HEAT WAVE ACTION PLAN 2018

Extreme Maximum Temperature (°C)

HEAT WAVE

DEPARTMENT OF REVENUE (DISASTER MANAGEMENT)
GOVT. OF KARNATAKA
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Executive Summary
Climate is a critical factor in the lives and livelihoods of the people and socioeconomic development as a whole. Climate has shown warming of 0.89 [0.69 to 1.08] °C over the period 1901–2012 which is mainly attributed to anthropogenic activities (IPCC 2013).

As stated in the State Level Climatic Monologue (IMD) “State averaged summer mean maximum temperatures have increased over Andaman and Nicobar, Andhra Pradesh, Goa, Himachal Pradesh, Karnataka, Kerala, Lakshadweep, Maharashtra, Mizoram, Rajasthan, Sikkim and Tamil Nadu.” The figure is as below.
The newer findings indicate that warming is more pronounced than expected. The impact would be particularly severe in the tropical areas, which mainly consist of developing countries, including India (Sathaye, Shukla & Ravindranath, 2006). Increasing temperature trends of the order of 0.60°C during last 112 years (IMD 2012) and increase in heavy rainfall events and decrease in low and medium rainfall events (Goswami et al. 2006) over India have been observed.

Change in land use pattern, excessive deforestation, increased urbanization, industrialization and greenhouse gases emission are causing climatic imbalance/climate change.

The temperature rise combined with microclimatic effect like **Urban Heat Island (UHI)** may result into unhealthy heat stress and even significant increase in heat related mortality (Kleerekoper et al-2012). The urban microclimate created by modifications in urban landscape (Arnfield 2003) along with attenuated meteorological parameters has higher implications on human thermal comfort (Unger 1999).

The ‘heat island effect’ is a compounding factor in urban and suburban areas because many common construction materials absorb and retain more of the sun’s heat. The temperature difference is normally more pronounced at night than during the day.

Climate change manifests in different conditions, such as increased number of drought events, high intensity precipitation, extreme heat events, infectious disease events and are also altering air quality, agriculture conditions.

A study by Smoyer et al. (2000) highlights that, **demographic characteristics** and **socio-economic** factors threaten and impedes adaptive capacity of population to deal with heat stress adversities.

Climate change is leading to an increase in average temperatures and increased possibilities of severe heat waves. Extreme heat can lead to dangerous, even deadly, health consequences, including heat stress and heatstroke. The bordering States of North Interior Karnataka, i.e., Telangana and Andhra Pradesh, have been experiencing severe heat wave in the past five years and many deaths have been reported. Karnataka has been experiencing higher than normal temperatures particularly in districts belonging North Interior Karnataka. It is imperative that we take proactive measures to prevent adverse health impact of heat wave on general public, livestock and wild life.
Elderly people, women, children, and low-income group in particular are most vulnerable to heat-related illness when exposed to extreme heat conditions. In this backdrop, the heat wave action plan is formulated to enable administrators to take appropriate measures and action for being in a state of preparedness for the heat wave during the months of April, May and June.

1. What is Heat wave

There is no universally excepted definition for heat wave, it is generally defined as a prolonged period of temperature above normal (excessive heat). As per World Meteorological Organization (WHO) heat wave is defined as “when the daily maximum temperature of more than five consecutive days exceeds the average maximum temperature by 5°C.”

As per India Meteorological Department (IMD) for heat wave to be declared, following criteria to be met:

<table>
<thead>
<tr>
<th>When maximum temperature reaches <strong>40°C in plains</strong> and at least <strong>30°C in hilly regions.</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Based on Departure from Normal</td>
</tr>
<tr>
<td>• Heat Wave: Departure from normal is <strong>4.5°C to 6.4°C.</strong></td>
</tr>
<tr>
<td>• Severe Heat Wave: Departure from normal is <strong>&gt;6.4°C or more.</strong></td>
</tr>
<tr>
<td>b. Based on Actual Maximum Temperature</td>
</tr>
<tr>
<td>• Heat Wave: When actual maximum temperature ≥ <strong>45°C.</strong></td>
</tr>
<tr>
<td>• Severe Heat Wave: When actual maximum temperature ≥ <strong>47°C.</strong></td>
</tr>
<tr>
<td>c. Criteria for describing Heat Wave for coastal stations</td>
</tr>
<tr>
<td>• When maximum temperature departure is <strong>4.5°C or more</strong> from normal, Heat Wave may be described provided actual maximum temperature is <strong>37°C or more.</strong></td>
</tr>
</tbody>
</table>

To declare a heat wave, the above criteria should be met at least at two stations in a Meteorological sub-division for at-least two consecutive days. A heat wave will be declared on the second day.
Heat wave in India typically occurs between March and June. Annual Cycle of Minimum and Maximum temperature in India is as follows:

1.1 Temperature/Humidity Index
Humidity aggravates physiological effects of temperature, but level of also discomfort depends on combination of other meteorological factors (temp, wind, direct sunshine),
social/cultural (clothing, occupation, accommodation) and physiological (health, fitness, age, level of acclimatization) factors and adaptability.

In the absence of India specific heat index metric, Heat index chart developed by the National weather Service of the USA given below can be used to gauge the level of heat stress disorder as temperature and humidity outside range of this chart are not uncommon in many parts of India.

<table>
<thead>
<tr>
<th>Table 1: Temperature/Humidity Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relative Humidity %</td>
</tr>
<tr>
<td>----------------------</td>
</tr>
<tr>
<td>40</td>
</tr>
<tr>
<td>45</td>
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<tr>
<td>50</td>
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<tr>
<td>55</td>
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<td>60</td>
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<td>75</td>
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<td>80</td>
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<tr>
<td>85</td>
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<tr>
<td>90</td>
</tr>
<tr>
<td>95</td>
</tr>
<tr>
<td>100</td>
</tr>
</tbody>
</table>

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

2. Background of Temperature Trend in Karnataka

The below temperature maps clearly depicts districts of North Interior Karnataka are prone to high temperature for a longer duration in a year. Coastal and South Interior Karnataka are less prone to heat wave when compared to NIK due to the occurrence of maritime air over these regions, but on some occasions, heat wave may also develop over these region in situ under the favorable conditions. However, temperature is not the sole criteria for heatwave, relative humidity and other other meteorological factors factors determine the heatwave conditions. Threshold values of
temperature and relative humidity is to be determined for each district of Karnataka to take specific action plan.
Graph depicting no of hoblis recorded temperature greater than 40 degrees from 2011-18

Hoblis of South Interior Karnataka are also experiencing high temperature in the last three years.

3. Need for Heat wave Action Plan

The evidence about the risks to health from heatwaves is extensive and consistent from around the world. Excessive exposure to high temperatures can kill. During the summer heatwave of 2014,15,16 and 17 in neighbouring States of Andhra Pradesh and Telangana (then undivided Andhra Pradesh) unprecedentedly high day and night-time temperatures resulted in 2776 deaths. The vast majority of these were among older people. Karnataka thought reported less mortality due to heatwave during the same period, but the parts North Interior Karnataka remains vulnerable to heatwave as many of these are bordering districts of Telangana and Andhra Pradesh.
Heatwave depends on factors such as humidity, demographics, urban or rural design issues and acclimatisation mean that similar temperatures might have a different impact in different environments or communities. Heat threshold depends on aforementioned factors thus it is imperative that relationship between temperature and health in different population be established using epidemiological studies to enable administrator to alert the public and activate heatwave related protocols.

