Cold Wave Action Plan

(2021)

HP State Disaster Management Authority

Disaster Management Cell
Department of Revenue
HP Secretariat, Shimla-2

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1.1 Introduction

Extreme winter cold can cause death and injury to people, as well as to livestock and wildlife, through direct exposure to cold temperatures, impacts on vegetation, and impacts on the built environment and infrastructure which can depend on elements that become brittle and lose function in cold temperatures.

Impact of cold wave In recent years, occurrences of extremely low temperatures in association with the incursion of dry cold winds from the north into the sub-continent area have been substantial in creating cold wave spells. The impact of the cold wave on human beings can lead to death or injury. The mortality rates show a marked increase in populations exposed to cold wave.

A cold wave can also cause death and injury to livestock. During a cold wave, the animals require a higher intake of nutrition. Often, if a cold wave is accompanied by heavy and persistent snow, grazing animals are unable to graze hence requiring more fodder to be provided indoors. If the food is inadequate and there is exposure to low temperatures, animals may die of hypothermia or starvation. Similarly, wildlife also experiences challenges during winter for both shelter and food.

Cold waves bring unexpected freeze and frost during the Rabi cropping season affecting crops, horticultural plantations/orchard, and other agricultural allied services. Cold waves impede the vegetative growth of plants/ seedlings and may result in crop failure. As a result, the livelihood of people gets adversely affected. A farmer also needs to acquire food and fodder to feed livestock at considerable cost if there is crop failure. At times cold waves can leave the land in danger of forest fires that consume dead biomass. The infrastructure is also affected due to extremely cold climate. For instance, specific plumbing is required in colder regions. Similarly, antifreeze needs to be added to the car for it to function.

1.2 Definition:

A rapid fall in temperature within 24 hours to a level requiring substantially increased protection to agriculture, industry, commerce, and social activities.

a. When normal minimum temperature is equal to 10°C or more.

- Cold Wave Departure from normal is -5°C to -6°C.
- Severe Cold Wave Departure from normal is -7°C or less

b. When normal minimum temperature is less than 10°C.

- Cold Wave Departure from normal is -4°C to -5°C.
- Severe Cold Wave Departure from normal is -6°C or less.

When WCTn is 0°C or less, Cold Wave should be declared irrespective of normal minimum temperature of the station. However, this criteria is not applicable for those stations whose normal minimum temperature is below 0°C.

1.3 Purpose and Aim:

HPSDMP is the primary agency with responsibility for the hazard of Cold wave. The purpose of the Cold wave Management Plan (this plan) is to outline the arrangements for the management of Cold waves in Himachal Pradesh across preparedness, response and recovery. The aim of this plan is to enable Himachal Pradesh to mitigate the effects of, prepare for, respond to, and recover from cold waves.

1.4 Necessity of Cold Wave Action Plan

There is a need of a coordinated multi-agency approach to the state for the management of Cold waves. At present, the problem of cold waves is being managed at an operational level but it needs to be managed at a strategic level. There is the need for clear roles and responsibilities in the management of cold 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 impacts across the community.

1.5 Objective of Action Plan on Cold wave

I. The Cold Wave Action plan aims to provide a framework for implementation, coordination and evaluation of response activities in cities/ towns/Panchayats that reduce the negative impact.
II. The Plan's primary objective is to alert those at risk where extreme cold conditions either exist or are imminent, and to take appropriate precautions.
III. The Plan also calls for preparedness measures to protect livestock/animals as low temperature causes significant stress to them as well.
IV. The Cold wave action plan is intended to mobilize departments and communities against avoidable health problems during spells of very cold weather.
V. The Plan also intends to help early warning agencies as well as the media. Taking all administrative/preventive actions that need to be taken by multiple agencies.

1.6 Goals

Recurring /Regular Activities

i. Developing and Display of colour Cold wave alerts and Do's and Don'ts in public domains such as hospital, offices, etc.
ii. Multiple medium of communication (preferably in local languages) like TV, Radio and newspaper for awareness.
iii. Identify and reduce awareness gap through disseminating of information using pamphlets hoardings, LED display on advertisement boards.
iv. Change in timings of school, college, office, markets, etc.

Short-Term

1. Developing mobile application for spreading awareness.
2. Issuing advisories for locals and tourists.
3. Identify "Risk pone Area" in State through appropriate tracking and modelling of meteorological data and promote the timely development and implementation of local Cold Wave Action Plan with strategic inter-agency co-ordination, and response which targets the most vulnerable groups.
4. Setting up special warm shelters for "Wage Employment Programmes" such as Mahatma Gandhi National Rural Employment Guarantee Scheme (MNREGA).

Medium Term

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

(II) Involving departments of the Government for collating local coping and adaptation strategies, indigenous technologies such as vernacular building materials, construction of the green building, Energy Conservation Building Code (ECBC)etc.

(III) New cold wave criteria must be evolved based on gridded data with maximum and minimum temperature, to develop a scientific model to determine all-cause mortality.

Long Term

1. Focused capacity building-cold wave mitigation management should be added in school curriculum to sensitize school children and local people. Training programmes in local level/ community level for awareness among people.
2. Integrate climate variability mitigation and adaptation efforts in HP.
3. Yearly improvisation of Cold wave plan through response and feedback data Collection.
4. Upgradation of forecast system and associated equipment to provide Cold wave alerts minimum of 2 to 3 weeks prior to the event.
5. Health-harming air pollution apportionment studies, emission inventories, and health impact assessment of ambient and household air pollution through State-wise Clean Air Action Plan and use these findings to inform policies targeted at reducing the main sources of pollution via an inter-ministerial approach.
6. Evaluation of cascading effects of cold waves i.e. Avalanche, Frost
7. Involvement of academia along with collaboration and more participation from higher educational institutes may be developed. The centres for excellence and dedicated research centres may have a pivotal role to play.

1.7 Key Strategies

Severe cold waves can also cause disruption to general, social and economic services. Government agencies will have acritical role to play in preparing and responding to cold waves at the local level, working closely with health and related departments on a long-term strategic plan.

a) Establish early Warning System and Communication System.
b) Developing inter- agency response plan and coordination in field
c) Preparedness at the local level for health eventualities
d) Health care system capacity building
e) Public awareness and community outreach
f) Collaboration with private, non-government and civil society
g) Assessing the impact- feedback for reviewing and updating the plan

Source: NDMA Guidelines for Preparation of Action Plan- Prevention and Management of Heat-Wave-20

Chapter-2

2.1. Physical Details of HP

The State of Himachal Pradesh has a geographical area of 55,673 sq km, which constitutes 1.69% of the geographical area of the country. The State lies between 30º22'N to 33º12'N latitude and 75º45' E to 79º04' E longitude and is bordered by Jammu & Kashmir in the North, Punjab in the West, Haryana in the South and Uttarakhand in the Southwest. The State has international border with China in the East.

Predominantly a mountainous State in the western Himalayas, the State has three distinct regions viz

1. The Shiwaliks with altitude upto 1,500 m,
2. Middle Himalayan region between 1,500 m to 3,000 m
3. The Great Himalaya/ Himadris higher than 3,000.

About one third of the area in the State is permanently under snow, glaciers and cold desert. The tree growth is minimal in this region due to harsh conditions. The average annual rainfall is about 1,800 mm. The temperature varies from sub-zero to 35°C. The Satluj, Beas, Ravi, Chenab and Yamuna are the important rivers of the State. The State has 12 districts all of which are hill districts. The Districts are further Sub-Divided into 69 Sub-Division. As per the 2011 census, Himachal Pradesh has a population of 6.86 million accounting for 0.57% of India's population. The rural and urban population constitutes 89.97% and 10.03% respectively. The population density of the State is 123 per sq km which is much lower than the national average. The 19th livestock census 2012 has reported a total livestock population of 4.84 million.

2.2. Temperature The State shows a significant increasing trend of 0.06°C/year on annual mean maximum temperatures and 0.02°C/year on annual mean temperatures for the 1951–2010 time period. The annual mean minimum temperatures have shown a decreasing (–0.01°C/year) trend over the State for the same time period (Rathore et al. 2013) (Figure 2.1, left). The seasonal mean temperature trends for the 1951–2010 period shows a significant increasing trend for most seasons viz. winters (0.02°C/ year), monsoons (0.03°C/year) and postmonsoon (0.02°C/year) but not significantly increasing for summers (0.01°C/year) (Rathore et al. 2013) (Figure 2.1, right). A short-term analysis has shown that the rate of increase in maximum temperature is observed to be greater over higher latitudes as compared to lower latitudes, and the rate of warming in north-western Himalayan region have been significantly higher than the global average. The winter air temperature in the last two decades has also shown a clear increasing trend over the observation stations of Shimla and Solang and over the entire State region as well (Bhutiyani et al. 2007; HP-SAPCC 2012).

