mos and MROs

ANNEXURE 11: Format A

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

DEATHS DUE TO HEAT RELATED ILLNESS - State .....
Data :

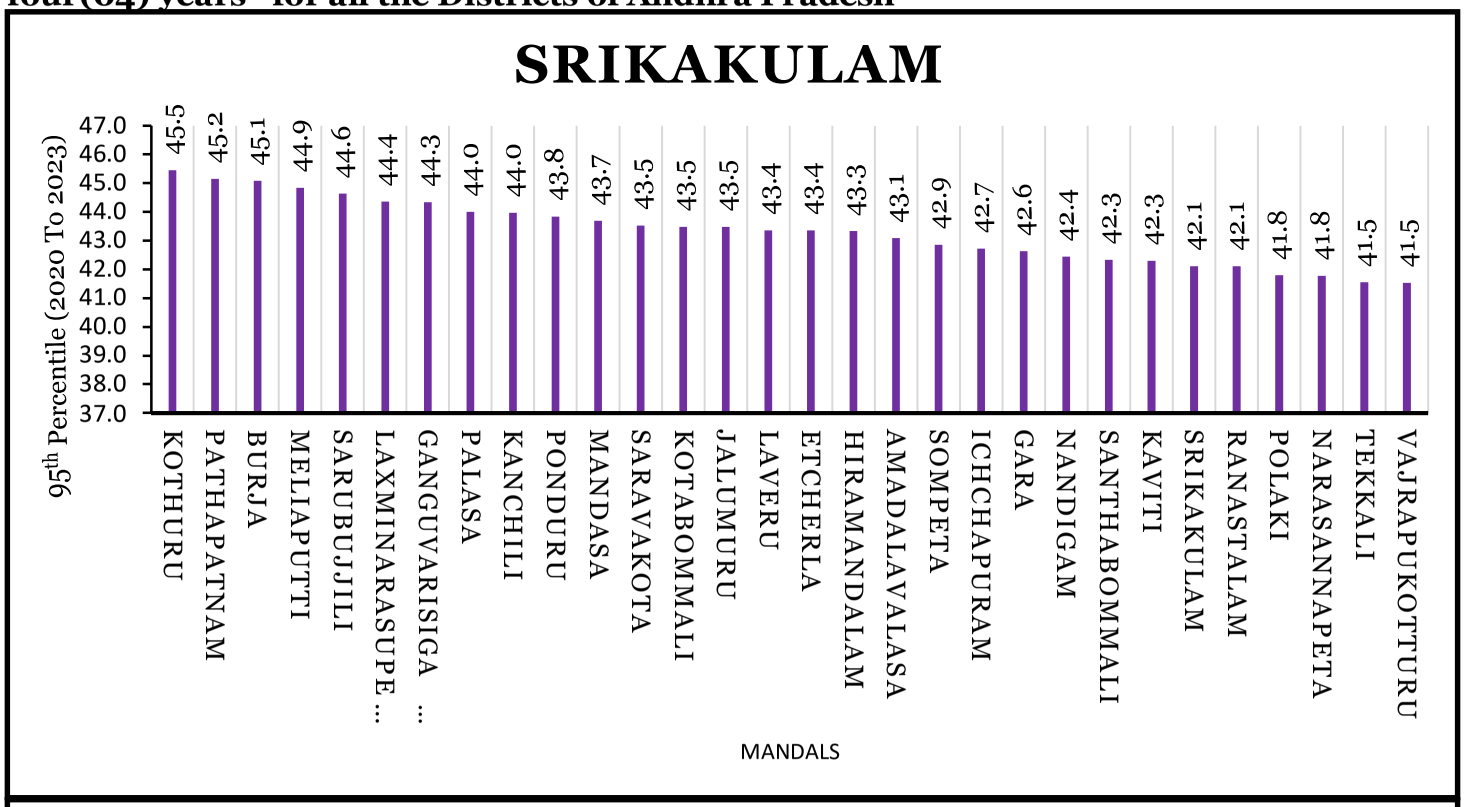
S.No.	Name of the district (Name of all districts)	New cases admitted due to Heat Related Illness since the last reporting period	Cumulative no.of cases admitted due to Heat Related Illness since 1st April	Death reported due to Heat Related Illness since the last reporting period	Cumulative no of deaths due to Heat Related Illness since 1st April	Remarks (If any shortage of ORS/IV fluids/ Treatment facilities etc . . .)
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
TOTAL						

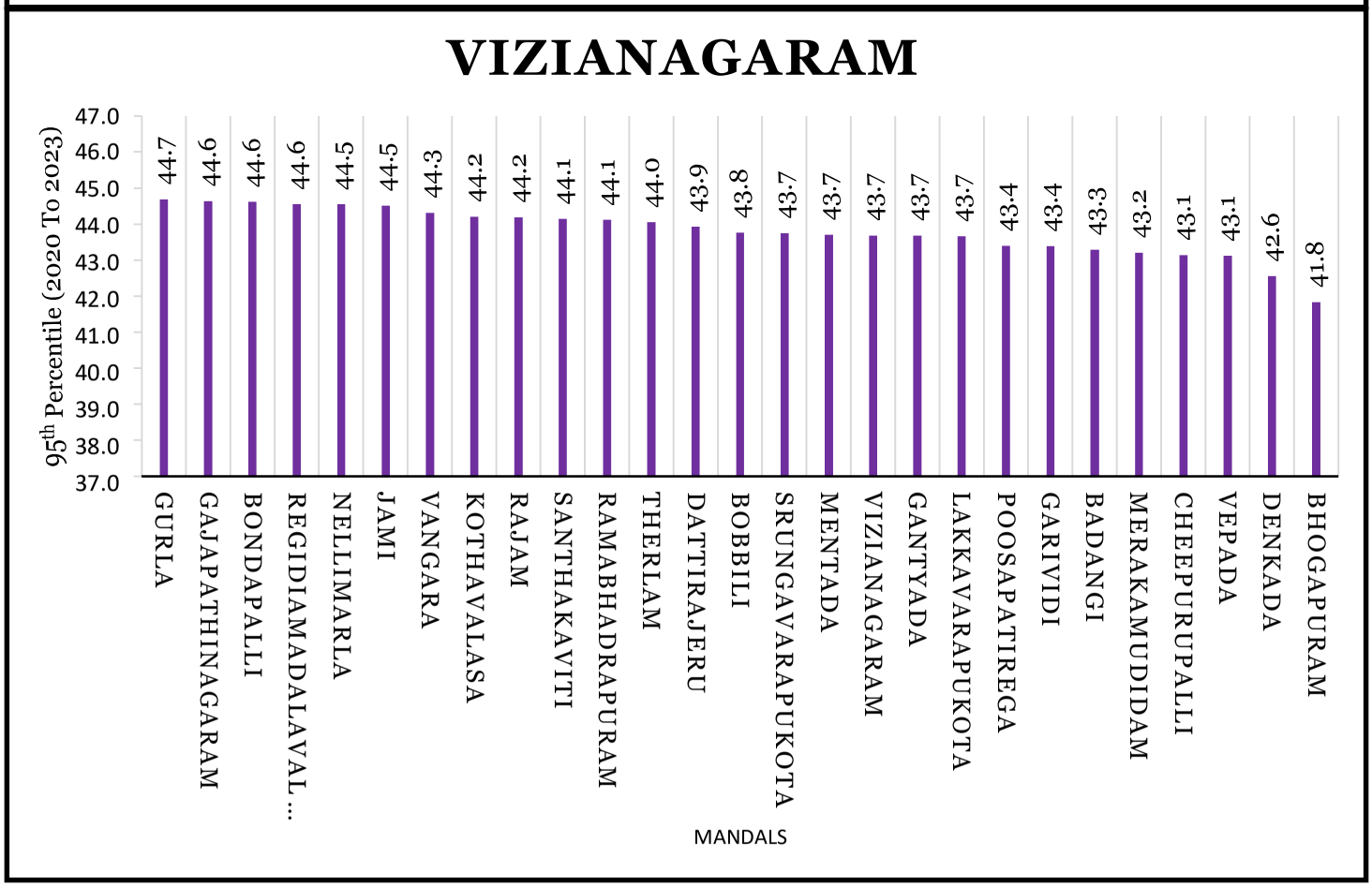
ANNEXURE 12: Format A

CASES AND DEATHS DUE TO HEAT RELATED ILLNESS - INDIA (Cumulated at the National Level)											
		Cumulative Data Form:						**For the week ending:**			
S.No.	Name of the State	Cases reported due to Heat wave Related Illness in the State (Since 15 March 2023)			Death reported due to Heat wave Related Illness in the State (Since 15 March 2023)						Remarks
					Suspected Deaths			Confirmed deaths			
		Up to last week	Last 7 days	**Total**	Up to last week	Last 7 days	**Total**	Up to last week	Last 7 days	**Total**	
1	Andhra Pradesh										
2	Bihar										
3	Chhattisgarh										
4	Delhi										
5	Gujarat										
6	Haryana										
7	Jharkhand										
8	Karnataka										
9	Maharastra										
10	Madhya Pradesh										
11	Odisha										
12	Punjab										
13	Rajasthhan										
14	Tamil Nadu										
15	Telangana										
16	Uttar Pradesh										

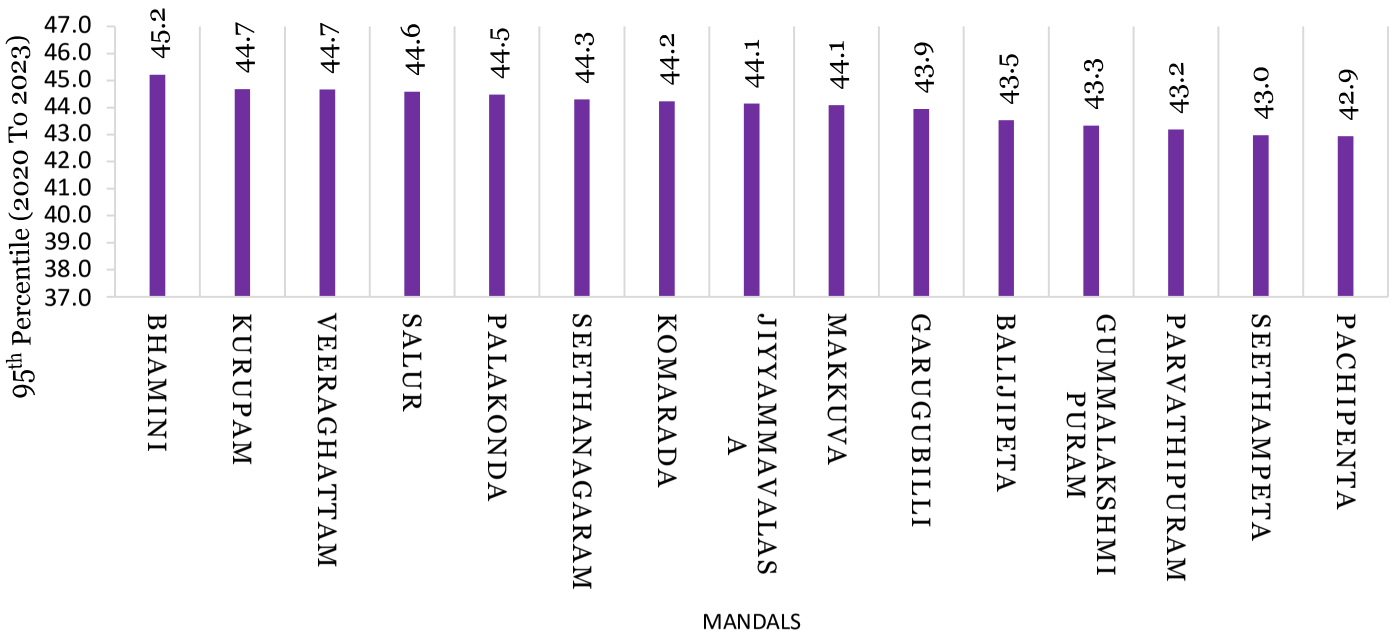
17	West Bengal										
18	Arunachal Pradesh										
19	Himachal Pradesh										
20	Jammu & Kashmir										
21	Kerala										
22	Goa										
23	Uttarakhand										
24	Telangana										
TOTAL											
	*** Added new Heat-prone States**										

ANNEXURE 13:Mandal Wise 95th percentile maximum temperatures over last four(04) years for all the Districts of Andhra Pradesh