The Heatwave Action plan is intended to protect the population from heat-related harm to health, thus reducing heatwave related morbidity and mortality in the population. It aims to create awareness, prepare, alert, and prevent avoidable impacts of heatwave on health during periods of severe heat in Karnataka. The Heatwave Action Plan brings about coordinated approach by synergies with existing plans and strategies of concerned departments and engages all stakeholders to reduce heatwave related health impact by identifying vulnerable groups and creating awareness.

<table>
<thead>
<tr>
<th>Sector</th>
<th>Range of heat stress value (WBGT) measured [°C]</th>
<th>Estimated worker population in 1,000s [as per Indian National Sample Survey, 2000]</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture</td>
<td>34.4–42.2</td>
<td>237,786</td>
<td>Nag et al., 1980</td>
</tr>
<tr>
<td>Glass</td>
<td>25–31</td>
<td>2,263</td>
<td>Shrestha et al., 2000</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>25–31</td>
<td>1,081</td>
<td>Patil et al., 1978</td>
</tr>
<tr>
<td>Ceramics</td>
<td>43–54</td>
<td>10,480</td>
<td>Sankare et al., 2002</td>
</tr>
</tbody>
</table>

Source Road Map for Planning Heat Wave Management in India-TARU
3.1 Main components of Heat Wave Action Plan

1. Building Public Awareness about heat wave, do’s and don’ts and management through innovative IEC activities focusing mainly on vulnerable communities. Community Outreach Program at ward level and panchayat level.

2. Dissemination heat wave alert to community using Early Warning System

3. Capacity Building among Health Care Professionals and community.

4. Reducing Heat Exposure and Promoting Adaptive Measures

4. Heat wave Early Warning and Dissemination

India Meteorological Department (IMD), Ministry of Earth Sciences, is the nodal agency for providing real time data and weather prediction of maximum temperature, heat wave warning, extreme temperatures, 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. These warnings, valid for the next four days, are issued around 1600 hours IST daily and are provided to all concerned authorities for taking suitable action at their end. A bulletin in extended range with outlook for the next two weeks is issued every Thursday (available at http://www.imd.gov.in/pages/extended.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 IMD website (http://nwp.imd.gov.in/cfs_all.php?param=tmax and http://nwp.imd.gov.in/cfs_all.php?param=tmaxa, respectively).

From 2016, IMD has introduced a system of issuing seasonal temperature outlooks for the next three months. For 2017, the first outlook valid for March to May was issued on 28 February, 2017; and the second one valid for April to June was issued on 02 April, 2017.
Heat wave is predicted by IMD in short, medium, extended and seasonal range in meteorological sub-divisional scale. The operational system of weather forecasts and warnings is summarized in the chart below:

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

- **Now casting:** (Lead time/validity of 3 to 6 hours)
- **Short range:** (Lead time/validity of 1 to 3 days)
- **Medium range:** (Lead time/validity of 4 to 10 days)
- **Long/Extended range:** (Lead beyond 10 days)
- **Local range:** (Its intensity, frequency and time of occurrence is indicated)

**Ministry of Earth Sciences Forecast Institutes**

<table>
<thead>
<tr>
<th>Category</th>
<th>Institute</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seasonal, monthly and extended</td>
<td>IITM, Pune</td>
</tr>
<tr>
<td>Probabilistic, Ensemble</td>
<td>NCMRWF</td>
</tr>
<tr>
<td>All Operational Forecasts</td>
<td>IMD</td>
</tr>
</tbody>
</table>

**4.1 Colour Code for Heat wave**

IMD currently follows a single system of issuing warnings for the entire country through a colour code system as given below. This system advises on the severity of an expected heat hazard. There are different cut-off points that determine the warning signals appropriate for a specific state/region. Extensive studies need to be conducted by each states in coordination Central Government to arrive at threshold assessments for mortality to enable state specific warning alerts be issued.
4.2 Heatwave Alert Dissemination

Karnataka State Natural Disaster Monitoring Centre (KSNDMC) is a state-of-art center which is a registered society of Government of Karnataka with a mandate to monitor natural disaster and disseminate early warning. Information Dissemination plays an important role in Disaster Risk Reduction. KSNDMC has employed various modes for disseminating disaster related information, alerts and advisories at real time to all stakeholders.

KSNDMC has installed 920 GPRS enabled solar powered telemetric 920 weather monitoring stations across the State (one each for hobli). Weather monitoring stations has thermal sensors which records temperatures at real time and relayed to KSNDMC server through GPRS towers, near real time temperature is flashed in the KSNDMC dashboard.
Heatwave alerts and forecast received from IMD at SEOC and KSNDMC are immediately disseminated to all concerned. The flow chart of dissemination is as follows:
SEOC and KSNDMC adopt different modes of communication for last mile dissemination. The modes are as follows:

5. **Heat wave related Illness**

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

Heat-related illness can occur when the body is unable to adequately cool itself. It can range from mild conditions such as a rash or cramps to very serious conditions such as heat stroke, which can kill people.

Heat cramps are muscle pains or spasms, usually in the abdomen, arms or legs and may be a symptom of heat exhaustion. They may occur after strenuous activity in a hot
environment, when the body gets depleted of salt and water. Heat exhaustion is a serious condition that can develop into heat stroke. Someone experiencing heat exhaustion may appear pale and sweating. They may have a rapid heart rate, muscle cramps, weakness, dizziness, headache, nausea, vomiting or fainting. Heat stroke is a life-threatening emergency. It occurs when the body is unable to prevent its temperature rising rapidly.

The symptoms may be the same as for heat exhaustion, but the skin may be dry with no sweating, and the person’s mental condition worsens. They may stagger, appear confused, have a fit or collapse and become unconscious.

Extreme heat, heat waves, and drought also cause other severe direct and indirect health effects, including:

- Malnutrition
- Decrease in water availability.
- Increase in communicable disease like dengue, enteric fever, chikungunya, malaria and diarrheal illness.
• Dehydration.
• Heat cramps.
• Heat exhaustion.
• Heat syncope.
• Heat stroke.

Heat index classification and health impacts are depicted in the table below

<table>
<thead>
<tr>
<th>Heat Index</th>
<th>Category</th>
<th>Health Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>27 - 32°C</td>
<td>Warm</td>
<td>Caution- Fatigue possible with prolonged exposure and/or physical activity. Continuing activity could result in heat cramps.</td>
</tr>
<tr>
<td>32 - 41°C</td>
<td>Hot</td>
<td>Extreme caution- Heat cramps and heat exhaustion possible with prolonged exposure and/or physical activity.</td>
</tr>
<tr>
<td>41 - 54°C</td>
<td>Very Hot</td>
<td>Danger- Heat cramps or heat exhaustion likely and heatstroke possible with prolonged exposure and/or physical activity.</td>
</tr>
<tr>
<td>&gt; 54°C</td>
<td>Extremely Hot</td>
<td>Extreme danger- Heatstroke highly likely with continued exposure.</td>
</tr>
</tbody>
</table>

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

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

6. **Hospital Preparedness to manage heat related illness**

**Hospitals should ensure that the following measures are in place:**

- Cases with suspected heat stroke should be rapidly assessed using standard Treatment Protocols.
- Identify the trend in no of cases in the taluk and mark the beds dedicated to treat heat stroke victims and enhance emergency department preparedness to handle more patients. To ensure proper networking with nearby hospitals to share patient load when there increase in no of cases.
- Identify RRT (Rapid Response Teams) to respond to any exigency call outside the hospitals.
- Ensure adequate arrangements of Staff, Beds, IV fluids, ORS, essential medicines and equipment to cater to management of volume depletion and electrolyte imbalance.
- May try to establish outreach clinics/mobile clinic at various locations easily accessible to the vulnerable population to reduce the number of cases affected. Health
Centers must undertake awareness campaigns for neighbourhood communities using different means of information dissemination.