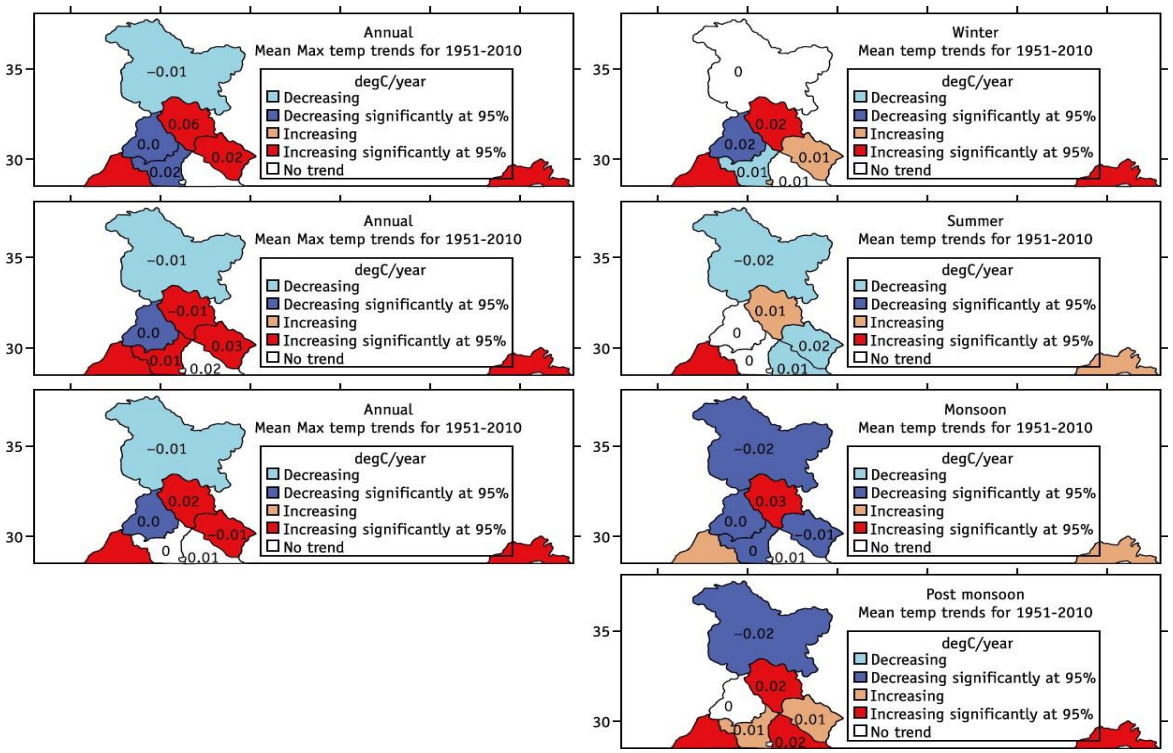


Figure 2.1: Trends in annual maximum, minimum, and mean temperatures (on left) and trends in seasonal mean temperatures (on right) for 1951–2010 period
Source: IMD monograph: ESSO/IMD/EMRC/02/2013

2.3 Temperature extremes as per Climate Modeling

Analyze of future climate over the State using the regional model simulations at 25 km × 25 km resolution are being carried out. The model used in the study is Providing Regional Climates for Impacts Studies (PRECIS) Model.

Mean annual maximum temperature (Tmax) over the State is projected to increase by 1.1–1.9°C (Figure 2.2). The mean annual minimum temperature (Tmin) is also projected to increase over the study domain area in the range 1.5– 1.9°C (Figure 2.3). Relatively larger changes projected for minimum temperatures for the future. These findings corroborate with the historical trends overIndia,whichhaveseenincreaseinminimumtemperaturetocontributemorethan maximum temperature for the increase in mean temperature over the baseline period (1970–2000) (also see INCCA report, MoEF 2010) Increase in minimum temperature has many impacts not only over plants, crops but over humancomfortaswell.Thisalsoindicatesthatnighttimetemperaturesalsowill increase in the near future relative to the base line period.

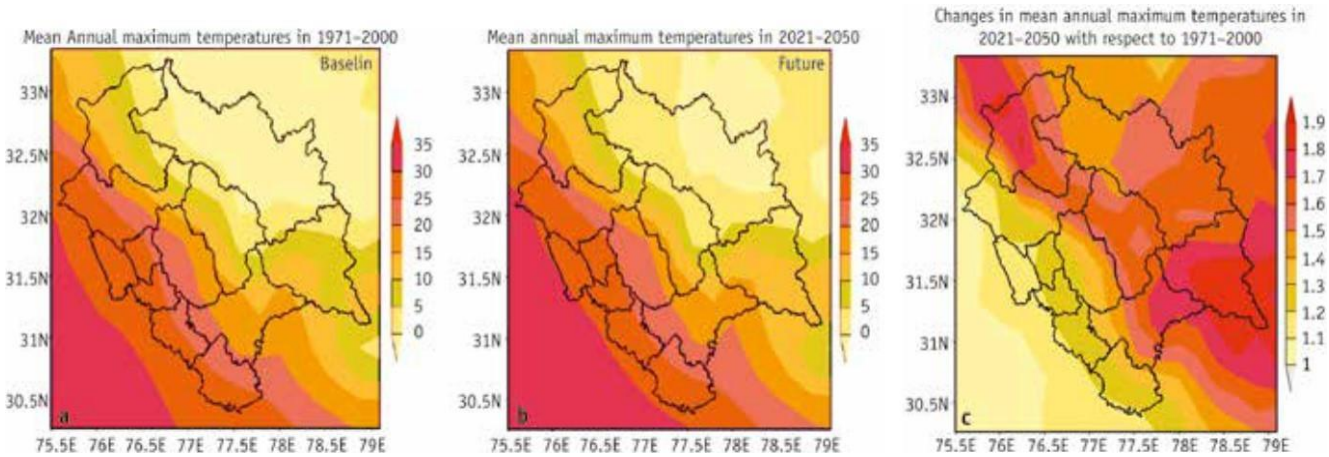
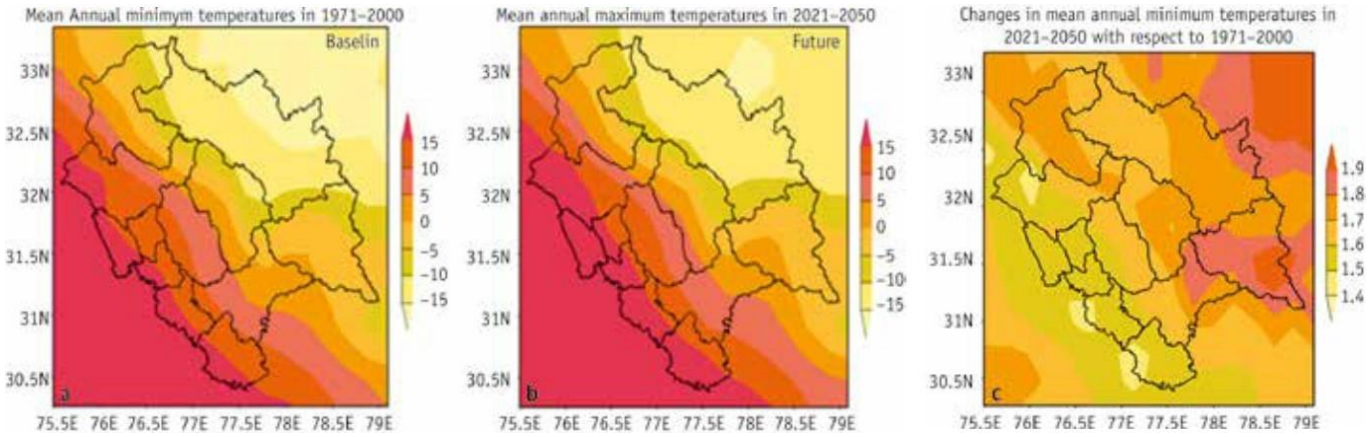
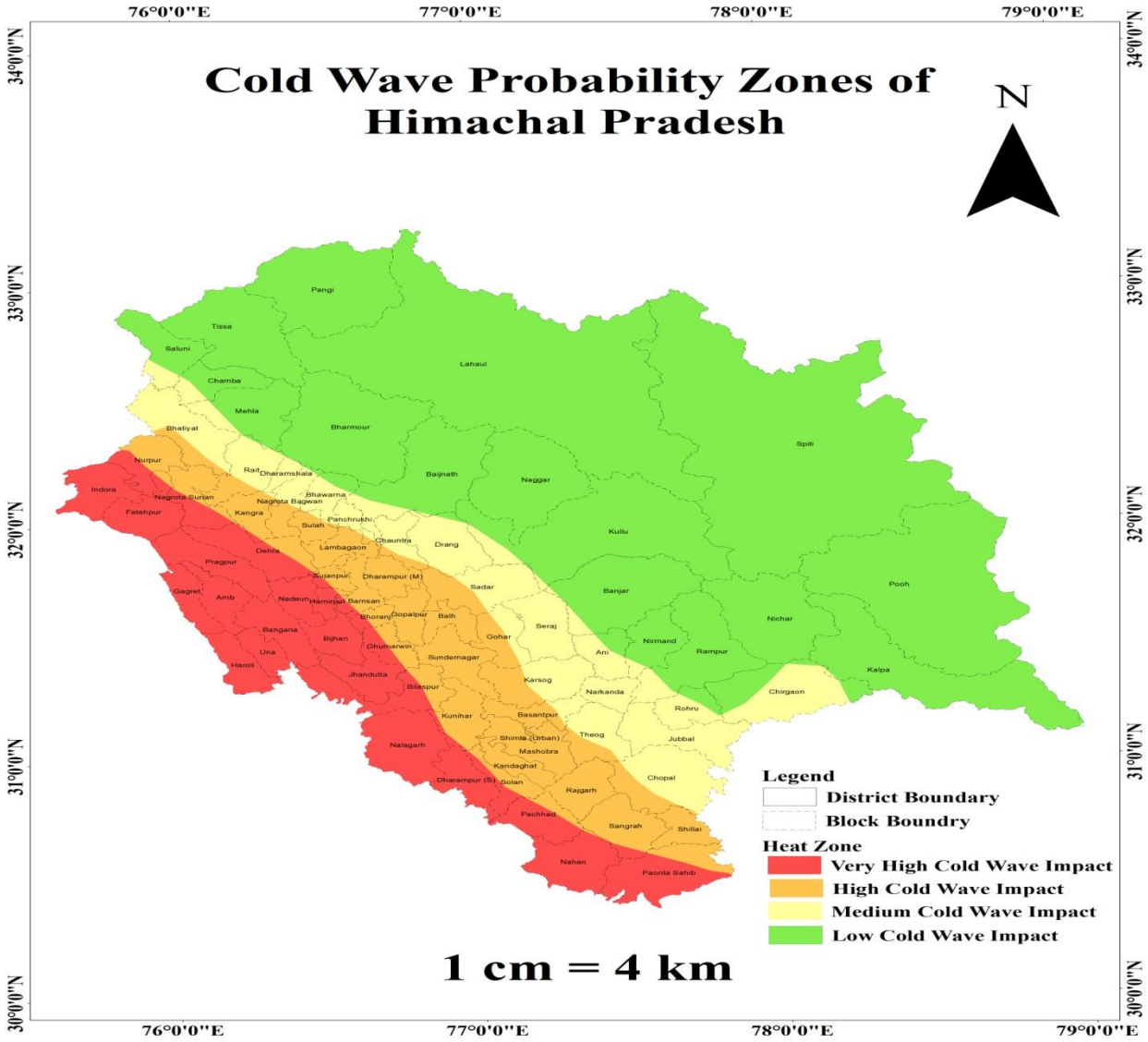