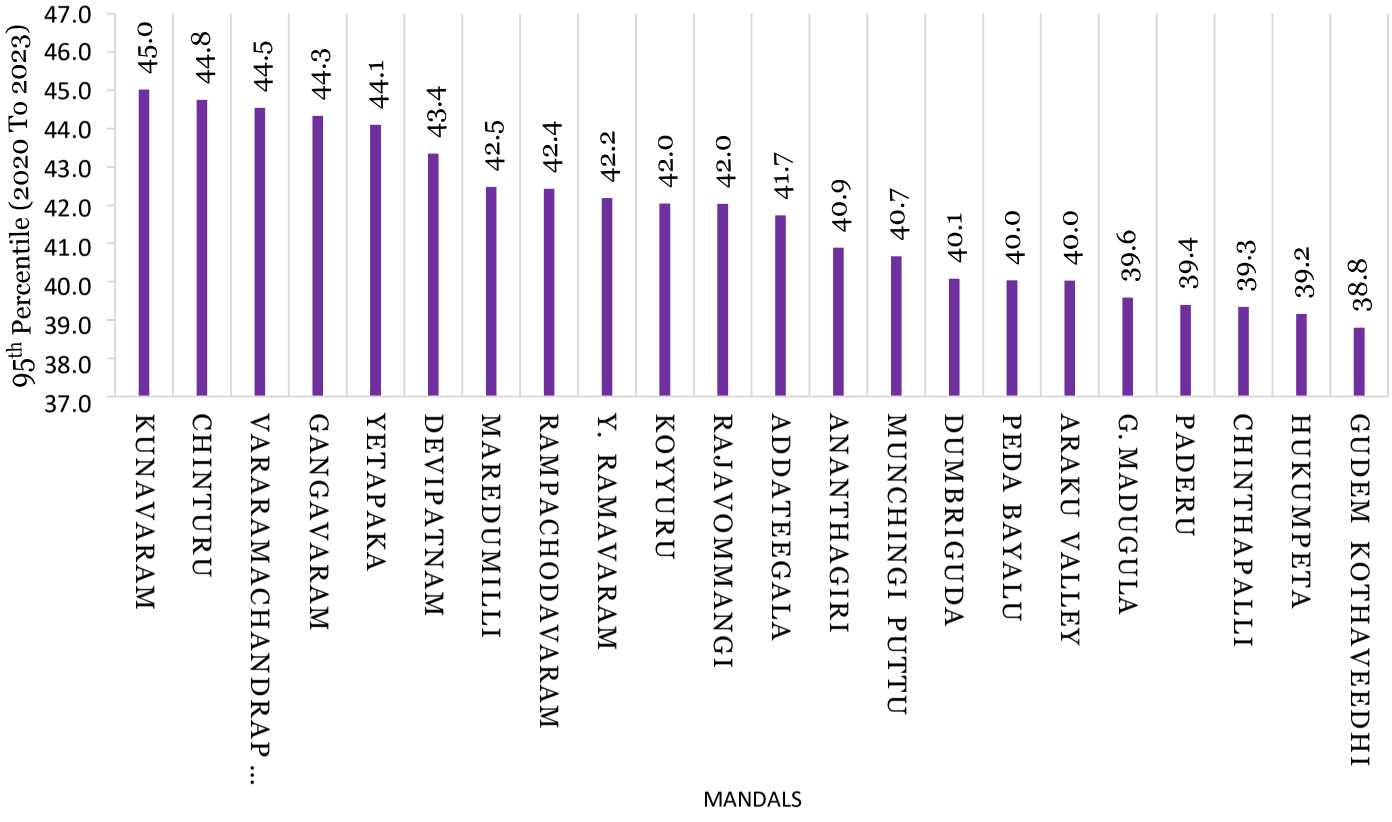




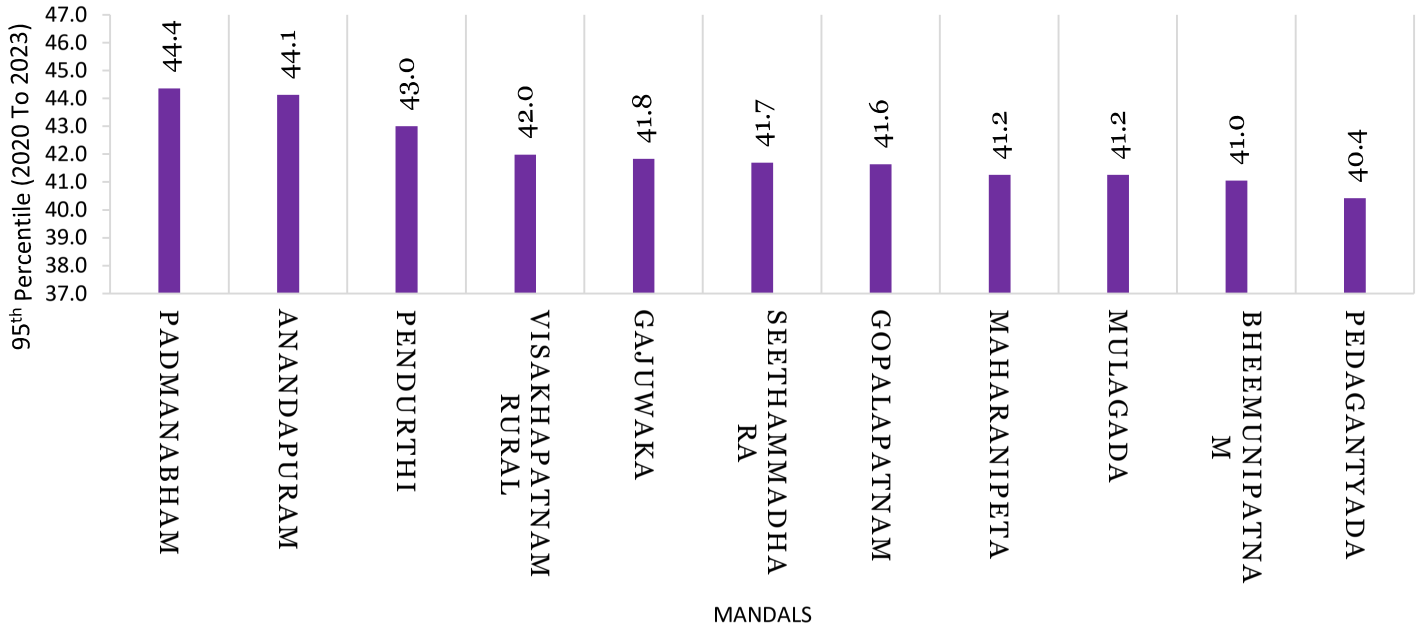
PARVATHIPURAM MANYAM



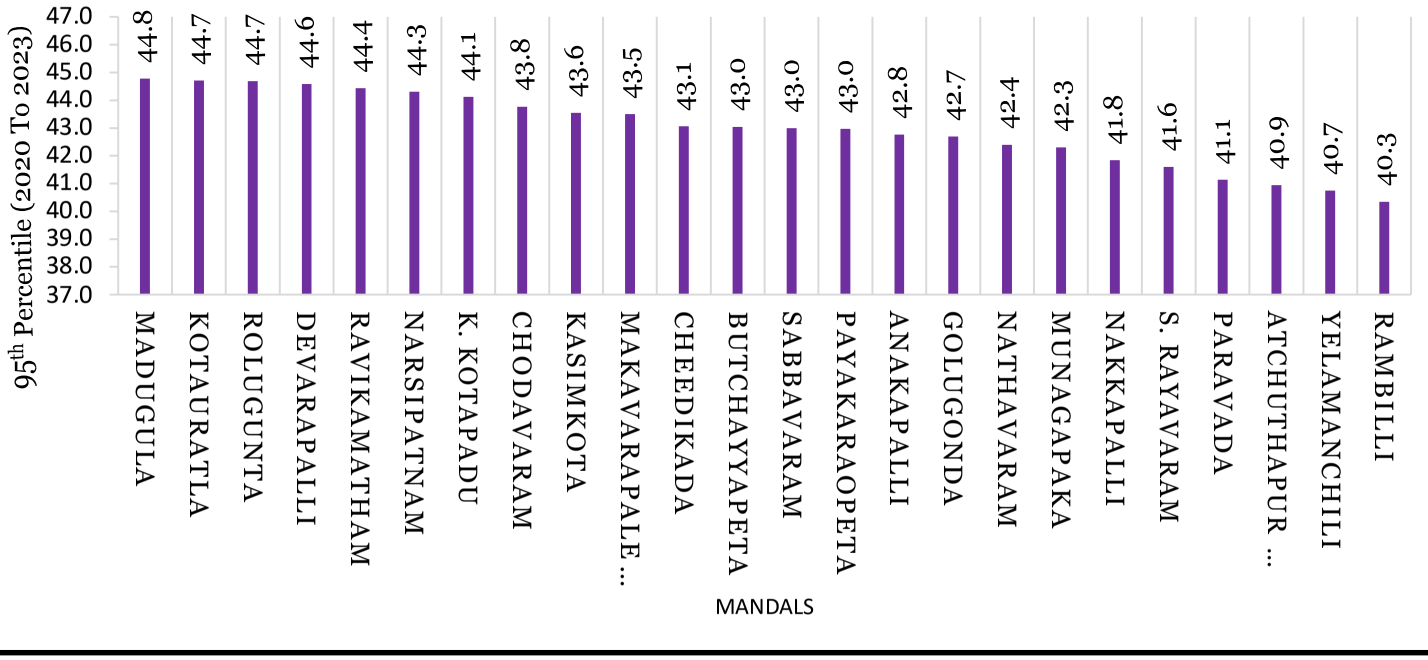
ALLURI SITHARAMA RAJU

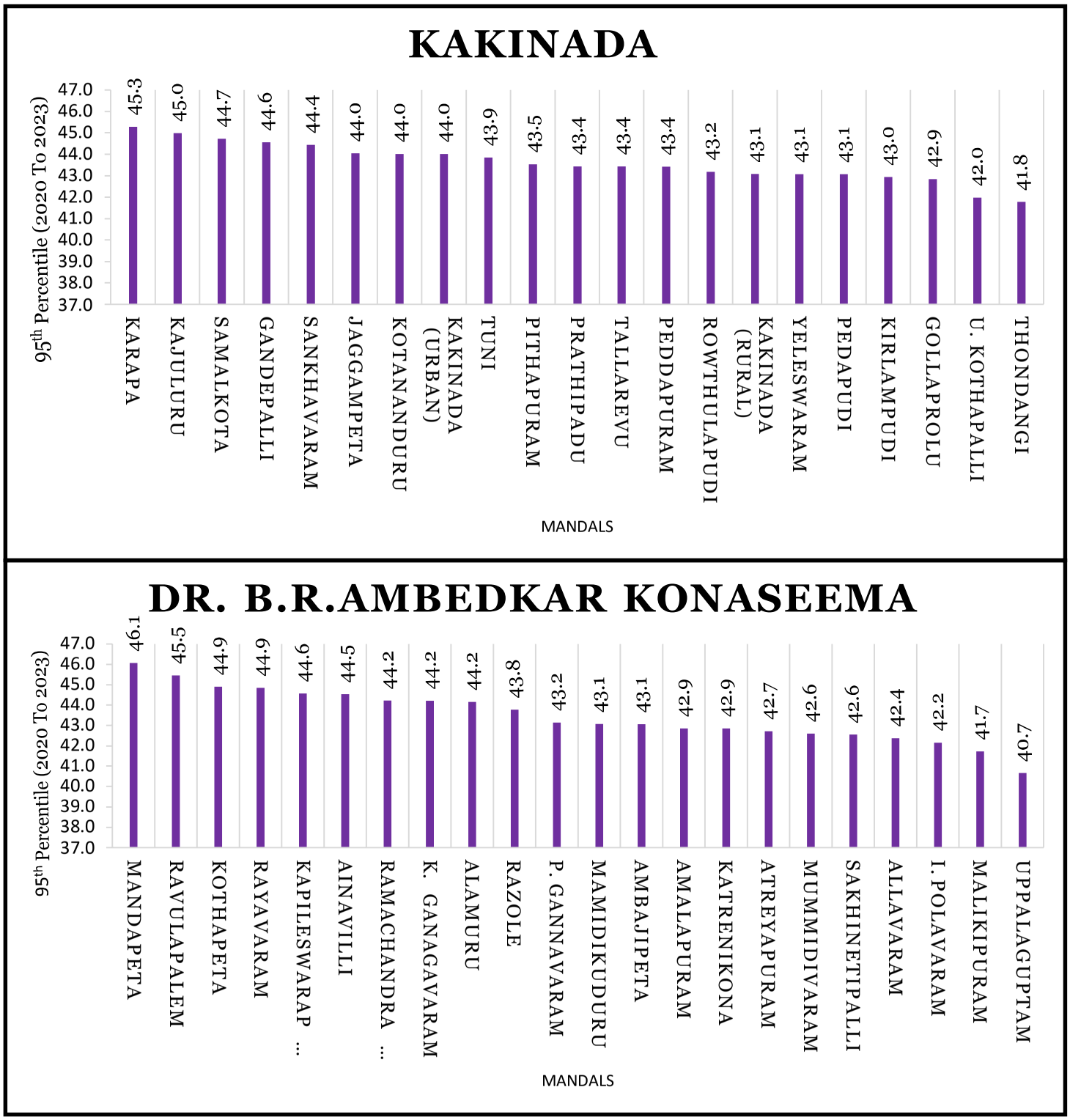


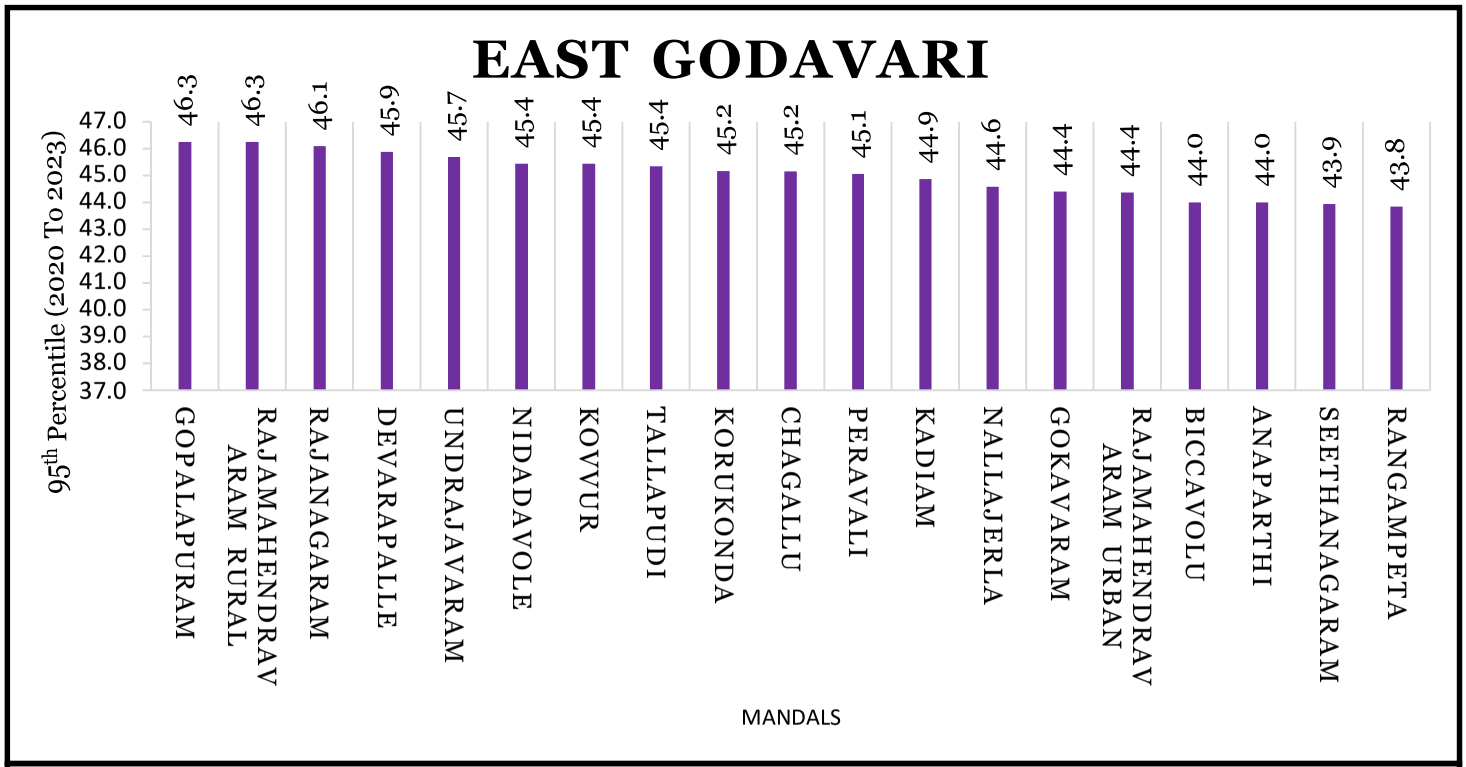
VISAKHAPATNAM



ANAKAPALLI




KAKINADA
95th Percentile (2020 To 2023)
47.0
46.0
45.0
44.0
43.0
42.0
41.0
40.0
39.0
38.0
37.0
KARAPA 45.3
KAJULURU 45.0
SAMALKOTA 44.7
GANDEPALLI 44.6
SANKHAVARAM 44.4
JAGGAMPETA 44.0
KOTANANDURU 44.0
KAKINADA (URBAN) 44.0
TUNI 43.9
PITHAPURAM 43.5
PRATHIPADU 43.4
TALLAREVU 43.4
PEDDAPURAM 43.4
ROWTHULAPUDI 43.2
KAKINADA (RURAL) 43.1
YELESWARAM 43.1
PEDAPUDI 43.1
KIRLAMPUDI 43.0
GOLLAPROLU 42.6
U. KOTHAPALLI 42.0
THONDANGI 41.8
MANDALS
DR. B.R.AMBEDKAR KONASEEMA
95th Percentile (2020 To 2023)
47.0
46.0
45.0
44.0
43.0
42.0
41.0
40.0
39.0
38.0
37.0
MANDAPETA 46.1
RAVULAPALEM 45.5
KOTHAPETA 44.9
RAYAVARAM 44.9
KAPILESWARAP ... 44.6
AINAVILLI 44.5
RAMACHANDRA ... 44.2
K. GANAGAVARAM 44.2
ALAMURU 44.2
RAZOLE 43.8
P. GANNAVARAM 43.2
MAMIDIKUDURU 43.1
AMBAJIPETA 43.1
AMALAPURAM 42.9
KATRENIKONA 42.9
ATREYAPURAM 42.7
MUMMIDIVARAM 42.6
SAKHINETIPALLI 42.6
ALLAVARAM 42.4
I. POLAVARAM 42.2
MALIKIPURAM 41.7
UPPALAGUPTAM 40.7
MANDALS