- PHC must refer the patients to the higher facility only after ensuring adequate stabilization and basic definitive care.
- All cases of heat-related illnesses should be reported to IDSP (Integrated Disease Surveillance Programme) unit of the district.

The roles of the Department Health and Family Welfare Department is elaborated in the next chapter.

Heat wave induced illness treatment protocol and heat illness symptoms, signs, and prognosis prepared by IIPH, Gujarat, is annexed for the ready reference.

6.1 Identification of heat wave illness and recording of causalities

It is important to undertake an objective identification of heat wave illnesses and systematically record causalities resulting from heat wave. Taluk level committee comprising of local medical officer, 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, mahajar/ panchanama or other witness, evidence or verbal-autopsy.
- Postmortem/medical checkup report with causes.
- Local authority or local body enquiry/verification report.

The medical report will be certified by District Health Officer. Deputy Commissioner, to release ex-gratia as appropriate.

7. Roles and Responsibilities of Departments in Managing Heat wave Conditions

Role of Revenue Department (Disaster Management)/Principal Secretary, Revenue (DM)/ Relief Commissioner

1. Preparing heat wave action plan which clearly delineates the roles and responsibilities of all concerned departments and monitoring its implementation by coordination with all concerned departments.
2. Monitor heat wave condition on day to day basis and disseminate heat wave alert received from IMD to departments, DEOC, line departments and community.

3. KSNDMC to alert all stakeholders and community on real time heatwave conditions through various mode of communication. If need be colour coded message be relayed to take appropriate action.

4. Review implementation of heat wave action plan with Deputy Commissioner’s regularly.

5. Provide sufficient fund to Deputy Commissioners to deal with drink water contingency.

6. Device ICT activities in coordination with other departments and district administration to create awareness about heatwave.

7. Deputy Commissioner of each district to be nodal officer to manage heatwave condition.

7.1 Department of Health and Family Welfare

1. Create awareness about dangers of heatwave and how to minimize the risk to public through intensive ICT activities, distribution of pamphlets/flyers about do’s and don’t during heatwave. Putting up posters in strategic location to create awareness. Propagating awareness through TV, radio, print media and Social media. Also to create awareness about the most appropriate diet during heat wave.

2. Maintain sufficient supply of ORS sachets and ice packs in heatwave prone PHCs, Community Health Centers, Taluk Hospitals, District Hospitals and private hospitals. Wherever possible to encourage opening of ORS booth in coordination with NGO’s or as CSR initiative.

3. Health centers in heatwave prone hobli/taluk to earmark beds at cool and ventilated place to treat heatwave affected victims.

4. Ensure ambulances/other PHC vehicles should be stocked with ORS and ice packs and be kept in roadworthiness for referral of heatwave affected patient.

5. Train medical officers and paramedical workers on heatwave treatment protocol. Paramedical and ASHA workers to sensitized on heat stress disorders, prevent and management.

6. Instructions to be issued to DHOs to provide to certify if the death has occurred due to
heat stress and share copy of post-mortem report with respective Tahasildars to expedite payment of ex-gratia to the next of kin.

7.2 Department of Primary Education/Secondary Education

- Reschedule school timing to avoid peak heat period in heatwave prone taluks/ district during summer.
- Avoid outdoor Physical Education Training/sports during peak heat period.
- If possible paint the rooftop of schools white/ Albedo painting to reduce heat built-up and will keep the class room cool.
- Provision of cool and clean drinking water in earthen pots,
- Create awareness on heat wave prevention and management in schools using IEC activities. Training to the teachers on identification, health risks and the subsequent management during Heat Waves.
- Encourage planting of trees in the vicinity of school (long term plan)

7.3 Department of Animal Husbandry

- Create awareness on effect of heat wave on livestock through IEC activity.
- Construct water trough for animals in strategic location.
- Stock essential medicines to deal with heat related stress in livestock.

7.4 Department of Forest, Ecology and Environment

- To ensure water for animals in reserved/protected forests by constructing artificial ponds/water bodies.
- To issue directions to Zoo authorities for special arrangements for animals in zoo to protect them from the effect of heat wave.
- Ensure veterinary doctor are readily available to deal with heat stress disorder in animals.
- To provide water to human habitations facing water scarcity inside reserved forest.
- Promote rain water harvesting as long term strategy.

7.5 Department of Urban Development and Directorate of Municipal Administration

- Ensure uninterrupted supply of clear drinking water during summer.
- Disseminate heat alert to all the key stakeholders received from SEOC and KSNDMC
to all stakeholders and general public.

- Create awareness through intensive IEC activities, electronic/print media and social media to general public about heat wave management, do’s and don’t during heatwave and safety tips to avoid heat related disorder.
- Set up water kiosk in market places and other strategic location in coordination with NGO’s or under CSR fund.
- Designating cooling centers such as schools (during vacations), public parks to public for resting during peak heat period.
- Ensure adequate stock of ORS, IV fluids and other medicines in Cooperation run hospitals.
- Promote and construct ‘Heat Resistant Building’ as mitigating measures in the long run.
- Promote cool roofs initiative to paint roofs white (albedo paint), create green roofs and walls, and plant trees in neighbourhoods to keep them cool.

7.6 Department of Rural Development and Panchayat Raj

- Sensitize vulnerable population on Heat Wave management, do’s and don’ts issued by the department of Health and Family Welfare Department through posters, IEC activities, print/electronic media and social media.
- Reschedule working time (flexi worktime) for workers under MGNREGA to avoid peak heat period.
- Productive discount (reduced target/workload but paid full wages) during summer to prevent fatigue and exertion.
- Provide drinking water at MGNREGA site and cooling place such as nearby schools (during vacation)/community halls for resting during peak heat period. Stock of ORS be maintained.
- Provision water kiosks at strategic locations such as panchayat office, markets, etc, in coordination with NGO’s or under CSR fund.
- Providing cooling centers to general public such as schools (during vacation), community halls, parks to rest during peak heat period during the day.
- Providing clean drinking water to the community, take repairs pertaining to supply
of drinking water on priority.

7.7 Department of Women and Child Development

- Public awareness campaigns about the do’s and don’ts during heatwave issued by the department of Health and Family Welfare with special focus on infants, children below five years, pregnant and lactating mothers and geriatric population. Create awareness regarding importance of hydration.
- Create awareness on heat wave prevention and management in anganwadi using IEC activities. Training to the anganwadi workers on identification, health risks and the subsequent management during Heat Waves.
- Anganwadis to be functional during summer by planning staggered leaves to Anganwadi helpers/supervisors. Anganwadi timing to be rescheduled to avoid peak heat, ORS packets to be stocked in in Anganwadi if necessary.
- If needed buttermilk/curd will be served in anganwadi instead of milk.
- No outdoor activities during peak heat period, plan indoor activities to keep children engaged.
- Allow anganwadis (during vacation) located in villages to be for general public public for resting during peak heat period.

7.8 Labour Department

- To issue directives for flexible working hours to avoid peak heat exposure.
- Create awareness among construction workers, factory labourers, manual labourers and other workers whose occupations require intensive work outdoors on how to protect from heat exposure, management, first aid, and on staying hydrated.
- Clean and safe drinking water to be provided in work place and cool place for resting.
- Stock of ORS and ice packs (wherever possible)be stocked in the site.
- Hospitals near the work site be request to reserve bed for patient with heat stress disorder.
- To enforce relevant labour laws to protect health of workers during heat wave.