Figure 2.2: Mean annual maximum temperature (Tmax)

Figure 2.3: Mean Annual Minimum Temperature (Tmin)



2.4 Cold Wave Vulnerability Assessment



2.5 Impact of cold wave

Impact of cold wave In recent years, occurrences of extremely low temperatures in association with the incursion of dry cold winds from the north into the sub-continent area have been substantial in creating cold wave spells. The impact of the cold wave on human beings can lead to death or injury. The mortality rates show a marked increase in populations exposed to cold wave.

A cold wave can also cause death and injury to livestock. During a cold wave, the animals require a higher intake of nutrition. Often, if a cold wave is accompanied by heavy and persistent snow, grazing animals are unable to graze hence requiring more fodder to be provided indoors. If the food is inadequate and there is exposure to low temperatures, animals may die of hypothermia or starvation. Similarly, wildlife also experiences challenges during winter for both shelter and food.

Cold waves bring unexpected freeze and frost during the Rabi cropping season affecting crops, horticultural plantations/orchard, and other agricultural allied services. Cold waves impede the vegetative growth of plants/ seedlings and may result in crop failure. As a result, the livelihood of people gets adversely affected. A farmer also needs to acquire food and fodder to feed livestock at considerable cost if there is crop failure. At times cold waves can leave the land in danger of forest fires that consume dead biomass. The infrastructure is also affected due to extremely cold climate. For instance, specific plumbing is required in colder regions. Similarly, antifreeze needs to be added to the car for it to function.

2.6 Vulnerable Groups of Population

Extreme variation in temperature does not impact all people equally. Some people are more vulnerable and its impacts than others. It is important to identify the more vulnerable areas and populations of the State in order to establish priorities and minimum thresholds for alerts and activities. Incorporating informationaboutvulnerablepopulationgroupswithin theStatewillhelpplanners create effective, targeted strategies for reaching and protecting these groups. This will make the Cold wave action plan more robust and equitable for all of the State residents. Following may be considered as vulnerable group:

a. Young children
b. Pregnant Women & Nursing mothers
c. Older people mainly above the age of60
d. Below Poverty Line (BPL) families with no or poor housing conditions
e. Infirm, isolated, and destitute
f. People with pre-existing medical conditions (e.g., cardiovascular and respiratory illness, diabetes), people on certain medications
g. People with limited mobility, impairment of thermoregulatory capacity and reduced ability to perceive changes in temperature.
h. People engaged in outdoor occupations.

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 service sand active registration of individuals with a general practitioner or social services.

Chapter-3

3.1 Early Warning and Communications

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 provides warning against severe weather phenomena like tropical cyclones, squally winds, heavy rainfall/snow, thunder-squall, hailstorm, dust storms, heat/ cold wave, warm night, fog, cold wave, cold night, ground frost, etc. It also provides real time data and weather prediction of maximum temperature, extreme temperatures, and alerts for vulnerable cities/rural areas.

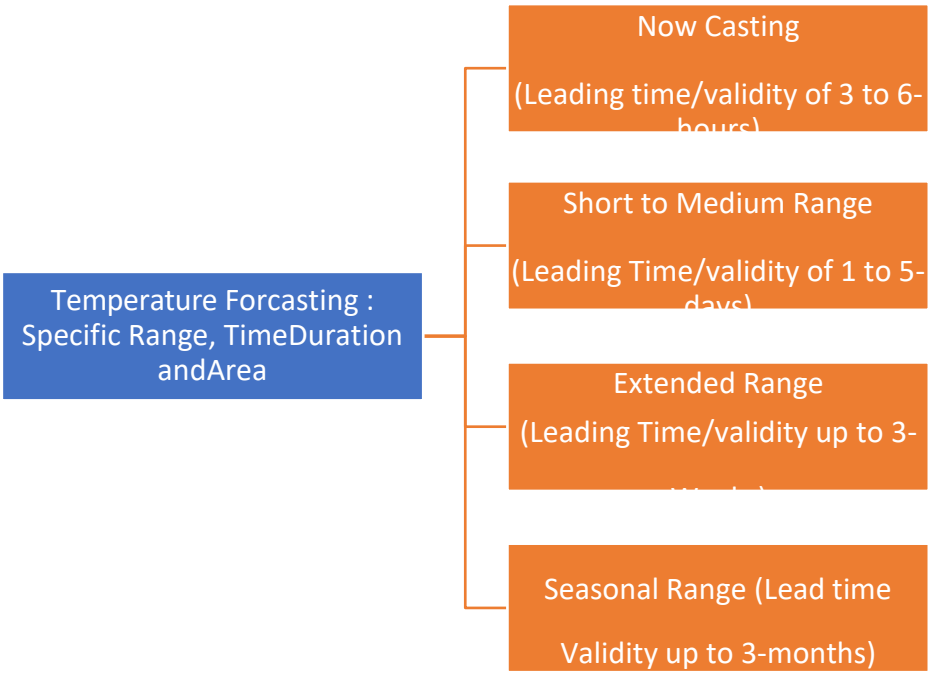
IMD issues forecasts and warnings for all weather-related hazards in short to medium range (valid for then extend five days) every day as a part of its multi-hazard early warning system. These warnings, updated four times a day, are available at ***http://www.imd.gov.in/pages/allindiawxfcbulletin.php.***