EAST GODAVARI
95th Percentile (2020 To 2023)
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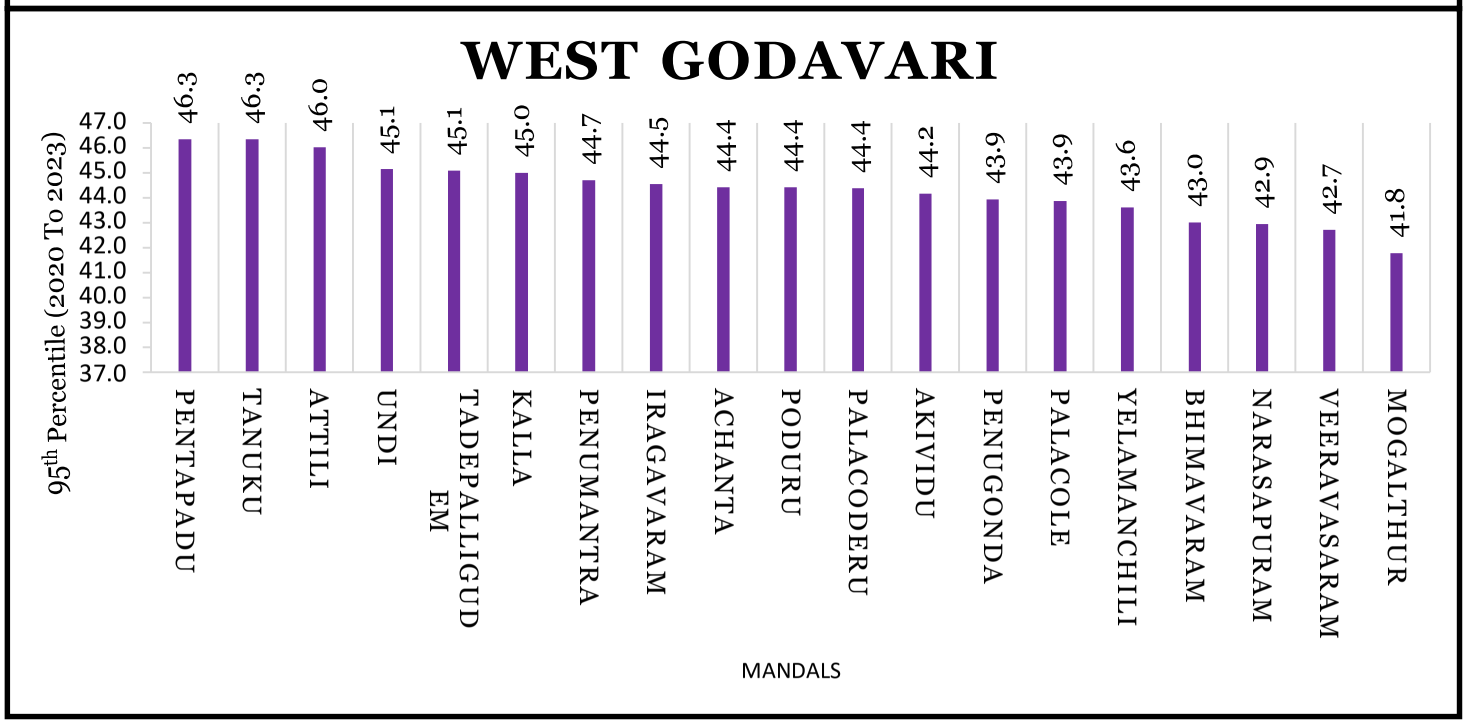
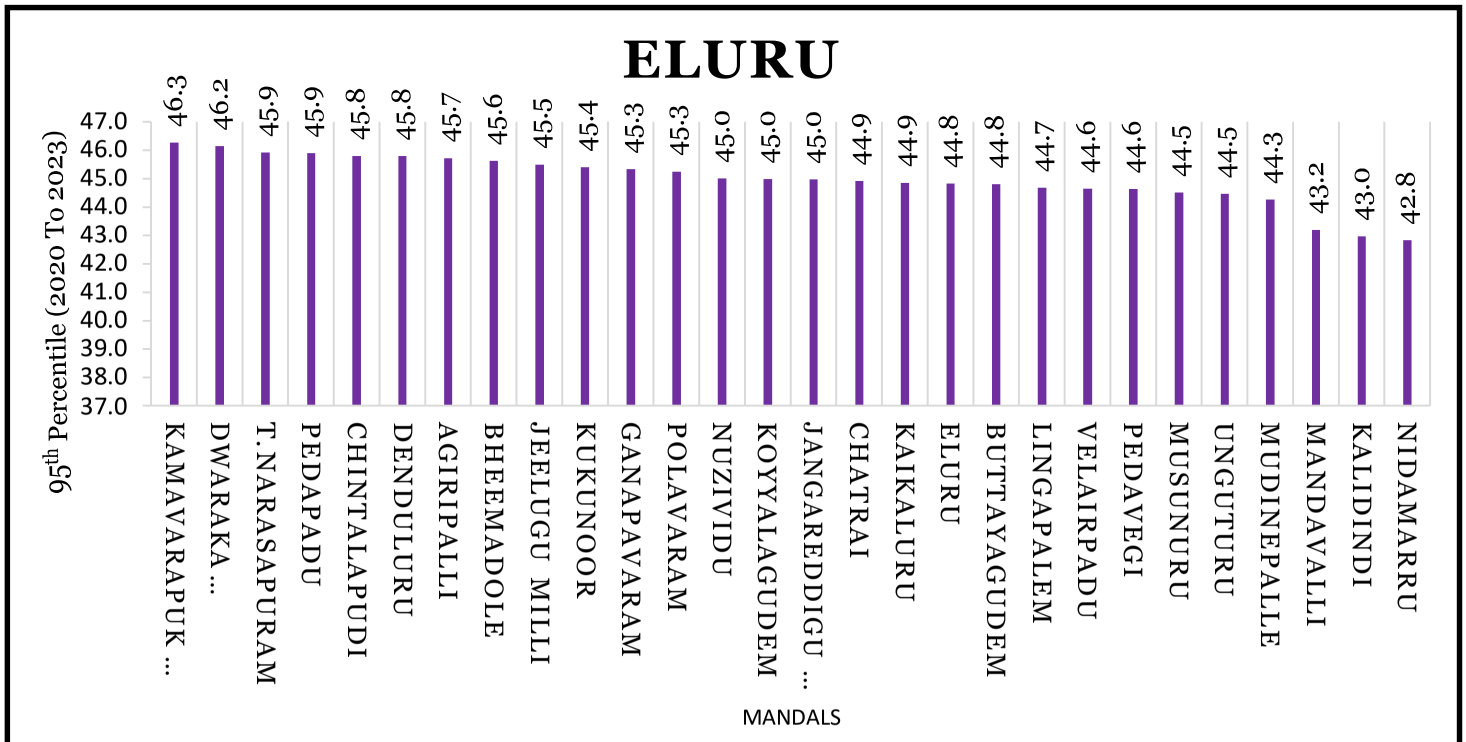
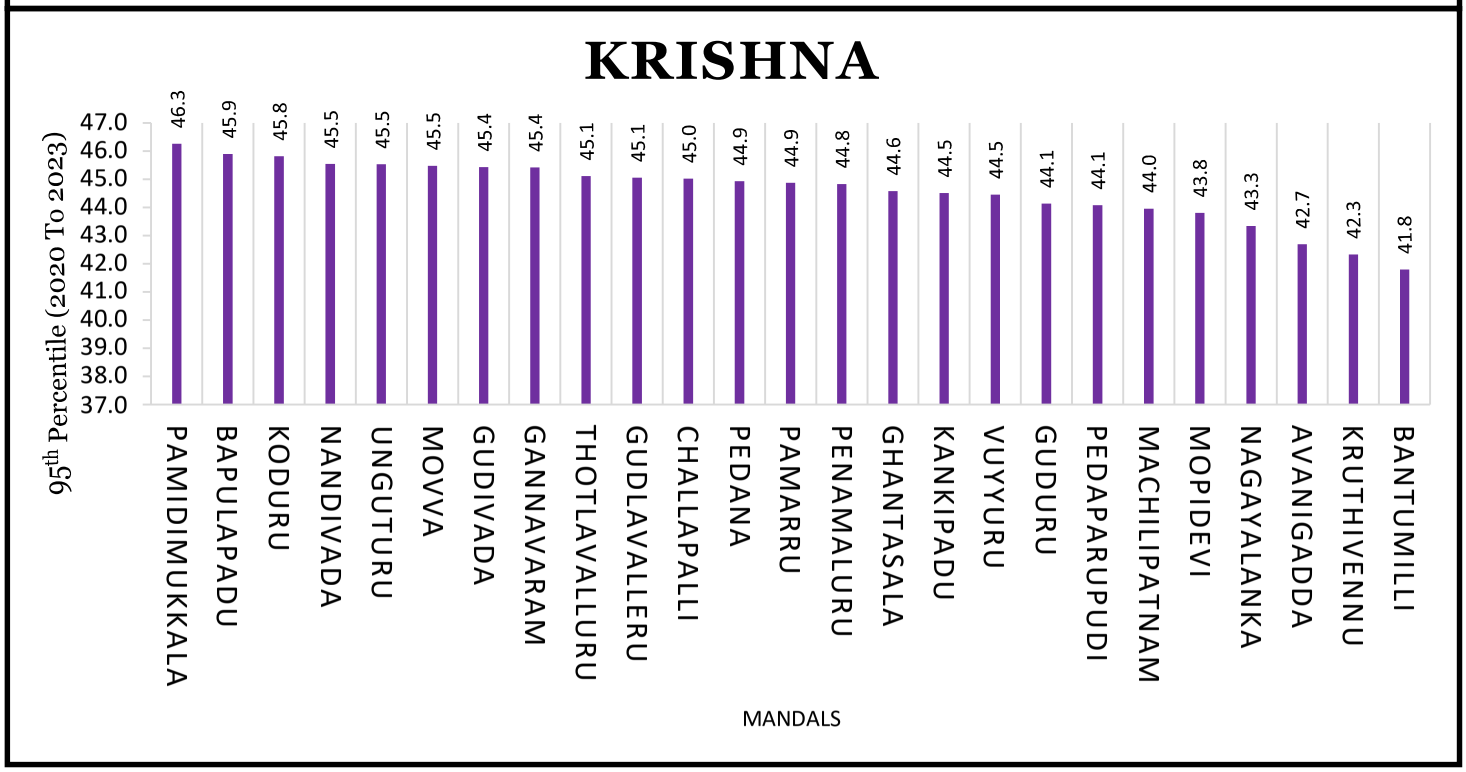
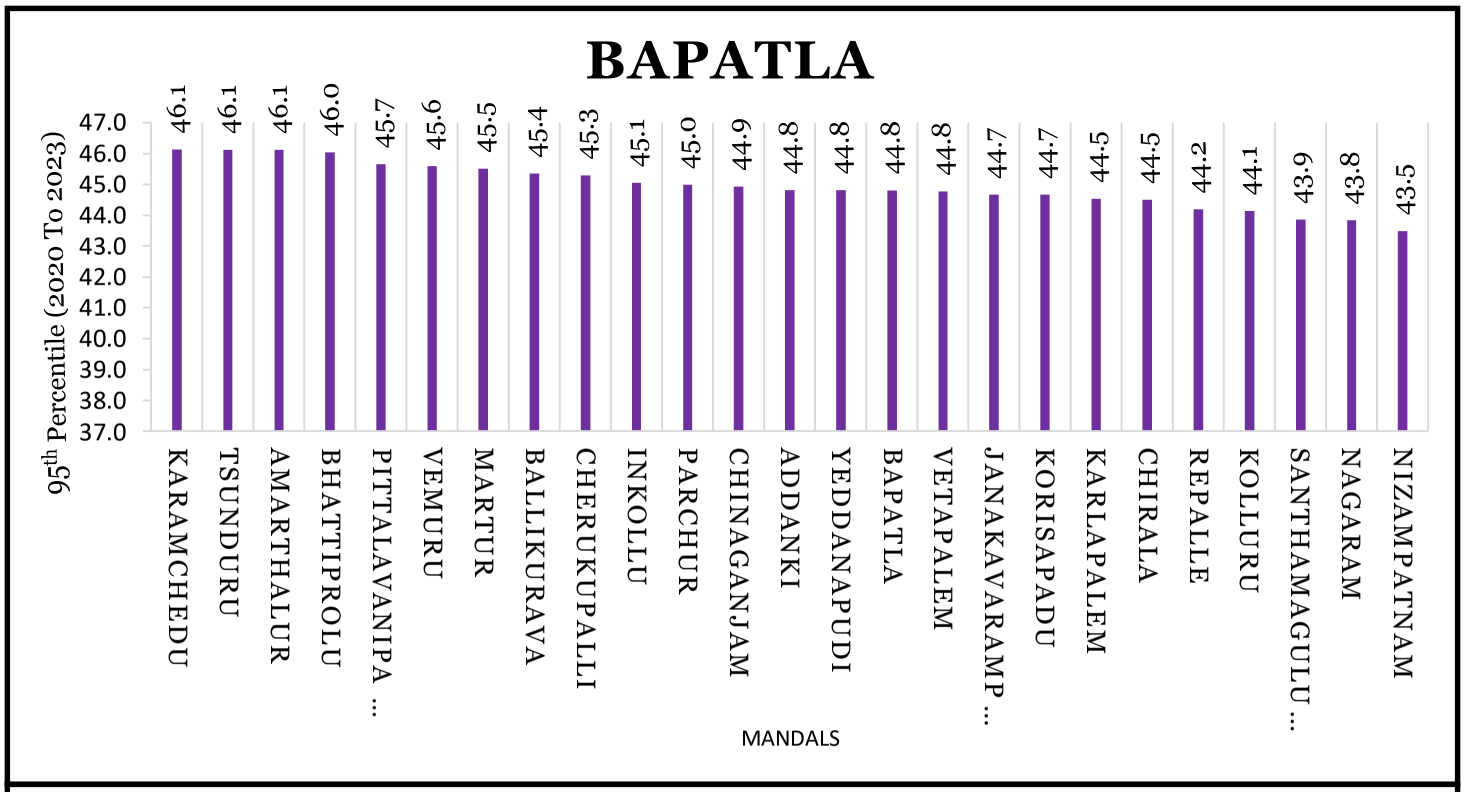
46.0
45.0
44.0
43.0
42.0
41.0
40.0
39.0
38.0
37.0
46.3
46.3
46.1
45.9
45.7
45.4
45.4
45.4
45.2
45.2
45.1
44.9
44.6
44.4
44.4
44.0
44.0
43.6
43.8
GOPALAPURAM
RAJAMAHENDRAVARAM RURAL
RAJANAGARAM
DEVARAPALLE
UNDRAJAVARAM
NIDADAVOLE
KOVVUR
TALLAPUDI
KORUKONDA
CHAGALLU
PERAVALI