7.9 Water Resources Department

- To ensure available water in reservoirs to used exclusively for drinking water purpose.
7.10 Energy Department

- To ensure continuous power supply to critical infrastructure such as hospitals, RO plants, etc.
- Load shedding to be cut down/reduced during peak heat period.
- Create awareness among people on energy conservation
- Develop a policy for power cuts depending on vulnerable areas (slums) and population.

7.11 Department of Information and Public Relations

- Mass disseminating heat wave warning through print, electronic and social media.
- Broadcasting of heat wave related jingles, short videos through electronic media.

7.12 Department of Tourism

- Display of Heat Wave precautionary measures for tourists during summer at tourist points and related information in website of department of tourism.
- Disseminate heat wave early warning to tourist through Display board, social media, SMS or another media.
- Ensure the availability of drinking water and cooling place if needed.
- Restrict the timing of the visit of tourist places during severe heat wave period if necessary.

7.13 NGO’s/Civil Society Organization/Religious Organization/Corporates

- To support Govt departments in creating awareness about heatwave do’s and don’ts and management in general public through IEC activities. Using social media platform to disseminate awareness.
- Set up drinking water kiosk in strategic location along with ORS boots wherever possible.
- Constructing drinking water troughs for animals
- Opening community hall or any building to be used as cooling center to public for resting during peak heat period.
7.14 Nodal Department and Officers

Revenue Department (Disaster Management) is the Nodal agency for the response to heat wave and will coordinate with all other department to prepare and effective implementation of heat wave plan.

Relief Commissioner/Principal Secretary is the nodal officer and is responsible for strategic management of heat wave related incidence in coordination with Health and Family Welfare Department and other allied departments at the State level.

Deputy Commission is the Nodal Officer at District Level, Commissioner (Municipal) – Nodal Officer for Respective Municipalities.

Generally the Responsibilities of Nodal Officer include:

- Managing all response activities.
- Notifying support agencies.
- Establishing incident and emergency management teams.
- Collecting, analysing and dissemination information regarding the emergency due to heat wave.
- Preparation of report in coordination with other departments and line departments.
- Leading coordinated multi-agency response planning.
- Issuing timely information and warning to the community.
- Developing incident action plans.

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

8. Heat wave vulnerability

Below poverty line population and 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.
**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 BPL families slum community members’ susceptibility to extreme heat’s effects on health.

**Reasons for inadequate coping**
1. Ignorant about of heat alerts.
2. Lack of awareness of precautionary measures (Dos & Don’ts).
4. Lack of proper connectivity to Primary Health Centres (PHCs).
5. Lack of access to urgent medical attention at local levels (in villages).
6. No access to shaded areas and cooling places.
7. Non availability of adequate water.
8. No knowledge of Services available etc.

**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.

**Mitigation Measure:** 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.

Intensive awareness generation about heat wave and importance of staying hydrated be taken up in this community, providing clean drinking water and promoting affordable solution like 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.

9  **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. Moreover, temperature threshold (bearable temperature) varies for different breeds, thus mitigation measures to be tailored for each breed. Heat waves cause imbalance in hormone production which effect productivity.

**9.1 Suggestive adaptive measures to mitigate adverse impact of Heat Wave in livestock**

A) Sprinklers: on the top of the roof of poultry, Dairy, Sheep and Goats , and piggery farm sheds
B) Covered water tanks: Cover the water tanks with agro waste, and paddy straw waste Grass and Gunny bags to keep the water cool.

C) Ventilation on roof: Keep the ventilation on roof top to remove hot air and gas from shed.
E) Environmentally controlled farm: This will reduce the impact of adverse effect of heat wave conditions

F) Foggers: Use foggers after every 5-6 ft will keep the livestock cool.
G) Side roof/over hang: Provide 6 feet side roof/over hang in the south side of shed to avoid sunlight falling inside the shed.

![Side roof/over hang](image)

**Provide 6 feet side roof/over hang in the south side of shed to avoid sunlight falling inside the shed.**

H) Fans inside the shed: Switch on the fans to reduce the temperature when bird, animals starts panting.

![Fans inside the shed](image)

**Switch on the fans to reduce the temperature when bird starts panting.**
I) Spacing between two sheds: 40-45 ft space between two sheds is important for cross ventilation.

J) Gunny cloth with drip water: Fix 12” to 18” height gunny cloth at the side with drip water to get cool breeze inside shed.
K) Cooling pad: cooling pad will keep the cool environment in the shed

L) Thatching: cover the roof with 3” inches thickness using available agro waste, coconut leaf and green leaves.
M) Smoke tiles or exhaust: Ensure smoke tiles at 10 feet interval without any block for good exhaust.

N) White wash to roof top to allow maximum reflection of sunlight, which will keep the shed cool.

O) Vegetation in surrounding area: encourage the growth of grass 10 feet away from the shed at 6 inch height. Avoid bush and plant trees like rain trees.

P) Provide water melon, musk melon skin with fruits to chicks, sheep, goat and pigs.
Q) Provide vitamin “C” and electrolytes in drinking water in hot weather mixed in ice cubes.

10 Data Analysis

As heat wave is not a notified disaster at the national level, thus no financial assistance be claimed under National Disaster Response Fund (NDRF), but State Government can declared it as a disaster under local context, which will enable heat wave related victims to get relief/ex-gratia under State Disaster Response Fund (SDRF). Thus Data from various domains are very much needed to have a sound evidence-based policy and its proper strategization valid and reliable data is needed for mortality as well as morbidity—the health outcomes directly as well as indirectly related to heat. Thus accurate information and data related to heat wave deaths and illnesses is imperative. In order to prepare for and take necessary mitigative action against heat wave, data on age group, sex and occupation of those who die of heat wave will be collected in the proforma annexure (Form A, B C). The data will be used to prepare vulnerability map and device appropriate heat action plan.

10.1 Post-Heat Wave Season Review

Feedback on all stakeholders will be elicited. Comprehensive evaluation of the action plan based on its impact will be conducted. Based on these inputs plan will be revised.

Successful implementation of Heat Action Plan requires coordinated action between many diverse stakeholders, including Government Departments / Agencies, health care professionals including emergency medical personnel, health center staff, and hospital staff and community groups.
11 Heat wave Do’s and Don’ts

**General Instructions**

- Listen to Radio; watch TV; read Newspaper for local weather news, check SMS or call 24/7 interactive KSNDMC No. 9243345433 and 080-22745232 to check on hobli level temperature and Relative humidity.

- Drink plenty of water, ORS, buttermilk, rice water, lemonade, etc, - even if not thirsty, to prevent dehydration. Avoid coffee, tea and carbonated drinks.
Avoid high protein food to the extent possible.

HEATWAVE : DO's AND DON'TS

Avoid alcohol, tea, coffee and carbonated soft drinks, which dehydrates the body

HEATWAVE : DO's AND DON'TS

Avoid high-protein food and do not eat stale food
• Wear lightweight, light-coloured, loose, cotton clothes

HEATWAVE: DO's AND DON'TS

Cover your head: Use a cloth, hat or umbrella
• Stay indoors as much as possible, avoid going out between 12:00 noon to 3:00 pm.

**HEATWAVE: DO's AND DON'TS**

Avoid going out in the sun, especially between 12:00 noon and 3:00 p.m.

Avoid walking barefoot
Avoid strenuous physical work during peak heat period, schedule such job during earlier in the day or in the evening.

**HEATWAVE : DO's AND DON'TS**

Avoid strenuous activities when outside in the afternoon

**HEATWAVE : DO's AND DON'TS**

Caution workers to avoid direct sunlight
- Keep your home cool, use curtains, shutters or sunshade and open windows at night. Try to remain on lower floors. Paint the roof top with albedo/white paint.