A new system of exclusively temperature variation-related warnings has been introduced with effect from 03 April 2017. These warnings, valid for the next 5(five) days, are issued around 1600hours 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 outlook for the next two weeks (for all hazards including Cold wave) 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*** & (***http://nwp.imd.gov.in/cfs_all.php?param=tmaxa,respectively).***

From 2016, IMD has introduced a system of issuing seasonal temperature outlooksforthenextthreemonths.For2017,the first outlook valid for March to May was issued on28February2017;andthesecondonevalidforApriltoJune wasissuedon02April 2017.Theseseasonaloutlooksareissuedintheformofa press release on the IMD website, and through electronic and print media. These are also provided to all concerned Chief Secretaries, Disaster Managers and to the health sector through the India Medical Association (IMA).

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



(Figure-1)

3.2 Cold-Related Threshold

A rapid fall in temperature within 24 hours to a level requiring substantially increased protection to agriculture, industry, commerce, and social activities.

a. When normal minimum temperature is equal to 10°C or more.
   - Cold Wave Departure from normal is -5°C to -6°C.
   - Severe Cold Wave Departure from normal is -7°C or less
b. When normal minimum temperature is less than 10°C.
   - Cold Wave Departure from normal is -4°C to -5°C.
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When WCTn is 0°C or less, Cold Wave should be declared irrespective of normal minimum temperature of the station. However, this criteria is not applicable for those stations whose normal minimum temperature is below 0°C.

The IMD disseminates information directly to Relief Commissioner (RC) which being circulated by State Emergency Operation Centre to all DDMAs along with various state agencies, Doordarshan, All India Radio (AIR) and other media houses by mails. In case of an expected Cold Wave, mails are also sent to all the district collectors for alertness and preparedness for action.

3.3 Identification of Color Signals for Cold Alert

IMD currently follows a single system of issuing warnings for the entire country through a color code system as given below (Figure-4). This system advises on the severity of an expected Cold hazard. However, threshold assessments carried out in different parts of the country tells us that there are different cut-off points that determine the warning signals appropriate for a specific state/region. The States should, therefore, carry out their respective threshold assessments for mortality and provide the information to IMD so that it can provide specific warning alerts to those States.

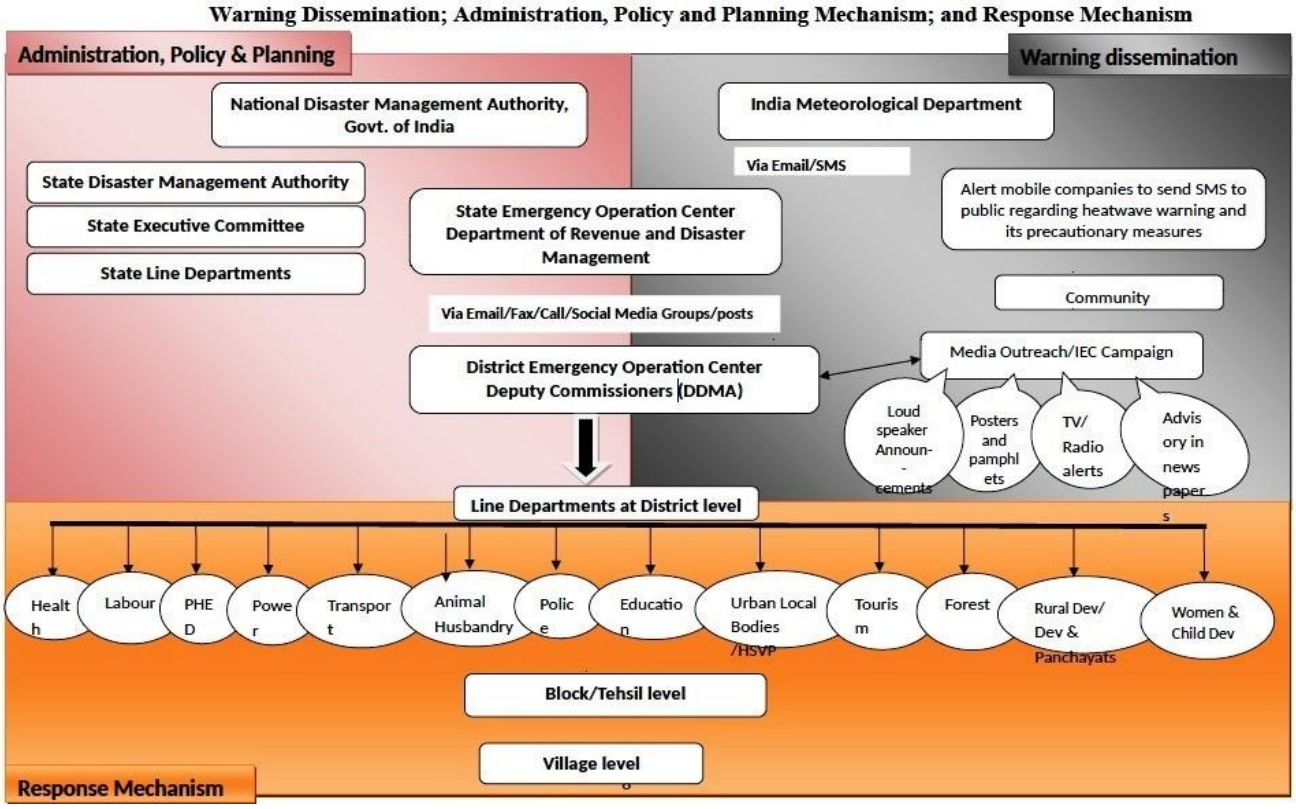
Colour Code	Alert	Impact
Green **(No action)**	Normal night	Minimum temperatures are near normal
Yellow Alert **(Be updated)**	Cold Alert	Cold wave conditions at isolated pockets persist on 2 nights
Orange Alert **(Be prepared)**	Severe Cold Alert for the night	(i) Severe cold wave conditions persist for 2 days (ii) Though not severe, but cold wave persists for 4 nights or more
RedAlert **(Take Action)**	Extreme cold Alert for the night	(i) Severe cold wave persists for more than 2 nights (ii) (Total number of cold/severe cold wave nights exceeding 6 nights.

Source:-Proceedings ofNational Webinar on Cold Wave Risk Reduction 2020-21

(Figure-2)

3.4 Cold Alert Warning System

Early warning systems can enhance the preparedness of decision-makers and their readiness to harness favorable weather conditions. Early warning systems for natural hazards is based both on sound scientific and technical knowledge. Accurate and timely alert systems are essential. Collaboration with India Meteorological Department (IMD) is needed to develop cold warning systems (CWS), trigger a warning, determine the threshold for action and communicate the risks. It also provides real-time data and weather prediction of maximum temperature. The IMD issues a weekly bulletin with the Current Temperature Status and Warning for next five days. The Himachal Pradesh State Disaster Management Authority and State Emergency Operation Centre instantly share this info to the District Disaster Management Authority and District Emergency Operation Centre. The District Administration communicates this in multiple channels to the public.