KADIAM
NALLAJERLA
GOKAVARAM
RAJAMAHENDRAVARAM URBAN
BICCAVOLU
ANAPARTHI
SEETHANAGARAM
RANGAMPETA
MANDALS

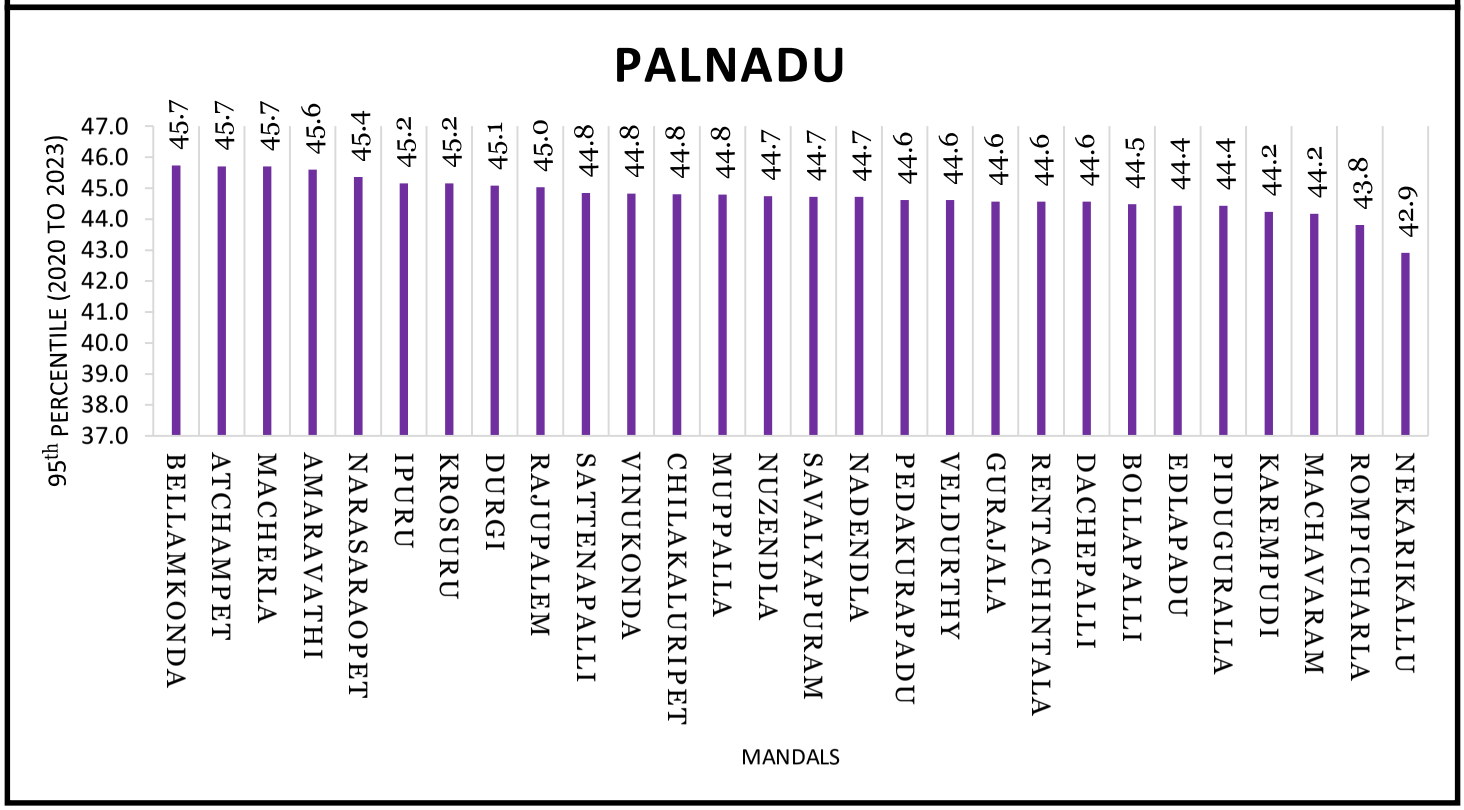

WEST GODAVARI
95th Percentile (2020 To 2023)
47.0
46.0
45.0
44.0
43.0
42.0
41.0
40.0
39.0
38.0
37.0
46.3
46.3
46.0
45.1
45.1
45.0
44.7
44.5
44.4
44.4
44.4
44.2
43.9
43.9
43.9
43.0
42.9
42.7
41.8
PENTAPADU
TANUKU
ATTILI
UNDI
TADEPALLIGUDEM
KALLA
PENUMANTRA
IRAGAVARAM
ACHANTA
PODURU
PALACODERU
AKIVIDU
PENUGONDA
PALACOLE
YELAMANCHILI
BHIMAVARAM
NARASAPURAM
VEERAVASARAM
MOGALTHUR
MANDALS