- Ventilate the cooking area by opening windows and avoid cooking as much as possible during peak heat period
- First aid for heat related stress

- Keep animals in shade and give them plenty of water to drink
- Heat wave stress treatment plan

### Heat Stroke

- **Use a fan to lower temperature**
- **Apply cold compresses**
- **Elevate feet**
- **Have victim lie down**
- **Have victim drink fluids**

#### Signs & Symptoms

- Warm, flushed skin
- Faintness
- Dizziness
- Weakness
- Very high fever of 41°C

#### Treatment

**Emergency Measures:**

- Move the person to a shady spot or indoors & have him/her lie down with legs elevated.
- If able to drink liquids, have them sip cool water.
- Remove clothing, apply cool water to the skin, & fan the person.
- Apply ice to armpits, wrists, ankles, & groin.

Heat stroke is a medical emergency! Bring the patient immediately to the hospital after instituting emergency measures.

#### Risk Factors / Causes

- Dehydration
- Hot & humid weather
- Vigorous exercise in hot weather
- Too much direct exposure to the sun
- Working outdoors

#### Prevention

- Limit the amount of time you spend outdoors.
- Drink plenty of water.
- Avoid tea, coffee, soda, & alcohol.
- Wear a wide-brimmed hat & long-sleeved clothing when outdoors.
- Schedule heavy-duty activities for the beginning or end of the day, when it’s cooler.
12 Annexures

- Range of Heat Illness-Typical Presentations-symptoms, sign and prognosis.
- Heat Illness treatment protocol.
- Form A, B and C.
- Government Orders.
### Heat Wave Disorder Case Definitions

**Range of Heat Illness-Typical Presentations-symptoms, sign and prognosis (Source IIPH)**

<table>
<thead>
<tr>
<th>Clinical Entity</th>
<th>Age Range</th>
<th>Setting</th>
<th>Cardinal Symptoms</th>
<th>Cardinal/Important Signs</th>
<th>Pertinent Negative findings</th>
<th>Prognosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heat rash/prickly heat/Miliaria</td>
<td>All, but frequently in children</td>
<td>Hot environment; +/- insulating clothing or swaddling (wrap in tight clothes)</td>
<td>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</td>
<td>Diffused red coloured skin or vesicular rash, itching of the skin without visible eruption</td>
<td>Not focally distributed like a contact dermatitis</td>
<td>Fully recovery with elimination of exposure and supportive care</td>
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<tr>
<td>Heat cramps</td>
<td>All</td>
<td>Hot environment, typically with exertion, +/- insulating clothing</td>
<td>Painful spasms of large and frequently used muscle groups</td>
<td>Uncomfortable appearance, may have difficulty fully extending affected limbs/joints</td>
<td>No contaminated wounds/tetanus exposure; no seizure activity</td>
<td>Fully recovery with elimination of exposure and supportive care</td>
</tr>
<tr>
<td>Heat exhaustion</td>
<td>All</td>
<td>Hot environment; +/- insulating clothing or swaddling (wrap in tight clothes)</td>
<td>Feeling overheated, light-headedness, exhausted and weak, unsteady, feeling of vomiting, sweaty and</td>
<td>Sweaty/diaphoretic; flushed skin; hot skin; normal core temperature +/- dazed, +/- generalized weakness, slight</td>
<td>No coincidental signs and symptoms of infection; no focal weakness;</td>
<td>Full recovery with elimination of exposure and supportive care; progression to</td>
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<tr>
<td>Heat syncope</td>
<td>Typically adults</td>
<td>Hot environment; +/- insulating clothing or swaddling (wrap in tight clothes)</td>
<td>Feeling hot and weak; light-headedness followed by a brief loss of consciousness</td>
<td>Brief generalized loss of consciousness in hot setting, short period of disorientation if any</td>
<td>No seizure activity, no loss of bowel or bladder incontinence, no focal weakness, no difficulties in swallowing or speech</td>
<td>Full recovery with elimination of exposure and supportive care; progression to heat stroke if continued exposure</td>
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<tr>
<td>Heat Stroke</td>
<td>All</td>
<td>Hot environment; +/- insulating clothing or swaddling (wrap in tight clothes)</td>
<td>Severe overheating; profound weakness; disorientation, not fully alert, convulsion, or other altered mental status</td>
<td>Flushed, dry skin (not always), core temp ≥40°C; altered mental status with disorientation, incoherent behaviour, coma, convulsion; tachycardia; +/- hypotension</td>
<td>No coincidental signs and symptoms of infection; no focal weakness; no difficulties in swallowing food or speech, no overdose history</td>
<td>25-50% mortality even with aggressive care; significant morbidity even if survives</td>
</tr>
</tbody>
</table>
Heat Illness Treatment Protocol

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

1. Initial patient assessment primary survey (airway, breathing, circulation, disability, exposure), vital signs including temperature.

2. Consider heat illness in differential diagnosis if:
   a. Presented with suggestive symptoms and signs
   b. Patient has one or more of the following risk factors:
      i. Extremes of age (infants, elderly).
      ii. Debilitation /physical deconditioning, overweight or obese.
      iii. Lack of acclimatization to environment heat (recent arrival, early in summer season).
      iv. Any significant underlying chronic disease, including psychiatric, cardiovascular, neurologic, hematologic, obesity, pulmonary, renal and respiratory disease.
      v. Taking one or more of the following:
         1. Sympathomimetic drugs.
         2. Anticholinergic drugs.
         4. Diuretics.
         5. Alcohol.

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 the skin.
   c. Use fan to blow cool air on to 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). If temperature if 40°C or above, initiate IV rehydration and immediately transport to emergency department for stabilization.
## Format A

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

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Village</th>
<th>PHC</th>
<th>Block/City</th>
<th>Name &amp; Son/ Daughter/Wife of</th>
<th>Urban U Rural R</th>
<th>BPL Y/N</th>
<th>Age/Sex</th>
<th>Date of attack of Heat Stroke</th>
<th>Any Antecedent illness</th>
<th>Cause of death</th>
<th>Death confirmed by MOs and MROs</th>
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### Format B: Details of the death reported due to Heat-Wave (record kept with State government)

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Name and Address</th>
<th>Age</th>
<th>Sex (M/F)</th>
<th>Occupation</th>
<th>Place of death</th>
<th>Date and time of death</th>
<th>Max Temp recorded (Rectal and Oral)</th>
<th>Deaths reported during heat wave period or Not</th>
<th>List of chronic diseases present (Ask the family members)</th>
<th>Date and time of post mortem (If conducted)</th>
<th>Date and time of joint enquiry conducted with a revenue authority</th>
<th>Cause of death</th>
<th>Remarks</th>
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</table>

Name and designation of the reporting officer: ____________________________

Signature with Date: ____________________________
Form C

<table>
<thead>
<tr>
<th>District</th>
<th>Location</th>
<th>Occupation</th>
<th>Economic</th>
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<tbody>
<tr>
<td></td>
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<td>Farmers</td>
<td>Labours</td>
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<td>Urban</td>
<td>Rural</td>
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<td>Age Group</td>
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<td>Total State</td>
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*If any other information related to heat wave, please enclose a separate page.*

Name and designation of the reporting officer: ________________________________

Signature with Date: ________________________________
Government Orders

1. Department of Women and Child Welfare GOs (Rescheduling of Anganwadi Timings and staggering of Summer Holiday for Angawadi employees to ensure Anganawadi operates during summer vacation).