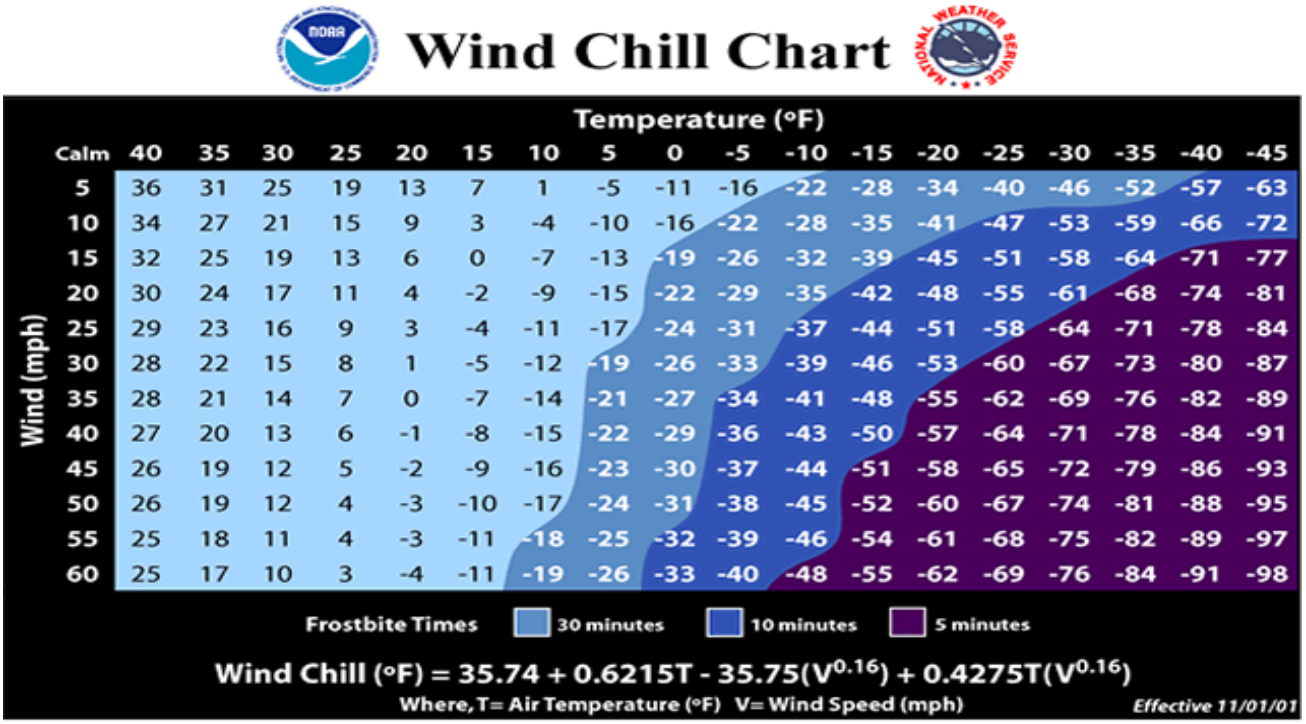
(Figure-3)

- Cold wave forecast is transmitted to all other concerned authorities through email by Himachal Pradesh State Emergency Operation Centre (HPSEOC). The warning is sent to District Emergency Operation Centre which is further transmitted to DC, SP, ADC/ADM, ASP, SDMs and Tehsildars and all the heads of line departments through mass text and image message in the WhatsApp group toall.
- Issue of Cold alert when extreme events are forecast by IMD to all key Departments / Agencies through SEOC.
- DepartmentofPublicandRelationDisseminationofColdalerts/advisories, Do's and Dont's in various district level as well local Hindi/ English Daily newspapers and other electronic social media.
- Dissemination through Doordarshan (DD) and All India Radio(AIR)
- Activation of the DEOCs with inter-departmental personnel with vide publicity of Toll-Free No:1077.

Chapter-4
Cold Wave Mitigation and Preparedness

A cold wave taken place when minimum temperature of a location goes below 4 degree Celsius. Cold waves generally are capable of occurrence at any geographical location and are formed cooler air masses that accumulate over certain region. Wind and cold together make up the wind chill, a common element in winter season forecasts. Wind chill extremes can make outdoors unsafe. The wind can penetrate and remove the insulating layer of warm air that surrounds your body. Any exposed skin is vulnerable to frostbite.

A graphic table below show the Wind Chill Temperature (WCT) chart developed by the Environment Canada (EC) and the U.S. National Weather Service (NWS) in 2001:



Source:-National Weather Services, US Govt.

4.1 Prevention and Acclimatization

To deal with cold wave is a need for multi-sectoral and multi-dimensional administrative approach. Early warnings are major elements of cold wave risk reduction activity to minimize the loss of life and economic impacts. Its impact not only affects the human being but also livestock and wildlife. Many cold waves related illnesses are largely avoidable. The most crucial point of intervention concerns the use of appropriate prevention strategies and knowledge of effective prevention, first-aid.

Symptom and First Aid for Various Cold Disorders

Cold wave Disorder	Symptoms	First Aid
Hypothermia	***Early Symptoms*** • Shivering • Fatigue • Loss of coordination • Confusion and disorientation ***Late Symptoms*** • No shivering • Blue skin • Dilated pupils • Slowed pulse and breathing • Loss of consciousness	Take the following steps to treat a worker with hypothermia: • Alert the supervisor and request medical assistance. • Move the victim into a warm room or shelter. • Remove their wet clothing. • Warm the centre of their body first-chest, neck, head, and groin-using an electric blanket, if available; or use skin-to-skin contact under loose, dry layers of blankets, clothing, towels, or sheets. • Warm beverages may help increase the body temperature, but do not give alcoholic beverages. Do not try to give beverages to an unconscious person. • After their body temperature has increased, keeps the victim dry and wrapped in a warm blanket, including the head and neck. • If victim has no pulse, begin cardiopulmonary resuscitation (CPR).
Frostbite	• Reduced blood flow to hands and feet (fingers or toes can freeze) • Numbness • Tingling or stinging • Aching • Bluish or pail, waxy skin	• Get into a warm room as soon as possible. • Unless absolutely necessary, do not walk on frostbitten feet or toes-this increases the damage. • Immerse the affected area in warm-not hot-water (the temperature should be comfortable to the touch for unaffected parts of the body). • Warm the affected area using body heat; for example, the heat of an armpit can be used to warm frostbitten fingers. • Do not rub or massage the frostbitten area; doing so may cause more damage. • Do not use a heating pad, heat lamp, or the heat of a stove, fireplace, or radiator for warming. Affected areas are numb and can be easily burned.

Trench Foot	• Reddening of the skin • Numbness • Leg cramps • Swelling • Tingling pain • Blisters or ulcers • Bleeding under the skin • Gangrene (the foot may turn dark purple, blue, or gray)	• Remove shoes/boots and wet socks. • Dry their feet. • Avoid walking on feet, as this may cause tissue damage.
Chilblains	• Redness • Itching • Possible blistering • Inflammation • Possible ulceration in severe cases	• Avoid scratching • Slowly warm the skin • Use corticosteroid creams to relieve itching and swelling • Keep blisters and ulcers clean and covered

4.2 Hospital Preparedness Measures for Managing Heat related Illness

Director/In-charge of Hospitals in State/Districts should ensure that the following measures are in place:

a) Detailed action plan to tackle Cold-related illnesses well in advance for winter months.

b) Standard Operating Procedures to tackle all levels of cold related illnesses. Capacity building measures for doctors, nurses and others staff should be undertaken.

c) Caseswithsuspectedheatstrokeshouldberapidlyassessedusingstandard Treatment Protocols.

d) Identify surge capacities and mark the beds dedicated to treat heat stroke victims and enhance emergency department preparedness to handle more patients.

e) RRT (Rapid Response Teams) to respond to any exigency call outside the hospitals.

f) Ensure adequate arrangements of Staff, Beds, essential medicines and equipment to cater to management of volume depletion and electrolyte imbalance.

g) May try to establish outreach clinics at various locations easily accessible tothevulnerablepopulationtoreducethenumberofcasesaffected.Health Centres must undertake awareness campaigns for neighbourhood communities using different means of information dissemination.

h) Primary centres must refer the patients to the higher facility only after ensuring adequate stabilization and basic definitive care.

i) Hospitals must ensure proper networking with nearby facilities and medical centres to share the patient load which exceeds their surge capacities.