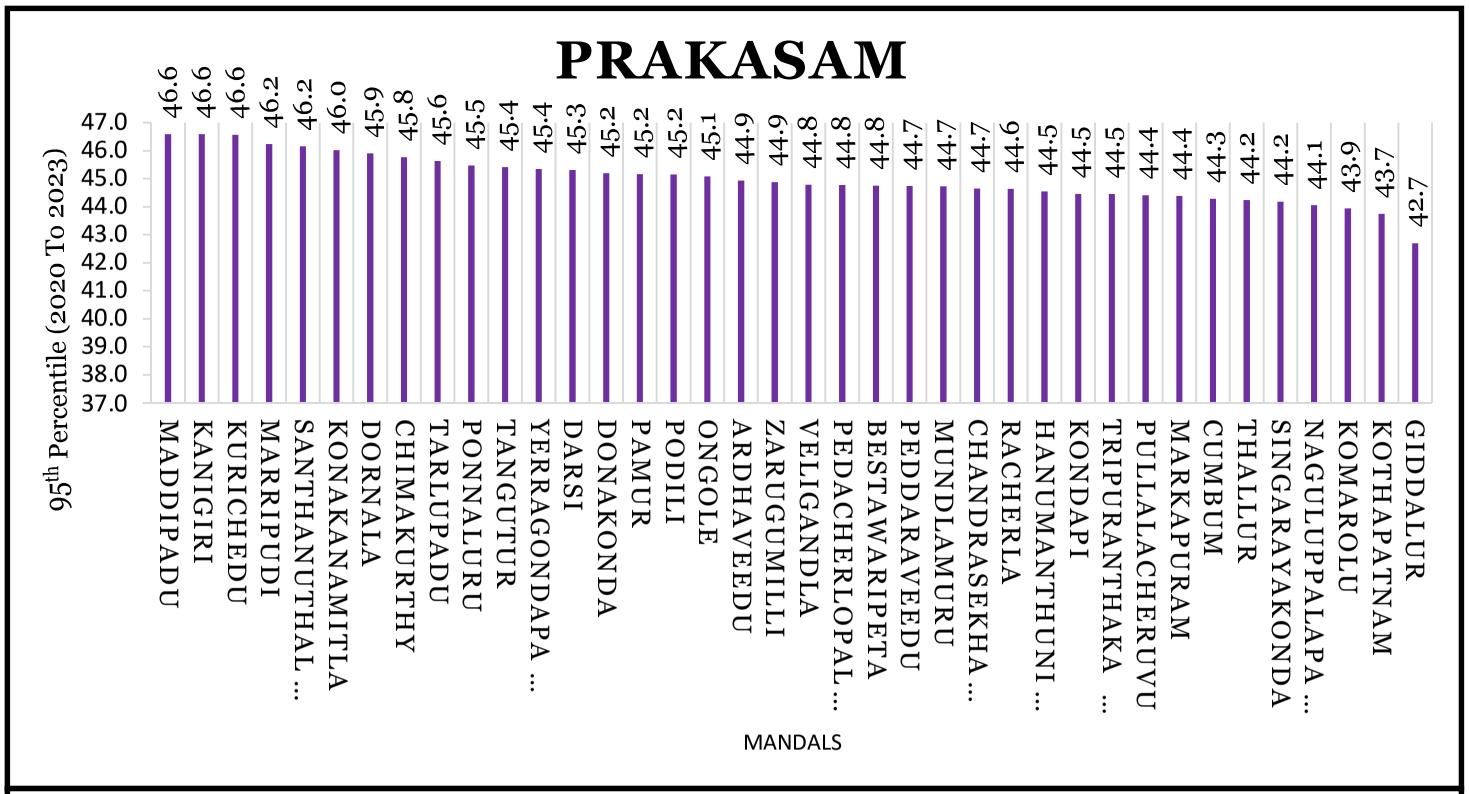

ELURU
95th Percentile (2020 To 2023)
47.0
46.0
45.0
44.0
43.0
42.0
41.0
40.0
39.0
38.0
37.0
46.3
46.2
45.9
45.9
45.8
45.8
45.7
45.6
45.5
45.4
45.3
45.3
45.0
45.0
45.0
44.9
44.9
44.8
44.8
44.7
44.6
44.6
44.5
44.5
44.3
43.2
43.0
42.8
KAMAVARAPUK ...
DWARAKA ...
T.NARASAPURAM
PEDAPADU
CHINTALAPUDI
DENDULURU
AGIRIPALLI
BHEEMADOLE
JEELUGU MILLI
KUKUNOOR
GANAPAVARAM
POLAVARAM
NUZIVIDU
KOYYALAGUDEM
JANGAREDDIGU ...
CHATRAI
KAIKALURU
ELURU
BUTTAYAGUDEM
LINGAPALEM
VELAIRPADU
PEDAVEGI
MUSUNURU
UNGUTURU
MUDINEPALLE
MANDAVALLI
KALIDINDI
NIDAMARRU
MANDALS

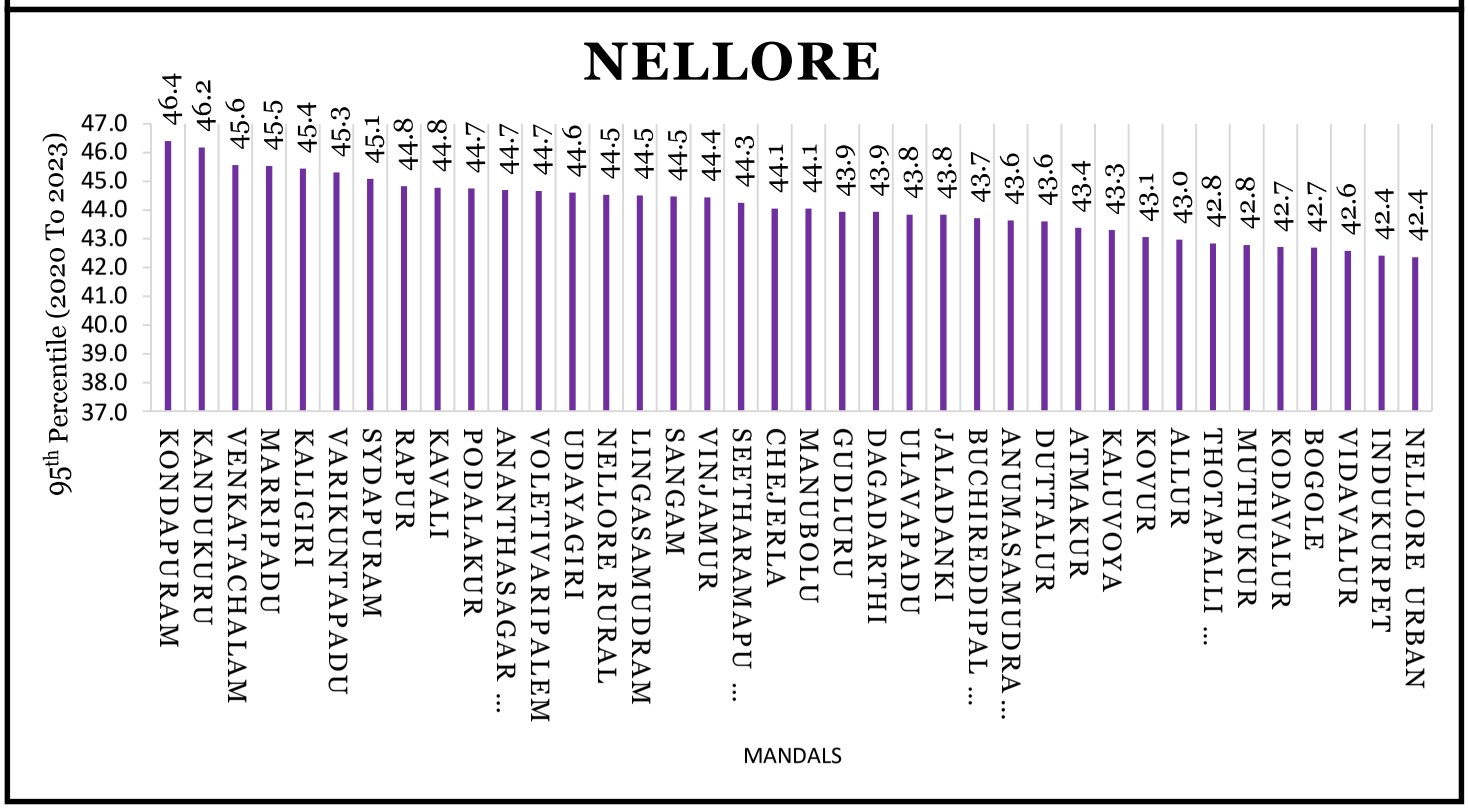

KRISHNA
95th Percentile (2020 To 2023)
47.0
46.0
45.0
44.0
43.0
42.0
41.0
40.0
39.0
38.0
37.0
46.3
45.9
45.8
45.5
45.5
45.5
45.4
45.4
45.1
45.1
45.0
44.9
44.9
44.8
44.6
44.5
44.5
44.1
44.1
44.0
43.8
43.3
42.7
42.3
41.8
PAMIDIMUKKALA
BAPULAPADU
KODURU
NANDIVADA
UNGUTURU
MOVVA
GUDIVADA
GANNAVARAM
THOTLAVALLURU
GUDLAVALLERU
CHALLAPALLI
PEDANA
PAMARRU
PENAMALURU
GHANTASALA
KANKIPADU
VUYYURU
GUDURU
PEDAPARUPUDI
MACHILIPATNAM
MOPIDEVI
NAGAYALANKA
AVANIGADDA
KRUTHIVENNU
BANTUMILLI
MANDALS

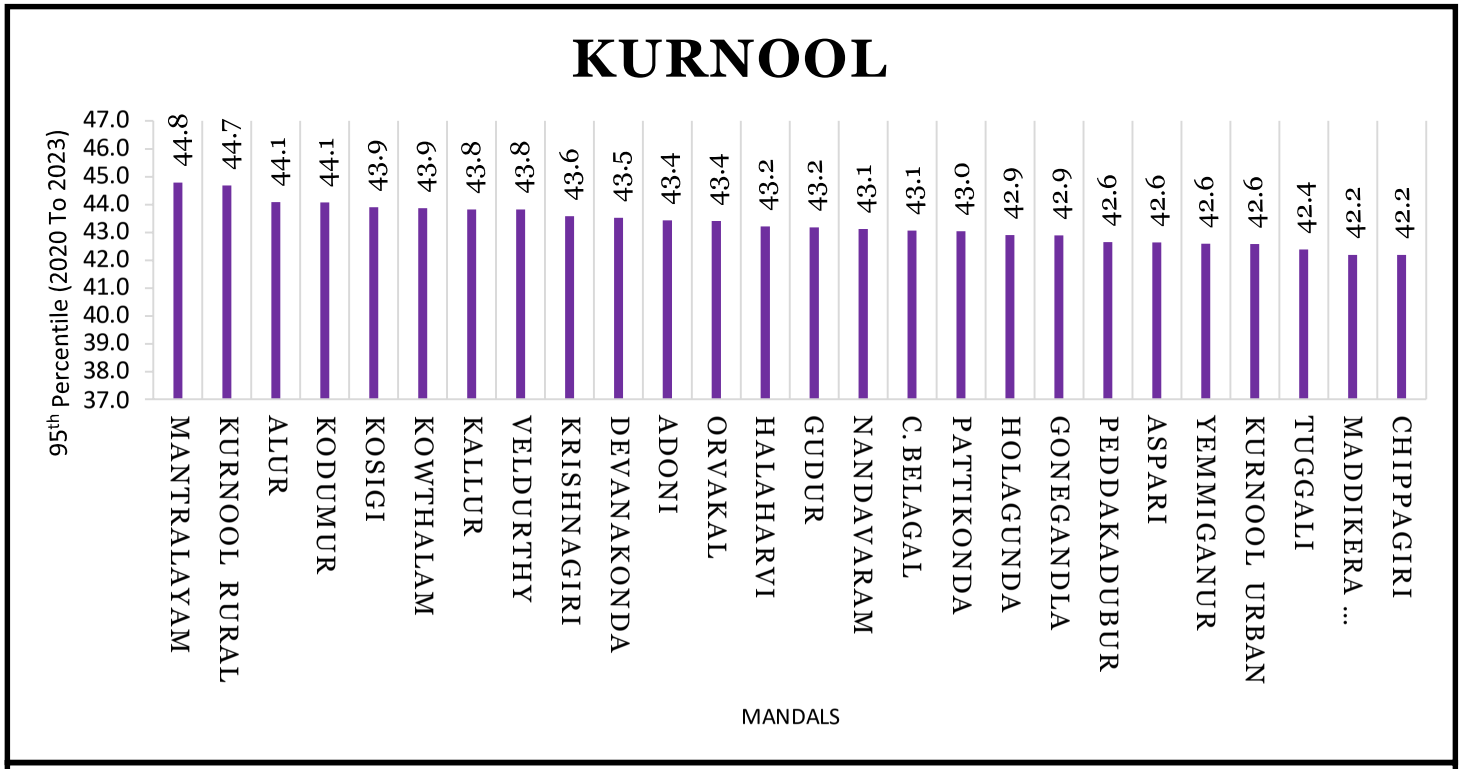
NTR
MANDALS
95th Percentile (2020 To 2023)
47.0
46.0
45.0
44.0
43.0
42.0
41.0
40.0
39.0
38.0
37.0
TIRUVURU 45.9
VIJAYAWADA (RURAL) 45.9
VISSANNAPETA 45.8
KANCHIKACHERLA 45.8
GADDAMANUGU KONDURU 45.6
CHANDARLAPADU 45.3
IBRAHIMPATNAM 45.3
NANDIGAMA 45.2
MYLAVARAM 45.1
JAGGAIAHPETA 45.1
PENUGANCHIPRO LU 45.1
ATLAPRAGADA KONDURU 45.0
VIJAYAWADA CENTRAL 44.8
VIJAYAWADA EAST 44.5
GAMPALAGUDEM 44.1
VEERULLAPADU 44.0
VIJAYAWADA NORTH 43.9
REDDIGUDEM 43.8
VIJAYAWADA WEST 43.8
VATSAVAI 43.7
GUNTUR
MANDALS
95th Percentile (2020 To 2023)
47.0
46.0
45.0
44.0
43.0
42.0
41.0
40.0
39.0
38.0
37.0
TENALI 46.4
TADIKONDA 46.3
GUNTUR EAST 45.9
PONNUR 45.7
MANGALAGIRI 45.6
DUGGIRALA 45.5
CHEBROLU 45.4
VATTICHERUKURU 45.2
KOLLIPARA 45.2
THULLURU 44.8
PEDANANDIPADU 44.8
PEDAKAKANI 44.8
PRATHIPADU 44.7
TADEPALLI 44.7
GUNTUR WEST 44.6
PHIRANGIPURAM 44.4
KAKUMANU 44.4
MEDIKONDURU 43.8