2. Department of Rural Development and Panchayat Raj GO (Regarding productive discount during summer).
ನಂತರ ಸರಿಸರದ ಸಮಯಗಳು

ವಿವರಳು: ಅನುಭವಿಸಿದ ಸಂದರ್ಭಗಳ ಸಮಯಗಳು ಸಂಖ್ಯೆಯ ನೆಲೆ,

ನಂಧನೆ:


ನಂತರೆ:

ನಂತರೆ. ಸಂಖ್ಯೆಯ ನೆಲೆಯಲ್ಲಿರುವ ಸಂದರ್ಭಗಳು. ಮಹಾರಾಷ್ಟ್ರದ ಮೂಲಗಳಿಗೆ ಸಂಬಂಧಿಸಿದ ಸಂದರ್ಭಗಳು ಸಂಖ್ಯೆಯ ನೆಲೆ ಗೊಳಿಸಿದ ಸಂಯೋಜನೆ 300 ಸಂಖ್ಯೆಯ ನೆಲೆಯಲ್ಲಿರುವ ಸಂಯೋಜನೆವಿರುವ, ಮತ್ತು ಸಂಖ್ಯೆಯ ನೆಲೆಯಲ್ಲಿರುವ ಸಂಯೋಜನೆ 100 ಸಂಖ್ಯೆಯ ನೆಲೆಯಲ್ಲಿರುವ ಸಂಯೋಜನೆವಿರುವ, ಮತ್ತು ಸಂಖ್ಯೆಯ ನೆಲೆಯಲ್ಲಿರುವ ಸಂಯೋಜನೆ 150 ಸಂಖ್ಯೆಯ ನೆಲೆಯಲ್ಲಿರುವ ಸಂಯೋಜನೆವಿರುವ.

ನಂತರೆ. ಸಂಖ್ಯೆಯ ನೆಲೆಯಲ್ಲಿರುವ ಸಂಯೋಜನೆ 17 ಸಂಖ್ಯೆಯ ನೆಲೆಯಲ್ಲಿರುವ ಸಂಯೋಜನೆವಿರುವ.

ನಂತರೆ. ಸಂಖ್ಯೆ 128 ಮತ್ತು 2018, ಬಾರಾರಿ: 06.04.2018

ನಂತರೆ. ಸಂಖ್ಯೆಯ ನೆಲೆಯಲ್ಲಿರುವ ಸಂಯೋಜನೆ 17 ಸಂಖ್ಯೆಯ ನೆಲೆಯಲ್ಲಿರುವ ಸಂಯೋಜನೆ 31 ಸಂಖ್ಯೆಯ ನೆಲೆಯಲ್ಲಿರುವ ಸಂಯೋಜನೆ 15 ಸಂಖ್ಯೆಯ ನೆಲೆಯಲ್ಲಿರುವ ಸಂಯೋಜನೆ 17 ಸಂಖ್ಯೆಯ ನೆಲೆಯಲ್ಲಿರುವ ಸಂಯೋಜನೆ 15 ಸಂಖ್ಯೆಯ ನೆಲೆಯಲ್ಲಿರುವ ಸಂಯೋಜನೆ 17 ಸಂಖ್ಯೆಯ ನೆಲೆಯಲ್ಲಿರುವ ಸಂಯೋಜನೆ 15 ಸಂಖ್ಯೆಯ ನೆಲೆಯಲ್ಲಿರುವ ಸಂಯೋಜನೆ.

1) ಇಲ್ಲಿ ವಿವರಣೆ. ಮತ್ತು ಸಂಖ್ಯೆಯ ನೆಲೆಯಲ್ಲಿರುವ ಸಂಯೋಜನೆ 15 ಸಂಖ್ಯೆಯ ನೆಲೆಯಲ್ಲಿರುವ ಸಂಯೋಜನೆ 17 ಸಂಖ್ಯೆಯ ನೆಲೆಯಲ್ಲಿರುವ ಸಂಯೋಜನೆ 300 ಸಂಖ್ಯೆಯ ನೆಲೆಯಲ್ಲಿರುವ ಸಂಯೋಜನೆ.

2) ಸಂಖ್ಯೆಯ ನೆಲೆಯಲ್ಲಿರುವ ಸಂಯೋಜನೆ 17 ಸಂಖ್ಯೆಯ ನೆಲೆಯಲ್ಲಿರುವ ಸಂಯೋಜನೆ 300 ಸಂಖ್ಯೆಯ ನೆಲೆಯಲ್ಲಿರುವ ಸಂಯೋಜನೆ.

ನಂತರೆ. ಸಂಖ್ಯೆ 17 ಸಂಖ್ಯೆಯ ನೆಲೆಯಲ್ಲಿರುವ ಸಂಯೋಜನೆ 300 ಸಂಖ್ಯೆಯ ನೆಲೆಯಲ್ಲಿರುವ ಸಂಯೋಜನೆ.

ನಂತರೆ. ಸಂಖ್ಯೆ 17 ಸಂಖ್ಯೆಯ ನೆಲೆಯಲ್ಲಿರುವ ಸಂಯೋಜನೆ 300 ಸಂಖ್ಯೆಯ ನೆಲೆಯಲ್ಲಿರುವ ಸಂಯೋಜನೆ.

ನಂತರೆ. ಸಂಖ್ಯೆ 17 ಸಂಖ್ಯೆಯ ನೆಲೆಯಲ್ಲಿರುವ ಸಂಯೋಜನೆ 300 ಸಂಖ್ಯೆಯ ನೆಲೆಯಲ್ಲಿರುವ ಸಂಯೋಜನೆ.

ನಂತರೆ. ಸಂಖ್ಯೆ 17 ಸಂಖ್ಯೆಯ ನೆಲೆಯಲ್ಲಿರುವ ಸಂಯೋಜನೆ 300 ಸಂಖ್ಯೆಯ ನೆಲೆಯಲ್ಲಿರುವ ಸಂಯೋಜನೆ.

ನಂತರೆ. ಸಂಖ್ಯೆ 17 ಸಂಖ್ಯೆಯ ನೆಲೆಯಲ್ಲಿರುವ ಸಂಯೋಜನೆ 300 ಸಂಖ್ಯೆಯ ನೆಲೆಯಲ್ಲಿರುವ ಸಂಯೋಜನೆ.

ನಂತರೆ. ಸಂಖ್ಯೆ 17 ಸಂಖ್ಯೆಯ ನೆಲೆಯಲ್ಲಿರುವ ಸಂಯೋಜನೆ 300 ಸಂಖ್ಯೆಯ ನೆಲೆಯಲ್ಲಿರುವ ಸಂಯೋಜನೆ.

ನಂತರೆ. ಸಂಖ್ಯೆ 17 ಸಂಖ್ಯೆಯ ನೆಲೆಯಲ್ಲಿರುವ ಸಂಯೋಜನೆ 300 ಸಂಖ್ಯೆಯ ನೆಲೆಯಲ್ಲಿರುವ ಸಂಯೋಜನೆ.

ನಂತರೆ. ಸಂಖ್ಯೆ 17 ಸಂಖ್ಯೆಯ ನೆಲೆಯಲ್ಲಿರುವ ಸಂಯೋಜನೆ 300 ಸಂಖ್ಯೆಯ ನೆಲೆಯಲ್ಲಿರುವ ಸಂಯೋಜನೆ.

ನಂತರೆ. ಸಂಖ್ಯೆ 17 ಸಂಖ್ಯೆಯ ನೆಲೆಯಲ್ಲಿರುವ ಸಂಯೋಜನೆ 300 ಸಂಖ್ಯೆಯ ನೆಲೆಯಲ್ಲಿರುವ ಸಂಯೋಜನೆ.