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

4.3 Identification and first-aid of Cold disorders in animals

Some cold wave illness includes:

- Hypothermia
- Frostbite
- Loss of appetite
- Arthritis in heavy animals
- Kennel cough in pet dogs
- Respiratory illness

Cold wave Disorder	Symptoms	First Aid
Hypothermia	Low body temperature (by extended exposure to cold), shivering, lethargy, listlessness	• Limited the time spent outside during the winter months • Swaddle animals in warm blankets.
Frostbite	Pale hard skin, blisters on skin with further darkening of skin and possibility of gangrene	• Limited the time spent outside during the winter months • Swaddle animals in warm blankets. • Apply Warm water to the affected area
Kennel Cough	Symptoms of respiration infection	• Vaccination and approach for veterinary care as soon as possible
Shock	Irregular heat rate, weak pulse, low temperature, pale gums	• Prevent loss of body heat and cover the animal with blankets. • approach for veterinary care as soon as possible

Veterinary infrastructure and expertise need to be arranged/ upgraded which may also include:

- Deployment of adequate number of veterinarians and paravets in cold prone area.
- An arrangement of mineral, lifesaving drugs, fluids and other medicines and equipment's in veterinary hospitals at all the times.
- Activation of mobile veterinary units
- Conducting awareness programmes in respect of clod management of animals.
- Identifying disposal sites for dead animals
- Liaison with stakeholder/agencies whenever required

Chapter-5

Documentation and Reporting format

To enable policy decisions and to take necessary mitigate action in case of extreme weather events (cold wave and frost), a detailed, uniform and validated data is required. Small and marginal farmers, animal owners, vendors, street hawkers, construction workers, field officials/employees, students, elder, children, women and mostly weaker sections of society are vulnerable to the adverse impacts of these extreme events. Data is needed for better planning and action taking for cold wave risk reduction.

A database of incidences of cold wave and frost; resultant damages; identified and mapped vulnerable areas of frequent cold wave and frost; level of preparedness of the local administration and the general public in the vulnerable areas, needs to be developed and shared with all concerned stakeholders for necessary and appropriate action to mitigate the impact of cold wave and frost. This database will also help in understanding the frequency and severity of these incidents in vulnerable areas, and prioritise and develop customise action plans.

A format for collecting data, to be used by the District/States Authority (DDMAs and SDMAs), is given as Format 1 to 2. District Administration/DDMAs will collect district-level data and report the same to respective States/SDMAs which, in turn, will collate all such data and share the same with the Centre (Ministry of Home Affairs/National Disaster Management Authority).

Chapter-6
Role and Responsibilities and Implementation Plan

6.1 Role of State Government:

Himachal Pradesh have notified Himachal Pradesh State Disaster Management Authority (HPSDMA) & State Executive Committee (SEC) at State & DDMAs at all Districts under DM Act.2005 to take effective steps for disaster management. These authorities are in charge of the relief and rehabilitation measures to look into the said activities Department of Revenue has establish Disaster Management Cell (DMC) to assist SDMA & DDMAs linkages with the various development and regulatory departments concerned with prevention, mitigation and preparedness. DMC also focuses on capacity building, participation and empowerment of these stakeholders in Heatwave management.

6.2 Departmental Responsibilities and Implementation Plan for Cold wave management.

Cold wave mitigation measure involves a multi-sectoral and multi-dimensional administrativeapproachinvolvingactivitiessuchasprovisionfordrinkingwater, temporary shelter, rescheduling the working hours, providing better emergency medical services/public health and soon. This Action plan provides a framework for implementation, coordination and evaluation of activities undertaken by Departments/Authorities in their respective area to reduce the negative impact of extreme Cold wave. In view of above, some of the departments have been identified and their responsibilities are fixed for the proper management of Cold wave in the State:

Cold wave

Standard Operating Procedures (Department-wise)

Role of SDMA in the Cold Wave management			
S. No.	**Action**	**Operating Procedure**	**Coordinating Agencies**
Risk Analysis			
.	**Prepare cold wave risk map/hotspot**	- SDMA to constitute a Technical Working Group on Cold Waves to analyze cold wave risk in state to identify hotspots. - SDMA to engage line department, technical institutions, CSOs/NGOs in technical working group. NIDM can be a good resource to technical working group. - Analysis of cold wave risk should include vulnerability/capacity (socio-economic data, population data, housing profile, livelihoods /work profile, health facility, agriculture and livestock),past cold wave data and impact and climate change projections. - Risk analysis should identify vulnerable areas, sectors and elements at risk. - SDMA to share cold wave hotspot/risk map with line department and DDMA. - SDMA to analyze actual cold wave and its impact against the cold wave risk map after the cold wave season. - SDMA to periodically update cold wave hotspot/risk map.	- Agriculture - Health - Animal Husbandry - Education - Panchayati Rajand - Urban Development - Police - University - Non-Govt. Organizations
Early Warning			
2.	**Disseminate seasonal winter (temperature) forecast[1], issued by IMD, to line departments and DDMA**	- SDMA to receive seasonal forecast for winter from IMD and other reliable sources. - SDMA to analyze seasonal forecast in terms of geographical focus and sectors and identify probable impact and mitigation measures. - SDMA to disseminate seasonal forecast to concerned line departments, DDMA and Municipal Corporations. - DDMA to disseminate forecast together with preparedness measures based on analysis.	- IMD - Agriculture - Health and Family Welfare - Animal Husbandry - Education - Urban Development - Rural Dev/Panchayati Raj

3.	**Disseminate 5-Day and Daily weather (severe cold wave/fog) warning to DDMA and line departments**	- SDMA to receive 5-day and Daily weather (severe cold wave/fog) forecast for winter from IMD. - SDMA to identify areas in forecasted cold wave/fog zone and probable impact of different sectors/line department. - SDMA to communicate cold wave/fog forecast to line departments, DDMA and municipal corporations. - SDMA to communicate forecast together with Dos and Don'ts. - SDMA to disseminate cold wave/fog forecast to public through social media, newspaper, TV Network and radio. - SDMA to corroborate 5-day and daily forecast of cold wave/fog with ground level information after the coldwave. - SDMA to compile the corroboration of forecast and actual situation for updating of cold wave risk map/hotspots.	- IMD - Health and Family Welfare - Animal husbandry - Transport - Food and civil supply - Education - Panchayati Raj - Urban development - Police/Traffic - Fire services - Labour - Social Welfare - Publicity - TV channel, FM Radio - Concerned Municipal Corporations
Preparedness			

4.	**Review and coordinate cold wave /fog preparedness measures**	- SDMA to organize state level meeting to review preparedness for cold wave/fog response. - SDMA meeting should review seasons forecast, identified cold wavehot spots, measures for response, coordination arrangement, preparedness of Disaster Management Cell (DM-Cell) relief measures, cold wave damage assessment system and mitigation measures. - SDMA to organize the meeting in November, preferably after the seasonal forecast by IMD. - SDMA to conduct awareness on Dos and Don'ts related to cold wave/fog through TV, radio, social media, newspaper, social event, public discussion. - SDMA to create a database of relief related NGOs/CSOs and volunteers at district and block level. - SDMA should organize a lesson learnt workshop on cold waves/fog after winter to draw key lessons from districts/ground level response. - SDMA to document good practices on cold wave preparedness and response. The learnings shall be widely shared including with NIDM. - SDMA to coordinate disaster response through DM-Cell.	- Health and Family Welfare - Animal Husbandry - Agriculture - Transport - Education - Panchayati Raj - Police - Food and Civil Supply - Urban Development - Social Welfare - Information and - DM-Cell - Relief/response related NGOs
Mitigation			

5.	**Coordinate cold wave risk mitigation measures into development interventions and relief and rehabilitation policy**	- SDMA should coordinate[2] with line department to identify measures for cold wave risk mitigation in development interventions of line departments. - SDMA to consolidate cold wave mitigation measures and prepare action plan for its implementation in partnership with line departments. - SDMA to coordinate with agriculture department for identification and promotion of cold wave risk mitigation measures in agriculture. It can include crop diversification, adoption of new locally appropriate measure, crop insurance, etc. - SDMA to coordinate with health department for strengthening cold wave medical response capacity at district and sub-district level. - SDMA to coordinate with public works/housing, urban development, civil engineering college/ university, engineer and architect association to look into feasibility of housing design for cold wave risk mitigation. - SDMA in collaboration with State ATI, NIDM, universities and NGOs/CSO to develop short- term course on cold wave/fog management for capacity building of stakeholders. SDMA to develop/adapt state specific cold wave dos and Don'ts.	District administration - Agriculture Department - Health and Family Welfare Department - Animal Husbandry Department - Public works/housing Department - Urban Dev Department - Panchayati Raj Department - Information and - State ATI - DDMA - Civil Engineering college/ University - Engineers and Architect Association NGOs/CSO
Risk Analysis			