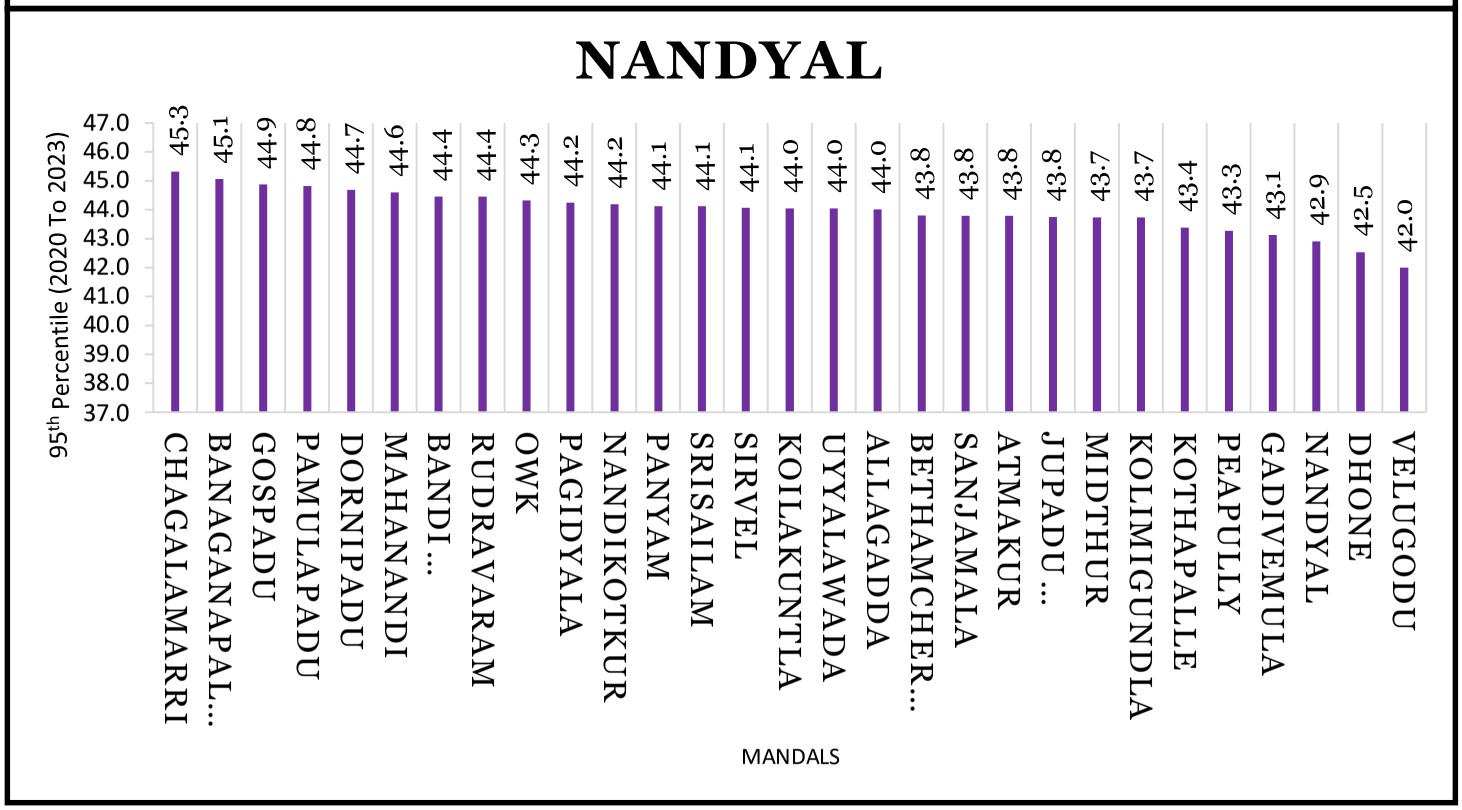

BAPATLA
95th Percentile (2020 To 2023)
47.0
46.0
45.0
44.0
43.0
42.0
41.0
40.0
39.0
38.0
37.0
KARAMCHEDU 46.1
TSUNDURU 46.1
AMARTHALUR 46.1
BHATTIPROLU 46.0
PITTALAVANIPA ... 45.7
VEMURU 45.6
MARTUR 45.5
BALLIKURAVA 45.4
CHERUKUPALLI 45.3
INKOLLU 45.1
PARCHUR 45.0
CHINAGANJAM 44.9
ADDANKI 44.8
YEDDANAPUDI 44.8
BAPATLA 44.8
VETAPALEM 44.8
JANAKAVARAMP ... 44.7
KORISAPADU 44.7
KARLAPALEM 44.5
CHIRALA 44.5
REPALLE 44.2
KOLLURU 44.1
SANTHAMAGULU ... 43.9
NAGARAM 43.8
NIZAMPATNAM 43.5
MANDALS

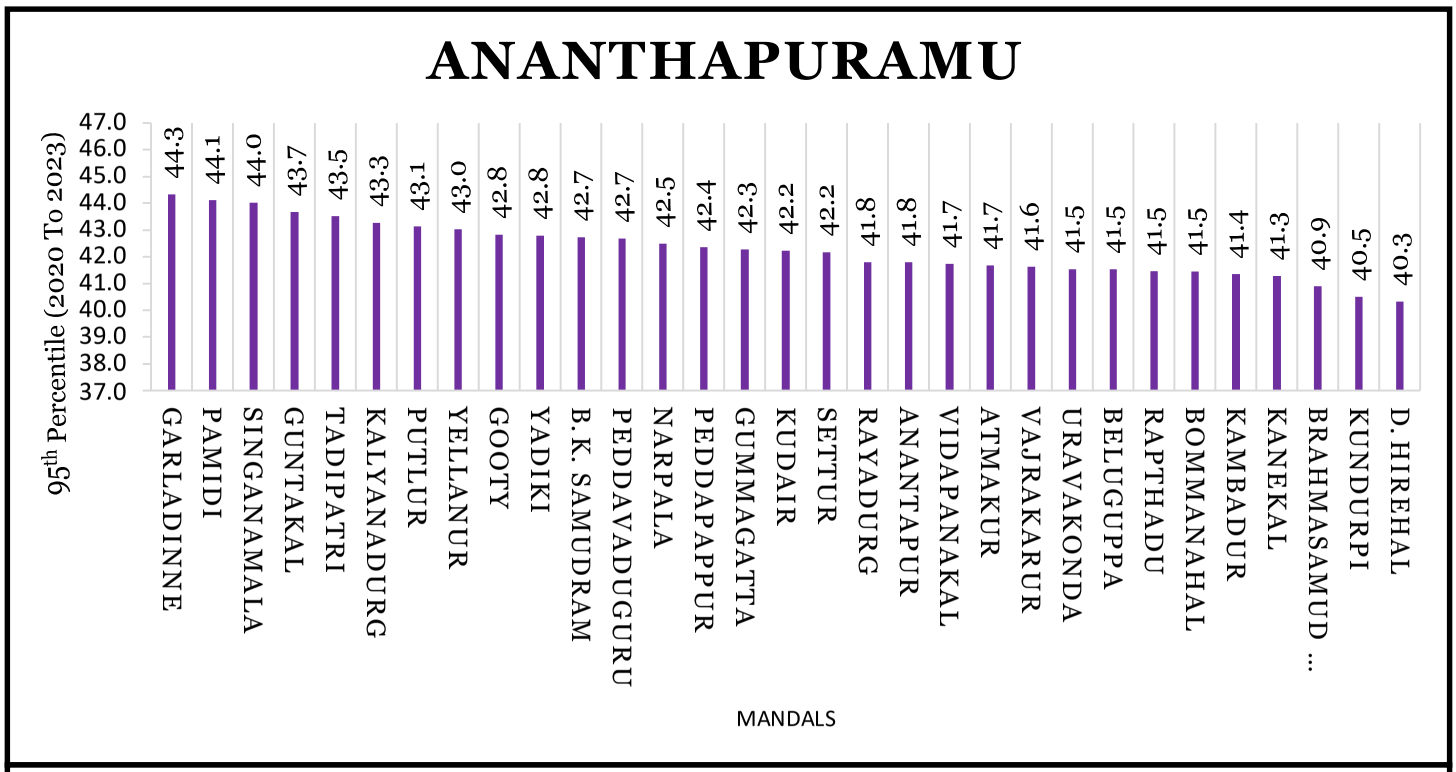

PALNADU
95th PERCENTILE (2020 TO 2023)
47.0
46.0
45.0
44.0
43.0
42.0
41.0
40.0
39.0
38.0
37.0
BELLAMKONDA 45.7
ATCHAMPET 45.7
MACHERLA 45.7
AMARAVATHI 45.6
NARASARAOPET 45.4
IPURU 45.2
KROSURU 45.2
DURGI 45.1
RAJUPALEM 45.0
SATTENAPALLI 44.8
VINUKONDA 44.8
CHILAKALURIPET 44.8
MUPPALLA 44.8
NUZENDLA 44.7
SAVALYAPURAM 44.7
NADENDLA 44.7
PEDAKURAPADU 44.6
VELDURTHY 44.6
GURAJALA 44.6
RENTACHINTALA 44.6
DACHEPALLI 44.6
BOLLAPALLI 44.5
EDLAPADU 44.4
PIDUGURALLA 44.4
KAREMPUDI 44.2
MACHAVARAM 44.2
ROMPICHARLA 43.8
NEKARIKALLU 42.9
MANDALS