ನಂತರೆ. ಸಂಖ್ಯೆ 17 ಸಂಖ್ಯೆಯ ನೆಲೆಯಲ್ಲಿರುವ ಸಂಯೋಜನೆ 300 ಸಂಖ್ಯೆಯ ನೆಲೆಯಲ್ಲಿರುವ ಸಂಯೋಜನೆ.
2. ಆಸ್ತರಿಸಿ. ಭಾವಿಯನ್ನು ಸ್ಥಿತಿ ಸಲ್ಲಿಸುವ ವರ್ಷವನ್ನು ರಚಿಸು, ವಿಕರಿಸಿ.
3. ಭವನ ವಾಜುಕುತ್ತಿತ್ತು
4. ಭವನ ವಾಜು ಪ್ರಭೂತಿ ವಿಧಾನದ ಭಾವನೆ ಸಹಾಪಿತ ವಿಧಾನ
5. ಸಹವಾಗಿ ವಾಜು ನಿಯಮ/ಎಂದರೂ ನಿಯಂತ್ರ.
(ಹಾಗೂ ಹೊಸ: 3-4ನೂರನ್ನು ಸ್ವಾರ್ಥವೆಂದ)
ಕನ್ನಡ ಕಲ್ಲೆಯ ಸಂಸ್ಥೆಗಳಾಗಿ

ನೋಟದ ಸಂಖ್ಯೆ: 2016-17, ಡಿ.03.04.2018.

ನೋಟ:

ಈ ನೋಟವಿನ ಅನುಸರಣೆಯಿಂದ ಸಂಸ್ಠೆಗಳಿಗೆ ಕೆಲಸ ಮಾಡಲು ಸಂಖ್ಯೆ 129 ಡಸ್ ಡಿ.06.04.2018

ಭವನದ ಮೇಲೆ ಹೊಂದಿರುವ ಹಿಂಭಾಗದಲ್ಲಿ, ನೋಟದಲ್ಲಿ ಪ್ರತ್ಯೇಕ ಮೇಲೆ ಮಾಡಲಾಗಿದೆ. ಈ ನೋಟದ ಪ್ರತಿಯೊಂದು ವಿಭಾಗದಲ್ಲಿ ಕೆಲಸ ಮಾಡಲು ಸಂಖ್ಯೆ 129 ಡಸ್ ಡಿ.06.04.2018.

ಯೋಜನ鹏 ಸೇವೆಗಳ ಮೇಲೆ ಮಾಡಿದ ಕೆಲಸ ಸಂಖ್ಯೆ 129 ಡಸ್ ಡಿ.06.04.2018

ಅಂಕಣ:

1. ಸುಂದರ, ಅನಂತರವಾಗಿ ಎಲೆಕ್ಟ್ರೊನಿಕ್ ಹೆಸರು, ಇಟ್ಟು ನಂಬಿರಿಸಿದ 5329, ಹೆಸರು ಸಂಖ್ಯೆ 000660001.
2. ಚಿತ್ರವೃತ್ತಿ, ಅನಂತರವಾಗಿ ಎಲೆಕ್ಟ್ರೊನಿಕ್ ಹೆಸರು, ಇಟ್ಟು ನಂಬಿಸಿದ 5329.
3. ಸಂಪ್ರದಾಯ ಹೆಸರು ಪ್ರಸ್ತುತೀಕ್ಷಣಾ.
4. ಸಂಪ್ರದಾಯ ಹೆಸರು ಪ್ರಸ್ತುತೀಕ್ಷಣಾ, ಕೆಲಸ ಮಾಡಲು ಸಂಖ್ಯೆ 129 ಡಸ್ ಡಿ.06.04.2018.
5. ಸಂಶೋಧ್ಯಗಾರಿಕ ಸಂಖ್ಯೆ/ಅನುಕ್ರಮಿಕಾ ಅಂಕಣ.

ಒಳಪ್ಪೆ ವಿಷಯಗಳು:

1. ಕನ್ನಡ ಕಲ್ಲೆಯ ಸಂಸ್ಥೆಗಳಾಗಿ ಮಾಡಿದ ಕೆಲಸ ಸಂಖ್ಯೆ 129 ಡಸ್ ಡಿ.06.04.2018.
2. ಕನ್ನಡ ಕಲ್ಲೆಯ ಸಂಸ್ಥೆಗಳಾಗಿ ಮಾಡಿದ ಕೆಲಸ ಸಂಖ್ಯೆ 129 ಡಸ್ ಡಿ.06.04.2018.
ವಿಷಯ: ಪ್ರಾಂತ್ಯದ ಅಧಿಕಾರಿಗಳ ದೃಢತೆಯ ವ್ಯವಹಾರದಲ್ಲಿ ಮಂದಿರ ಮತ್ತು ಹಕ್ಕಿಗಳ ವೈಯಕ್ತಿಕ ರೂಪವನ್ನು ಕ್ರಮೇಣ ವ್ಯವಹಾರಕರ ಫಲಿತತ್ವಕ್ಕೆ ರೂಪಿಸಲಾಗುತ್ತದೆ. ಪ್ರಾಂತ್ಯದ ಅಧಿಕಾರಿಗಳು ವೈಯಕ್ತಿಕ ರೂಪವನ್ನು ಕ್ರಮೇಣ ವ್ಯವಹಾರಕರ ಫಲಿತತ್ವಕ್ಕೆ ರೂಪಿಸಲಾಗುತ್ತದೆ. ಪ್ರಾಂತ್ಯದ ಅಧಿಕಾರಿಗಳು ವೈಯಕ್ತಿಕ ರೂಪವನ್ನು ಕ್ರಮೇಣ ವ್ಯವಹಾರಕರ ಫಲಿತತ್ವಕ್ಕೆ ರೂಪಿಸಲಾಗುತ್ತದೆ.

ಪತ್ರಿಕೆ: 1. ಪ್ರಾಂತ್ಯದ ಕಾರ್ಯಾಲಯದ ಪ್ರೀತಿಗಳ: ಬೆಂಗಳೂರು 451 ತಾಲೂಕಿನಲ್ಲಿ ನೌಕೋಟ: 10-05-2016
2. ಪ್ರಾಂತ್ಯದ ಕಾರ್ಯಾಲಯದ ಪ್ರೀತಿಗಳ: ಬೆಂಗಳೂರು 252 ತಾಲೂಕಿನಲ್ಲಿ ನೌಕೋಟ: 06-10-2016
3. ಪ್ರಾಂತ್ಯದ ಕಾರ್ಯಾಲಯದ ಪ್ರೀತಿಗಳ: ಬೆಂಗಳೂರು 199 ತಾಲೂಕಿನಲ್ಲಿ ನೌಕೋಟ: 03-02-2016
4. ಪ್ರಾಂತ್ಯದ ಕಾರ್ಯಾಲಯದ ಪ್ರೀತಿಗಳ: ಬೆಂಗಳೂರು 91 ತಾಲೂಕಿನಲ್ಲಿ ನೌಕೋಟ: 05-02-2016

ಎಡಿಟಿಂಗ್: 2016-17ರಲ್ಲಿ ಮಗಳು ಅವರ ಮುಖ್ಯ 30 ತಾಲೂಕಿಗಳ ಮೂಲಕ 176 ಲೋಕಸಾಹಿತ್ಯವನ್ನು ಹಾಡಿ.