1.	**Integration of cold wave as one of the hazards in the DDMP as per the NDMA guidance provided in Model framework for DDMP**	- Include cold wave in HRVCA process and identify risks to life, livelihoods and wellbeing of the people in district. In this regard ensure following: - Include cold wave in the vulnerability assessment of district with special reference to socio-economic profile, population data, vulnerable housing, agriculture and livestock. - Include cold wave as climate related hazard and conduct systematic hazard assessment indicating history, geographical hotspots of cold wave, frequency and intensity. - Conduct detailed capacity assessment including departmental capacities, local self-government institutions' (PRIs and ULBs) capacities and community capacities with special reference to coping and adaptive capacities for cold wave. - Finalize cold wave risk analysis and identify sector/department related disaster risks with special reference to cold wave through multiple stakeholders' coordination.	- District administration - Agriculture - Health and Family Welfare - Animal Husbandry - Education - Urban Development - Panchayati Raj - ULBs - Block Panchayats - CSR Foundations - Civil Society Organizations

Role of DDMA in the Cold Wave management			
S. No.	**Action**	**Operating Procedure**	**Coordinating Agencies**
Risk Analysis			
1.	**Capacity building for risk analysis from district to block, Panchayat and ULB level**	- Build capacities of line departments, block, Panchayat and ULBs for conducting detailed needs assessment with special reference to coldwave. - Monitor the process and outcome of risk analysis at line departments, block, Panchayat and ULBs in timely manner and integrate findings into DDMP. - Encourage line departments, block, Panchayat and ULBs to take up enhanced preparedness and mitigation measures with special reference to cold wave.	District administration in coordination with: - Agriculture - Health and Family Welfare - Animal Husbandry - Education - Urban Development - Panchayati Raj - ULBs - Block Panchayats - CSR Foundations - Civil Society Organizations
Early Warning			
-	**Disseminate seasonal winter (temperature) forecast, issued by IMD, to line departments and local bodies**	- DDMA to receive seasonal forecast for winter from IMD/SDMA, Shimla. - DDMA to analyze seasonal forecast in terms of geographical focus and sectors. - DDMA to disseminate seasonal forecast to concerned sectors at district levels, blocks and urban bodies. - DDMA to disseminate forecast together with preparedness measures based on analysis.	- Agriculture - Health and Family Welfare - Animal Husbandry - Education - Urban Development - Panchayati Raj - Municipalities - Blocks

Role of DDMA in the Cold Wave management			
S. No.	**Action**	**Operating Procedure**	**Coordinating Agencies**
		Early Warning	
	Disseminate 5-Day and Daily weather (severe cold wave/fog) warning to response related agencies and community	- DDMA to receive 5-day and Daily weather (severe cold wave/fog) forecast for winter from IMD/SDMA, Shimla. - DDMA to identify areas in forecasted cold wave/fog zone. - DDMA to communicate cold wave/ fog forecast to line departments, blocks and local bodies related to cold wave/fog zone. - DDMA to communicate forecast together with Dos and Don'ts. - Block to disseminate cold wave forecast and Dos and Don'ts to Gram Panchayats falling under forecast zone. - ULBs to disseminate cold wave/fog forecast and Dos and Don'ts to municipal wards. - DDMA to disseminate cold wave/fog forecast to public through social media, Local Cable TV Network, FM, Community Radio, social media. - DDMA/Block to coordinate with relief/response related NGOs, for volunteer mobilization and relief work.	- Health and Family W - Animal Husbandry - Transport - Education - Panchayati Raj - Police - Fire Services - Concerned Block(s) and Gram Panchayat(s) - Local TV channel(s) and FM Radio Station(s) - Concerned Municipal Bodies - Relief/response related NGOs
-	**Disseminate seasonal winter (temperature) forecast, issued by IMD, to line departments and local bodies**	- DDMA to receive seasonal forecast for winter from IMD/SDMA, Shimla. - DDMA to analyze seasonal forecast in terms of geographical focus and sectors. - DDMA to disseminate seasonal forecast to concerned sectors at district levels, blocks and urban bodies. - DDMA to disseminate forecast together with preparedness measures based on analysis.	- Agriculture - Health and Family Welfare - Animal Husbandry - Education - Urban Development - Panchayati Raj - Municipalities - Blocks

Role of DDMA in the Cold Wave management			
S. No.	**Action**	**Operating Procedure**	**Coordinating Agencies**
Early Warning			
	Disseminate 5-Day and Daily weather (severe cold wave/fog) warning to response related agencies and community	- DDMA to receive 5-day and Daily weather (severe cold wave/fog) forecast for winter from IMD/SDMA, Shimla. - DDMA to identify areas in forecasted cold wave/fog zone. - DDMA to communicate cold wave/ fog forecast to line departments, blocks and local bodies related to cold wave/fog zone. - DDMA to communicate forecast together with Dos and Don'ts. - Block to disseminate cold wave forecast and Dos and Don'ts to Gram Panchayats falling under forecast zone. - ULBs to disseminate cold wave/fog forecast and Dos and Don'ts to municipal wards. - DDMA to disseminate cold wave/fog forecast to public through social media, Local Cable TV Network, FM, Community Radio, social media. - DDMA/Block to coordinate with relief/response related NGOs, for volunteer mobilization and relief - work.	- Health and Family W - Animal Husbandry - Transport - Education - Panchayati Raj - Police - Fire Services - Concerned Block(s) and Gram Panchayat(s) - Local TV channel(s) and FM Radio Station(s) - Concerned Municipal Bodies - Relief/response related NGOs
Preparedness			
	Implement cold wave /fog pr Implement cold wave /fog preparedness measures preparedness measures	- DDMA to organize a meeting of members and first responders to review cold wave/fog preparedness in the district. - In the meeting, review overall cold wave preparedness including dissemination plan for 5-day/daily forecast for cold wave/fog; response plan of departments; temporary shelters for poor and	- Health and Family W - Animal Husbandry Department - Transport Department - Education Department - Panchayati Raj Department - Police

Role of DDMA in the Cold Wave management			
S. No.	**Action**	**Operating Procedure**	**Coordinating Agencies**
Preparedness			
	Disseminate 5-Day and Daily weather (severe cold wave/fog) warning to response related agencies and community	Home less; relief distribution plan and stocks; plan for assessment of agriculture sector; animal husbandry, etcetera; plan for activation of emergency operation centre/control room during severe cold wave forecast days; emergency directory of response agencies and volunteers. - The meeting should be organized in November, preferably after the seasonal forecast by IMD/SDMA. - DDMA to conduct mass awareness on Dos and Don'ts related to cold wave/fog through FM radio, social media, local cable channel, newspaper, hoarding, gram panchayats and NGOs. - DDMA to organize a lesson learnt workshop on cold waves/fog after winter to draw key lessons. The subject is relatively new; hence it is important to Draw lessons from ground.	- Fire Services Department - Concerned Block(s) and Gram Panchayat(s) - Local TV channel(s) and FM Radio Station(s) - Concerned Municipal Bodies - Relief/response related NGOs
Response			

	Operationalize EOC/ Control Room to coordinate cold wave response	- Activate EOC/Control Room for coordinating cold wave response: - At District level • Coordination with Line Departments • Ensure at least one staff with back up in each Control Room and at least one dedicated contact number at Control Room. - Set up helpline coordinating inter departmental assistance to cold wave affected individuals. **Send status report to DM-CELL.**	- Block(s)Administration - ULB(s) - Agriculture
Role of DDMA in the Cold Wave management			
S. No	**Action**	**Operating Procedure**	**Coordinating Agencies**
Preparedness			
	Disseminate Cold wave forecast to agencies and public	- Receive daily and 5-day cold wave forecast from IMD or State level. - Identify Blocks and Urban Local Bodies falling under the cold wave forecast. - Disseminate cold wave forecast to Blocks and Urban Local Bodies (ULBs). - Disseminate cold wave forecast to line departments and other institutions at district level. - Block administration to disseminate cold wave forecast and Dos and Don'ts to Gram Panchayats falling under the cold wave forecast. - ULBs to disseminate cold wave forecast and Dos and Don'ts to municipal wards. - Disseminate cold wave forecast to public through social media, Local Cable TV Network, FM, and Community Radio. - Monitor daily data of Cold related illnessin - Coordination with Health Department.	- Block(s)Administration - ULB(s) - Health and Family Welfare Department - Police Department - Social Welfare Department - Labor Department - Animal Husbandry Department - Education Department - Panchayati Raj Department - Transport Department - CSOs, Charitable Trust - Local Cable TV Network, FM, Community Radio
Mitigation			