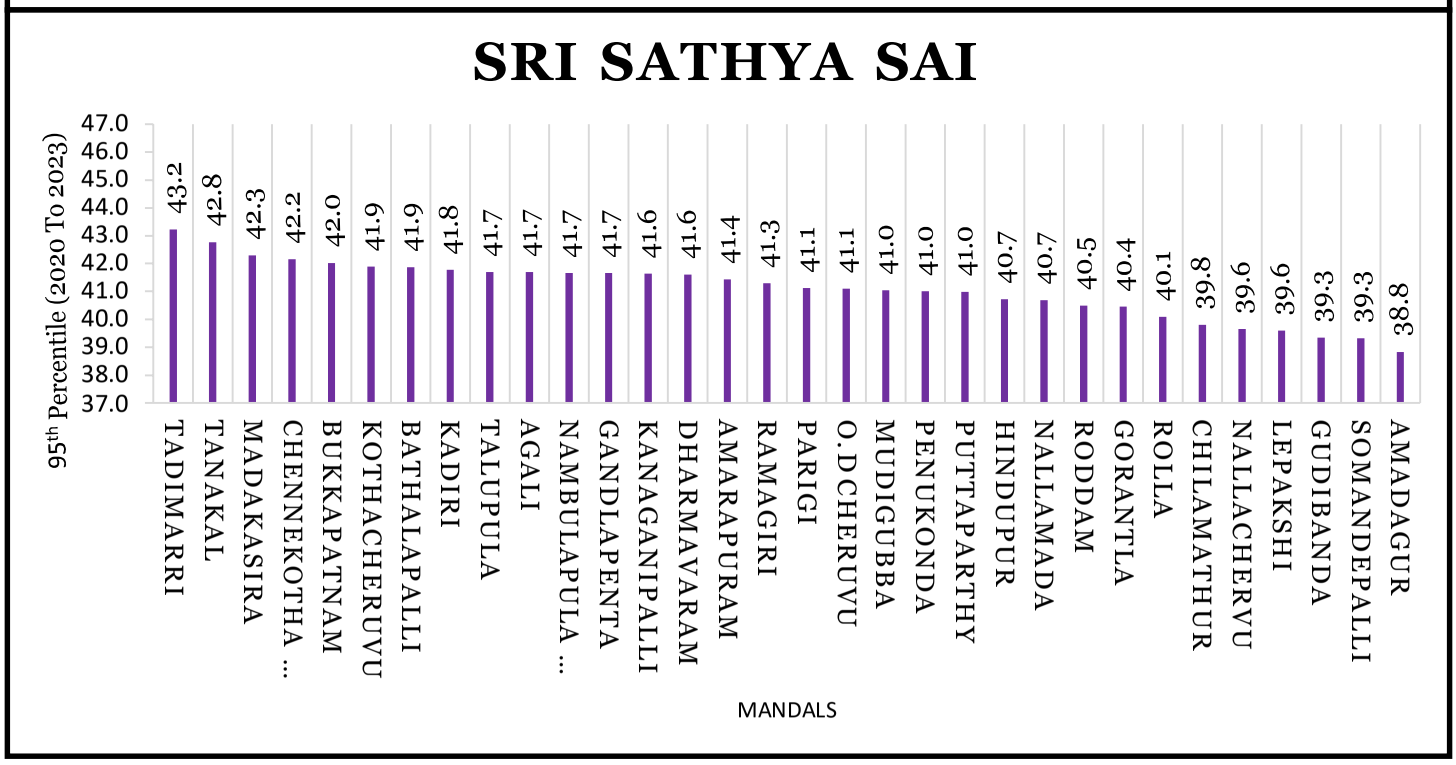

PRAKASAM
95th Percentile (2020 To 2023)
47.0
46.0
45.0
44.0
43.0
42.0
41.0
40.0
39.0
38.0
37.0
MADDIPADU 46.6
KANIGIRI 46.6
KURICHEDU 46.6
MARRIPUDI 46.2
SANTHANUTHAL ... 46.2
KONAKANAMITLA 46.0
DORNALA 45.9
CHIMAKURTHY 45.8
TARLUPADU 45.6
PONNALURU 45.5
TANGUTUR 45.4
YERRAGONDAPA ... 45.4
DARSI 45.3
DONAKONDA 45.2
PAMUR 45.2
PODILI 45.2
ONGOLE 45.1
ARDHAVEEDU 44.9
ZARUGUMILLI 44.9
VELIGANDLA 44.8
PEDACHERLOPAL ... 44.8
BESTAWARIPETA 44.8
PEDDARAVEEDU 44.7
MUNDLAMURU 44.7
CHANDRASEKHA ... 44.7
RACHERLA 44.6
HANUMANTHUNI ... 44.5
KONDAPI 44.5
TRIPURANTHAKA ... 44.5
PULLALACHERUVU 44.4
MARKAPURAM 44.4
CUMBUM 44.3
THALLUR 44.2
SINGARAYAKONDA 44.2
NAGULUPPALAPA ... 44.1
KOMAROLU 43.9
KOTHAPATNAM 43.7
GIDDALUR 42.7
MANDALS


NELLORE
95th Percentile (2020 To 2023)
47.0
46.0
45.0
44.0
43.0
42.0
41.0
40.0
39.0
38.0
37.0
KONDAPURAM 46.4
KANDUKURU 46.2
VENKATACHALAM 45.6
MARRIPADU 45.5
KALIGIRI 45.4
VARIKUNTAPADU 45.3
SYDAPURAM 45.1
RAPUR 44.8
KAVALI 44.8
PODALAKUR 44.7
ANANTHASAGAR ... 44.7
VOLETIVARIPALEM 44.7
UDAYAGIRI 44.6
NELLORE RURAL 44.5
LINGASAMUDRAM 44.5
SANGAM 44.5
VINJAMUR 44.4
SEETHARAMAPU ... 44.3
CHEJERLA 44.1
MANUBOLU 44.1
GUDLURU 43.9
DAGADARTHI 43.9
ULAVAPADU 43.8
JALADANKI 43.8
BUCHIREDDIPAL ... 43.7
ANUMASAMUDRA ... 43.6
DUTTALUR 43.6
ATMAKUR 43.4
KALUVOYA 43.3
KOVUR 43.1
ALLUR 43.0
THOTAPALLI ... 42.8
MUTHUKUR 42.8
KODAVALUR 42.7
BOGOLE 42.7
VIDAVALUR 42.6
INDUKURPET 42.4
NELLORE URBAN 42.4
MANDALS


KURNOOL
95th Percentile (2020 To 2023)
47.0
46.0
45.0
44.0
43.0
42.0
41.0
40.0
39.0
38.0
37.0
MANTRALAYAM 44.8
KURNOOL RURAL 44.7
ALUR 44.1
KODUMUR 44.1
KOSIGI 43.9
KOWTHALAM 43.9
KALLUR 43.8
VELDURTHY 43.8
KRISHNAGIRI 43.6
DEVANAKONDA 43.5
ADONI 43.4
ORVAKAL 43.4
HALAHARVI 43.2
GUDUR 43.2
NANDAVARAM 43.1
C. BELAGAL 43.1
PATTIKONDA 43.0
HOLAGUNDA 42.9
GONEGANDLA 42.9
PEDDAKADUBUR 42.6
ASPARI 42.6
YEMMIGANUR 42.6
KURNOOL URBAN 42.6
TUGGALI 42.4
MADDIKERA ... 42.2
CHIPPAGIRI 42.2
MANDALS

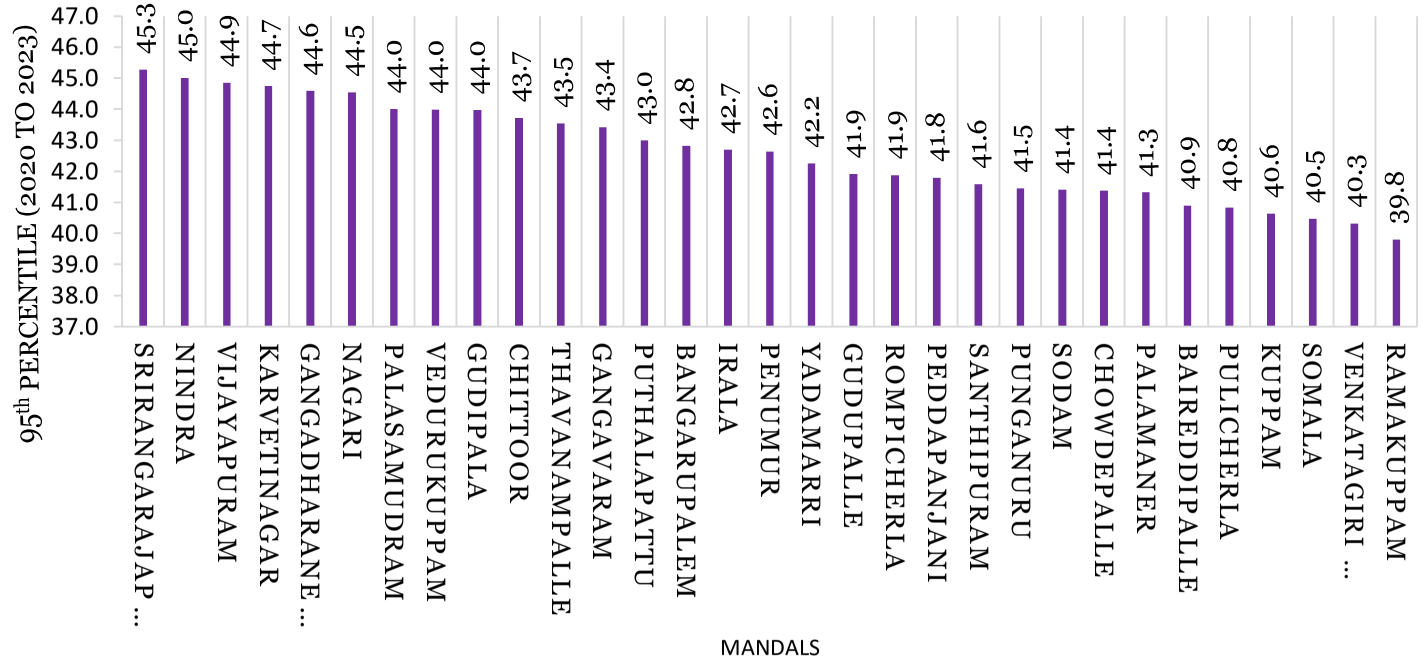

NANDYAL
95th Percentile (2020 To 2023)
47.0
46.0
45.0
44.0
43.0
42.0
41.0
40.0
39.0
38.0
37.0
CHAGALAMARRI 45.3
BANAGANAPAL... 45.1
GOSPADU 44.9
PAMULAPADU 44.8
DORNIPADU 44.7
MAHANANDI 44.6
BANDI... 44.4
RUDRAVARAM 44.4
OWK 44.3
PAGIDYALA 44.2
NANDIKOTKUR 44.2
PANYAM 44.1
SRISAILAM 44.1
SIRVEL 44.1
KOILAKUNTLA 44.0
UYYALAWADA 44.0
ALLAGADDA 44.0
BETHAMCHER... 43.8
SANJAMALA 43.8
ATMAKUR 43.8
JUPADU ... 43.8
MIDTHUR 43.7
KOLIMIGUNDLA 43.7
KOTHAPALLE 43.4
PEAPULLY 43.3
GADIVEMULA 43.1
NANDYAL 42.9
DHONE 42.5
VELUGODU 42.0
MANDALS


ANANTHAPURAMU
95th Percentile (2020 To 2023)
47.0
46.0
45.0
44.0
43.0
42.0
41.0
40.0
39.0
38.0
37.0
44.3
44.1
44.0
43.7
43.5
43.3
43.1
43.0
42.8
42.8
42.7
42.7
42.5
42.4
42.3
42.2
42.2
41.8
41.8
41.7
41.7
41.6
41.5
41.5
41.5
41.5
41.4
41.3
40.9
40.5
40.3
GARLADINNE
PAMIDI
SINGANAMALA
GUNTAKAL
TADIPATRI
KALYANADURG
PUTLUR
YELLANUR
GOOTY
YADIKI
B. K. SAMUDRAM
PEDDAVADUGURU
NARPALA
PEDDAPAPPUR
GUMMAGATTA
KUDAIR
SETTUR
RAYADURG
ANANTAPUR
VIDAPANAKAL
ATMAKUR
VAJRAKARUR
URAVAKONDA
BELUGUPPA
RAPTHADU
BOMMANAHAL
KAMBADUR
KANEKAL
BRAHMASAMUD ...
KUNDURPI
D. HIREHAL
MANDALS