100 ಲೋಕಸಾಹಿತ್ಯವನ್ನು ಪ್ರಾಂತ್ಯದ ಸ್ಥಾನಪನಿಷತ್ತುಗಳೆಂದು ಮಂದಿರ ರಚನೆಗಳ ಸಮಯದ ಮೇಲೆ ಹಾದಿ. ಪ್ರಾಂತ್ಯದ ಭಾಷೆಗಳ ಉದ್ದೇಶಗಳು ಸಾಮಾನ್ಯವಾಗಿ ಸಾಮಾನ್ಯವಾಗಿ ಪ್ರಾಂತ್ಯದ ಭಾಷೆಗಳ ಉದ್ದೇಶಗಳು ಸಾಮಾನ್ಯವಾಗಿ ಪ್ರಾಂತ್ಯದ ಭಾಷೆಗಳ ಉದ್ದೇಶಗಳು. ಪ್ರಾಂತ್ಯದ (4)ರ೅ ಸಮಯದಲ್ಲಿ ವ್ಯವಹಾರಗಳನ್ನು ಕೆಲಸಿದರು ಹಾದಿ. ಅದನ್ನು ಕೆಲಸಿದರು ಹಾದಿ. ಅದನ್ನು ಕೆಲಸಿದರು ಹಾದಿ. ಅದನ್ನು ಕೆಲಸಿದರು ಹಾದಿ. ಅದನ್ನು ಕೆಲಸಿದರು ಹಾದಿ. ಅದನ್ನು ಕೆಲಸಿದರು ಹಾದಿ. ಅದನ್ನು ಕೆಲಸಿದರು ಹಾದಿ. ಅದನ್ನು ಕೆಲಸಿದರು ಹಾದಿ. ಅದನ್ನು ಕೆಲಸಿದರು ಹಾದಿ. ಅದನ್ನು ಕೆಲಸಿದರು ಹಾದಿ. ಅದನ್ನು ಕೆಲಸಿದರು ಹಾದಿ. ಅದನ್ನು ಕೆಲಸಿದರು ಹಾದಿ. ಅದನ್ನು ಕೆಲಸಿದರು ಹಾದಿ. ಅದನ್ನು ಕೆಲಸಿದರು ಹಾದಿ. ಅದನ್ನು ಕೆಲಸಿದರು ಹಾದಿ.


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<th>ಕೋಳಿ</th>
<th>ಸಂಖ್ಯೆ  ತಾಳ  ಅವಧಿ</th>
<th>ಸಂಖ್ಯೆ  ತಾಳ  ಅವಧಿ</th>
<th>ಸಂಖ್ಯೆ  ತಾಳ  ಅವಧಿ</th>
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<tbody>
<tr>
<td>1</td>
<td>ಮಾರ್ಚ್ 2017</td>
<td>ಮಾರ್ಚ್ 25ನೇದು</td>
<td>ಮಾರ್ಚ್ 25ನೇದು</td>
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<td>2</td>
<td>ಮೇ 2017</td>
<td>ಮೇ 30ನೇ</td>
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<td>3</td>
<td>ಜೂನ್ 2017</td>
<td>ಜೂನ್ 30ನೇ</td>
<td>ಜೂನ್ 30ನೇ</td>
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<tr>
<td>4</td>
<td>ಜುಲೈ 2017</td>
<td>ಜುಲೈ 20ನೇ</td>
<td>ಜುಲೈ 20ನೇ</td>
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"ಮಾರ್ಚ್ 2017, ಮಾರ್ಚ್ 25ನೇದು" ಎಂಬ ವರ್ಣನೆ ಏಕತ್ತು, ತಾಳದ ಎಣ್ಣೆಯನ್ನು ಬಿಡುವರೆಯವು, ತಾಳದ ಎಣ್ಣೆಯನ್ನು ಬಿಡುವರೆಯವು.

ಓಪ್ಲನ್ ತಾಳದ ಎಣ್ಣೆಯನ್ನು ಬಿಡಲು ವಿಭಿನ್ನ ವಿಧವಾಗಿಯೂ ನೀಡಲಾಗುವ ಕಾರ್ಯವು, ಪ್ರತಿತ್ರೀತಿಯ ವಿಧವಾಗಿಯೂ ನೀಡಲಾಗುವ ಕಾರ್ಯವು.

ಆರ್ಥರಾಡ ತಾಳದ ಎಣ್ಣೆಯನ್ನು ಬಿಡಲಾಗದ ಕಾರ್ಯವು ನಡೆಯಲಾಗುವ ಕಾರ್ಯವು.

(ಭೇಟಿ ತಾಳದ ಎಣ್ಣೆಯನ್ನು ಬಿಡಲಾಗದ ಕಾರ್ಯವು ನಡೆಯಲಾಗುವ ಕಾರ್ಯವು)

1. ನೆಯತಕ್ಕೆಯಾಗಿ, ನೆಯತಕ್ಕೆಯಾಗಿ, ನೆಯತಕ್ಕೆಯಾಗಿ/ನೆಯತಕ್ಕೆಯಾಗಿ
2. ಗಿಡರಿದಾದಕ್ಕೆ, ಗಿಡರಿದಾದಕ್ಕೆ ವಿದ್ರೇತು, ಗಿಡರಿದಾದಕ್ಕೆ
3. ಪ್ರತಿತ್ರೀತಿಯ ವಿದ್ರೆ, ಪ್ರತಿತ್ರೀತಿಯ ವಿದ್ರೆ, ಪ್ರತಿತ್ರೀತಿಯ ವಿದ್ರೆ
4. ಪ್ರತಿತ್ರೀತಿಯ ವಿದ್ರೆ, ಪ್ರತಿತ್ರೀತಿಯ ವಿದ್ರೆ, ಪ್ರತಿತ್ರೀತಿಯ ವಿದ್ರೆ
5. ಪ್ರತಿತ್ರೀತಿಯ ವಿದ್ರೆ, ಪ್ರತಿತ್ರೀತಿಯ ವಿದ್ರೆ, ಪ್ರತಿತ್ರೀತಿಯ ವಿದ್ರೆ (ಪ್ರತಿತ್ರೀತಿಯ ವಿದ್ರೆ ಪ್ರತಿತ್ರೀತಿಯ ವಿದ್ರೆ, ಪ್ರತಿತ್ರೀತಿಯ ವಿದ್ರೆ)

ಆರ್ಥರಾಡ ತಾಳದ ಎಣ್ಣೆಯನ್ನು ಬಿಡಲಾಗದ ಕಾರ್ಯವು ನಡೆಯಲಾಗುವ ಕಾರ್ಯವು.

(ಭೇಟಿ ತಾಳದ ಎಣ್ಣೆಯನ್ನು ಬಿಡಲಾಗದ ಕಾರ್ಯವು ನಡೆಯಲಾಗುವ ಕಾರ್ಯವು)

1. ನೆಯತಕ್ಕೆಯಾಗಿ, ನೆಯತಕ್ಕೆಯಾಗಿ, ನೆಯತಕ್ಕೆಯಾಗಿ/ನೆಯತಕ್ಕೆಯಾಗಿ
2. ಗಿಡರಿದಾದಕ್ಕೆ, ಗಿಡರಿದಾದಕ್ಕೆ ವಿದ್ರೇತು, ಗಿಡರಿದಾದಕ್ಕೆ
3. ಪ್ರತಿತ್ರೀತಿಯ ವಿದ್ರೆ, ಪ್ರತಿತ್ರೀತಿಯ ವಿದ್ರೆ, ಪ್ರತಿತ್ರೀತಿಯ ವಿದ್ರೆ
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ಆರ್ಥರಾಡ ತಾಳದ ಎಣ್ಣೆಯನ್ನು ಬಿಡಲಾಗದ ಕಾರ್ಯವು ನಡೆಯಲಾಗುವ ಕಾರ್ಯವು.
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