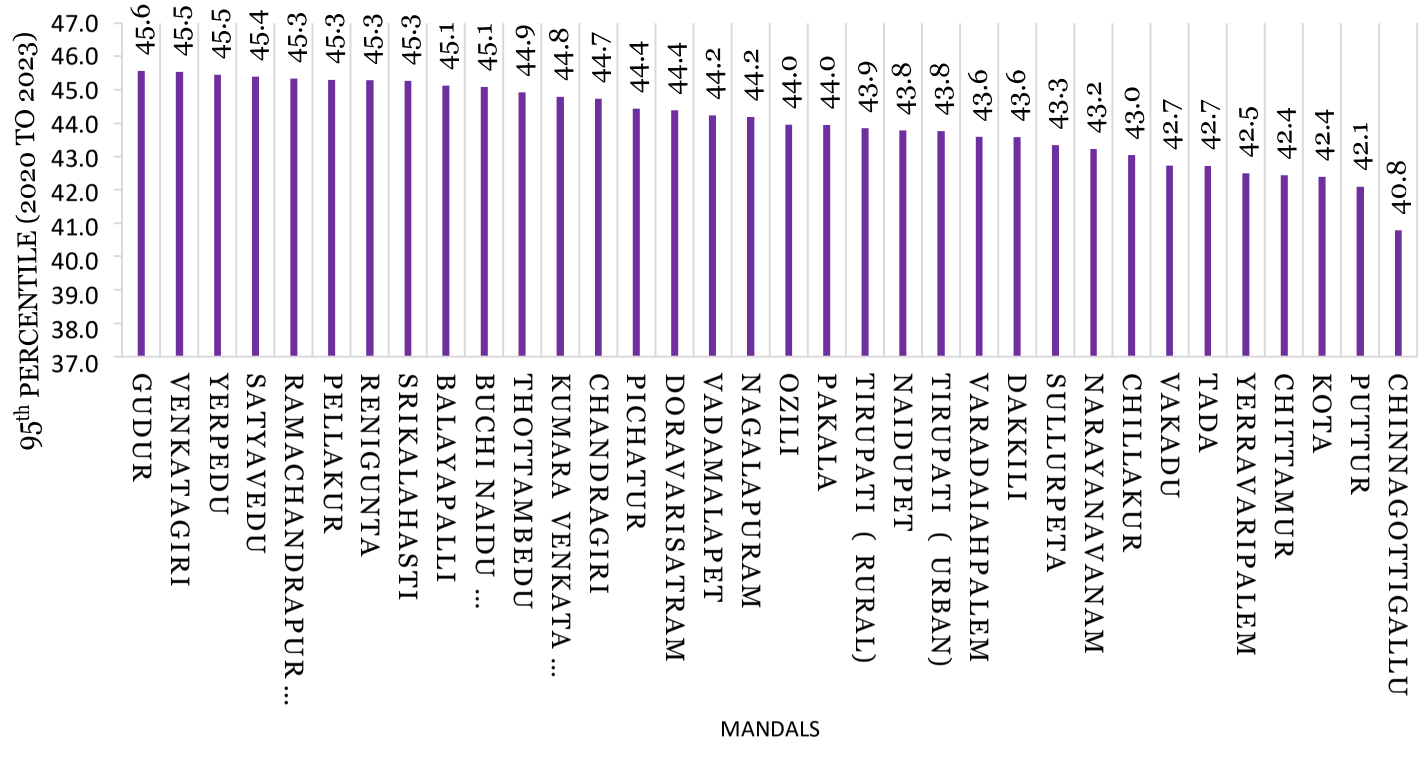

SRI SATHYA SAI
95th Percentile (2020 To 2023)
47.0
46.0
45.0
44.0
43.0
42.0
41.0
40.0
39.0
38.0
37.0
43.2
42.8
42.3
42.2
42.0
41.9
41.9
41.8
41.7
41.7
41.7
41.7
41.6
41.6
41.4
41.3
41.1
41.1
41.0
41.0
41.0
40.7
40.7
40.5
40.4
40.1
39.8
39.6
39.6
39.3
39.3
38.8
TADIMARRI
TANAKAL
MADAKASIRA
CHENNEKOTHA ...
BUKKAPATNAM
KOTHACHERUVU
BATHALAPALLI
KADIRI
TALUPULA
AGALI
NAMBULAPULA ...
GANDLAPENTA
KANAGANIPALLI
DHARMAVARAM
AMARAPURAM
RAMAGIRI
PARIGI
O. D CHERUVU
MUDIGUBBA
PENUKONDA
PUTTAPARTHY
HINDUPUR
NALLAMADA
RODDAM
GORANTLA
ROLLA
CHILAMATHUR
NALLACHERVU
LEPAKSHI
GUDIBANDA
SOMANDEPALLI
AMADAGUR
MANDALS

Y.S.R
95th PERCENTILE (2020 TO 2023)
47.0
46.0
45.0
44.0
43.0
42.0
41.0
40.0
39.0
38.0
37.0
MANDALS
KADAPA 44.9
SIDHOUT 44.5
ATLUR 44.4
VALLUR 44.2
SIMHADRIPURAM 44.2
PORUMAMILLA 44.1
BADVEL 44.1
KONDAPURAM 44.1
KHAJIPETA 44.0
KAMALAPURAM 43.9
JAMMALAMADU ... 43.8
VEMPALLI 43.7
KALASAPADU 43.7
SRI ... 43.6
CHINTHAKOMM ... 43.6
YERRAGUNTLA 43.6
VEERAPUNAYUN ... 43.4
MUDDANUR 43.4
RAJUPALEM 43.4
PRODDUTUR 43.4
CHAKRAYAPET 43.3
CHENNUR 43.3
PEDDAMUDIAM 43.2
DUVVUR 43.2
THONDUR 43.1
VONTIMITTA 43.1
B. KODUR 43.1
PENDLIMARRY 42.9
CHAPAD 42.9
PULIVENDULA 42.9
GOPAVARAM 42.7
MYLAVARAM 42.7
LINGALA 42.6
S. MYDUKUR 42.5
VEMULA 42.4
BRAHMAMGARI ... 42.1
ANNAMAYYA
95TH PERCENTILE (2020 TO 2023)
47.0
46.0
45.0
44.0
43.0
42.0
41.0
40.0
39.0
38.0
37.0
MANDALS
NANDALUR 44.2
CHITVEL 44.1
PULLAMPETA 43.9
PENAGALUR 43.6
KALIKIRI 43.5
OBULAVARIPALLE 43.3
RAJAMPET 43.3
KODUR 43.0
RAYACHOTI 42.9
SAMBEPALLE 42.5
KAMBHAMVARIPA ... 42.2
PEDDA ... 42.2
PILERU 42.2
GALIVEEDU 42.2
PEDDAMANDYAM 42.0
KALAKADA 42.0
T SUNDUPALLE 41.8
VEERABALLE 41.5
MULAKALACHERU ... 41.5
GURRAMKONDA 41.4
THAMBALLAPALLE 41.3
VALMIKIPURAM 41.2
MADANAPALLE 41.2
RAMASAMUDRAM 41.1
RAMAPURAM 41.0
BEERONGI ... 40.9
NIMMANAPALLE 40.9
LAKKIREDDIPALLI 40.9
KURABALAKOTA 40.9
CHINNAMANDEM 40.9

CHITTOOR



TIRUPATHI



ANNEXURE 14: Abstract for number of the Districts, Mandals having 95th percentile of maximum temperature of 44 °C and above in the Andhra Pradesh State.

S.No	District Name	No. of Mandals
1	Srikakulam	9
2	Vizianagaram	12
3	Parvathipuram Manyam	9
4	Alluri Sitharama Raju	5
5	Visakhapatnam	2
6	Anakapalli	7
7	Kakinada	8
8	Kona Seema	9
9	East Godavari	17
10	West Godavari	12
11	Eluru	25
12	Krishna	20
13	NTR	16
14	Guntur	17
15	Bapatla	22
16	Palnadu	26
17	Prakasam	35
18	Sri Potti Sriramulu Nellore	20
19	Kurnool	4
20	Nandyal	20
21	Ananthapuramu	3
22	Sri Sathya Sai	0
23	Y.S.R	9
24	Annamayya	2
25	Chittoor	9
26	Tirupati	19
Total		337

ANNEXURE 15: List of Mandals experiencing the 95th percentile of maximum temperatures of 44°C and above in the State of Andhra Pradesh

S.No	District Name	Mandals Names	No. of Mandals
1	Srikakulam	Kothuru, Pathapatnam, Burja, Meliaputti, Sarubujjili, Laxminarasupeta, Ganguvarisigadam, Palasa, Kanchili	9
2	Vizianagaram	Gurla, Gajapathinagaram, Bondapalli, Regidiamadalavalasa, Nellimarla, Vangara, Kothavalasa, Rajam, Santhakaviti, ramabhadrapuram, Therlam	12
3	Parvathipuram Manyam	Bhamini, Kurupam, Veeraghattam, Salur, Palakonda, Seethanagaram, Komarada, Jiyyammavalasa, Makkuva	9
4	Alluri Sitharama Raju	Kunavaram, Chinturu, Vararamachandrapuram, Gangavaram, Yetapaka	5
5	Visakhapatnam	Padmanabham, Anandapuram	2
6	Anakapalli	Madugula, Kotauratla, Rolugunta, Devarapalli, Ravikamatham, Narsipatnam, K.Kotapadu	7
7	Kakinada	Karapa, Kajuluru, Samalkota, Gandepalli, Sankhavaram, Jaggampeta, Kotananduru, Kakinada (Urban)	8
8	Dr. B.R.Ambedkar Konaseema	Mandapeta, Ravulapalem, Kothapeta, Rayavaram, Kapileswarapuram, Ainavilli,Ramachandrapuram, K.Ganagavaram, Alamuru	9
9	East Godavari	Gopalapuram, Rajamahendravaram Rural, Rajanagaram, Devarapalle, Undrajavaram, Nidadavole, Kovvur, Tallapudi, Korukonda, Chagallu, Peravali, Kadiam, Nallajerla, Gokavaram, Rajamahendravaram Urban, Biccavolu Anaparthi	17
10	West Godavari	Pentapadu, Tanuku, Attili, Undi, Tadepalligudem, Kalla, Penumantra, Iragavaram, Achanta, Poduru, Palacoderu, Akividu	12
11	Eluru	Kamavarapukota, Dwaraka Tirumala, T.Narasapuram, Pedapadu, Chintalapudi, Denduluru, Agiripalli, Bheemadole, Jeelugu Milli, Kukunoor, Ganapavaram, Polavaram, Nuzividu, Koyyalagudem, Jangareddigudem, Chatrai, Kaikaluru, Eluru, Buttayagudem, Lingapalem, Velairpadu, Pedavegi, Musunuru, Unguturu, Mudinepalle	25
12	Krishna	Pamidimukkala, Bapulapadu, Koduru, Nandivada, Unguturu, Movva, Gudivada, Gannavaram, Thotlavalluru, Gudlavalleru, Challapalli, Pedana, Pamarru, Penamaluru, Ghantasala, Kankipadu, Vuyyuru, Guduru, Pedaparupudi, Machilipatnam	20

13	NTR	Tiruvuru, Vijayawada (Rural), Vissannapeta, Kanchikacherla, Gaddamanugu Konduru, Chandarlapadu, Ibrahimpatnam, Nandigama, Mylavaram, Jaggaiahpeta, Penuganchiprolu, Atlapragada Konduru, Vijayawada Central, Vijayawada East, Gampalagudem, Veerullapadu	16
14	Guntur	Tenali, Tadikonda, Guntur, East Ponnur, Mangalagiri, Duggirala, Chebrolu, Vatticherukuru, Kollipara, Thulluru, Pedanandipadu, Pedakakani, Prathipadu, Tadepalli, Guntur West, Phirangipuram, Kakumanu	17
15	Bapatla	Karamchedu, Tsunduru, Amarthalur, Bhattiprolu, Pittalavanipalem, Vemuru, Martur, Ballikurava, Cherukupalli, Inkollu, Parchur, Chinaganjam, Addanki, Yeddanapudi, Bapatla, Vetapalem, Janakavarampanguluru, Korisapadu, Karlapalem, Chirala, Repalle, Kolluru	22
16	Palnadu	Bellamkonda, Atchampet, Macherla, Amaravathi, Narasaraopet, Ipuru, Krosuru, Durgi, Rajupalem, Sattenapalli, Vinukonda, Chilakaluripet, Muppalla, Nuzendla, Savalyapuram, Nadendla, Pedakurapadu, Veldurthy, Gurajala, Rentachintala, Dachepalli, Bollapalli, Edlapadu, Piduguralla, Karempudi, Machavaram	26
17	Prakasam	Maddipadu, Kanigiri, Kurichedu, Marripudi, SanthanuthalaPadu, Konakanamitla, Dornala, Chimakurthy, Tarlupadu, Ponnaluru, Tangutur, Yerragondapalem, Darsi, Donakonda, Pamur, Podili, Ongole, Ardhaveedu, Zarugumilli, Veligandla, Pedacherlopalle, Bestawaripeta, Peddaraveedu, Mundlamuru, Chandrasekharapuram, Racherla, Hanumanthunipadu, Kondapi, Tripuranthakam, Pullalacheruvu, Markapuram, Cumbum, Thallur, Singarayakonda, Naguluppalapadu	35
18	Sri Potti Sriramulu Nellore	Kondapuram, Kandukuru, Venkatachalam, Marripadu, Kaligiri, Varikuntapadu, Sydapuram, Rapur, Kavali, Podalakur, Ananthasagaram, Voletivaripalem, Udayagiri, Nellore Rural, Lingasamudram, Sangam, Vinjamur, Seetharamapuram, Chejerla, Manubolu	20
19	Kurnool	Mantralayam, Kurnool Rural, Alur, Kodumur	4
20	Nandyal	Chagalamarri, Banaganapalli, Gospadu, Pamulapadu, Dornipadu, Mahanandi, Bandi Atmakur, Rudravaram, Owk, Pagidyala, Nandikotkur, Panyam, Srisailam, Sirvel, Koilakuntla, Uyyalawada, Allagadda	17
21	Ananthapuramu	Garladinne, Pamidi, Singanamala	3
22	Sri Sathya Sai		0

23	Y.S.R	Kadapa, Sidhout, Atlur, Vallur, Simhadripuram, Porumamilla, Badvel, Kondapuram, Khajipeta	9
24	Annamayya	Nandalur, Chitvel	2
25	Chittoor	Srirangarajapuram, Nindra, Vijayapuram, Karvetinagar, Gangadharanellore, Nagari, Palasamudram, Vedurukuppam, Gudipala	9
26	Tirupati	Gudur, Venkatagiri, Yerpedu, Satyavedu, Ramachandrapuram, Pellakur, Renigunta, Srikalahasti, Balayapalli, Buchi Naidu Kandriga, Thottambedu, Kumara Venkata Bhupala Puram, Chandragiri, Pichatur, Doravarisatram, Vadamalapet, Nagalapuram, Ozili, Pakala	19