	Build capacities of line departments, ULBs and PRIs on climate change adaptation, mitigation and mainstreaming	- As guided in NDMA's model framework on DDMP[4] (chapter six) formulate capacity building plan of line departments, ULBs and PRIs on climate change adaptation, mitigation and main streaming of disaster risk reduction including cold wave as important hazard. - Considering cold wave as one of the climate related hazard, design and conduct training for line	District administration in coordination with: - Agriculture Department - Health and Family Welfare Deptt - Animal Husbandry Department - Education Department
	Build capacities of line departments, ULBs and PRIs on climate change adaptation, mitigation and mainstreaming of	Departments, ULBs and PRIs on climate change adaptation, mitigation and mainstreaming of disaster risk reduction including cold wave as important hazard, as per the guidance of Mainstreaming Disaster Risk Reduction & Climate Change Adaptation in District Level Planning, A Manual for District Planning Committees January 2017.	- Urban Development Department - Panchayati Raj Department - ULBs - Block - Panchayat
Mitigation			
	Monitor the progress of integration of risk reduction measures in departmental plans	- Provide guidance to line departments, ULBs and PRIs for the mainstreaming of disaster risk reduction in development planning with special reference to mitigation measures for cold wave. - Monitor the progress of the work taken up by departments for mitigation of cold wave through DDMA meetings as per the guidance provided in article 32 of DM Act2005.	District administration - Agriculture Department - Health and Family Welfare Department - Animal Husbandry Department - Education Department - Urban Development Department - Panchayati Raj Department - ULBs - Block - Panchayats

Role of Panchayati Raj Department in the Cold Wave management			
S. No.	**Action**	**Operating Procedure**	**Coordinating Agencies**
		Risk Analysis	
	Inclusion of cold wave in the risk analysis conducted for the development of village disaster management plans	- Development of guidelines for conducting risk analysis at Gram Panchayat level with special reference to climate change and multiple hazards including coldwave. - Inclusion of cold wave in the hazard mapping indicating frequency, intensity, timeline and impact. - Inclusion of vulnerability factors in risk analysis with special reference to cold wave including vulnerable housing, nutrition status, agriculture and livestock. - PRD to identify cold wave susceptible Gram Panchayats based on past cases and seasonal forecast by IMD/SDMA. - PRD to identify vulnerable groups (age, income, profession) in the cold wave zones.	- Gram Panchayats - SHGs and CBOs - Front line Workers - Agro Producer Companies - Local Dairy Centre(s) - Fair Price Shop Vendors
		Early Warning	
	Disseminate 5-Day and Daily weather (severe cold wave/fog) warning to GPs	- PanchayatiRajdepartmenttoreceive5-dayanddaily weather (severe cold /fog) forecast from SDMA or DDMA or IMD. - Panchayati Raj department to analyze the forecast and identify Gram Panchayats in forecasted zone. - Panchayati Raj department to disseminate coldwave - forecast and Dos and Don'ts to identified Gram Panchayats. - Panchayati Raj department to activate an emergency control room/facility for the forecasted duration.	- Blocks - Gram Panchayats - Response/relief related NGOs

Role of Panchayati Raj Department in the Cold Wave management			
S. No.	**Action**	**Operating Procedure**	**Coordinating Agencies**
Preparedness			
	Prepare cold wave emergency response plan	- PRD to take stock of emergency response and relief resources (firewood, blankets, food), volunteers and its location. - PRD to prepare coordination and communication - Structure for cold wave emergency response.	- IMD/SDMA/DDMA - Blocks - Gram Panchayats - Response/relief related NGOs
2	**Create mass awareness on Dos and Don'ts related to cold wave**	- PRD to create mass awareness on Dos and Don'ts related to cold wave at block and gram panchayat level. - PRD to disseminate Dos and Don'ts related to cold wave through local cable channel, radio and community level cultural events. - PRD to instruct Gram Panchayat to include coldwave Dos and Don'ts as one of the agenda in gram Sabha meeting. - Gram Sabha to identify vulnerable groups for cold wave and plan support mechanism. - Gram Sabha to discuss the risk of toxic fumes due to lack of proper ventilation, especially during night-time.	- Blocks - Gram Panchayats - Cable Operators/Radio - Cultural events related organizations
Response			
	Cold wave information disseminatio	Ensure daily dissemination of cold wave alerts over whatsapp group/SMS to village heads, or on radio, social media for precautions.	
	Fuel, Food and Warm Clothing	Provision adequate fuel supply, food supply and quilts/blankets at night shelters (Rain Basera) for homeless/stranded people	- District Administration - Food and Civil Supplies Department

Role of Panchayati Raj Department in the Cold Wave management			
S. No.	**Action**	**Operating Procedure**	**Coordinating Agencies**
Response			
		Provision adequate fuel supply and quilts/blankets to identified vulnerable households (Single Women HHs/Women Headed HHs/Transgenders)	
Mitigation			
	Mainstreaming of disaster risk reduction in district sectoral planning with special reference to cold wave, climate related stresses	1. Vet district sectoral plans through the disaster lens to see whether they improve the capacities and reduce vulnerability at District Planning Committee level with special reference to climate related hazards including coldwave. 2. Ensure inclusion of mitigation measures and risk informed development planning based on the local vulnerabilities and needs in sectoral plans at Zilla Parishad and District Planning Committee (DPC) level with special reference to climate related hazards including cold wave.	- Zilla Parishad - District Planning Committee
	Inclusion of climate adaptation and mitigation measures in Gram Panchayat Development Plans (GPDP)	Based on the risk analysis conducted for village disaster management plan, include climate adaptation and special mitigation measures in gram Panchayat development plans as per guidance provided in NDMP 2019 and guidelines for preparing Gram Panchayat Development Plans for: 1. Resilient housing 2. Resilient agriculture 3. Nutrition 4. Livestock development	Gram Panchayats

Role of Urban Local Bodies in the Cold Wave management			
S. No.	**Action**	**Operating Procedure**	**Coordinating Agencies**
		Risk Analysis	
	Conduct HRVA of all the cities as per the guidance provided by Ministry of Housing & Urban Poverty Alleviation, in *Disaster Risk Reduction: A Handbook for Urban Managers*[9] with special reference to cold	- Prepare hazard and exposure database. - Conduct spatial mapping of the vulnerable population to climate related hazards including cold wave. - Map vulnerability profile with special reference to the buildings made from temporary material and damaged housing. - Conduct risk assessment with special reference to the identification of risks to life, livelihoods and wellbeing of population based on combined effect of hazard, exposure database, spatial population vulnerability mapping and building vulnerability mapping.	- ULBs - Academic Research Institutions - Disaster Management Professionals - GIS and Technocrat Professionals
		Early Warning	
	Disseminate 5-Day and Daily weather (severe cold wave/fog) warning to ward level officials	- Urban bodies to receive 5-day and daily weather (severe cold /fog) forecast from SDMA or DDMA or IMD. - Urban local bodies to disseminate cold wave forecast and Dos and Don'ts to ward level functionaries. - Urban local bodies to disseminate cold wave forecast through social media, FM radio, local cable operators and newspaper(s). - Urban local bodies to reschedule large-scale public gathering events in open areas during extreme cold wave durations.	- SDMA/DDMA/IMD - Ward Functionaries - Local Cable Operators - FM Radio(s) - Response/relief related NGOs

Role of Urban Local Bodies in the Cold Wave management			
S. No.	**Action**	**Operating Procedure**	**Coordinating Agencies**
Preparedness			
	Prepare cold wave emergency response plan	- Urban local bodies to take stock of cold wave emergency response and relief resources (firewood, blankets, food), volunteers, temporary shelters and its capacity, facility and location. - Urban local bodies to review large-scale public gathering events planned in open areas during extreme cold wave forecasted period. - Urban local bodies to review cold wave response measures for slum areas. - Urban local bodies to disseminate Dos and Don'ts related to cold wave through social media, FM radio, local cable operators and newspaper. - Urban local bodies to update emergency contact details. - Urban local bodies to check cold wave/fog preparedness features in the public transport: repair broken windows and door, fog light, fixing speed limit, signage in foggy condition, reschedule local transport timing and duration.	- Ward Functionaries - Volunteers/NGOs/Charitable Trusts - FM Radio(s) - Cable Operators
Response			
	Cold wave information dissemination	- Urban local bodies to identify cold wave vulnerable spots based on age, income, profession, etc. - Ensure daily dissemination of cold wave alerts through local cable operator and over website for precautions.	-

ole of Urban Local Bodies in the Cold Wave management			
S. No.	**Action**	**Operating Procedure**	**Coordinating Agencies**
Response			
	Night shelters for homeless/stranded people	- Set up Night Shelters (Rain Basera) in the identified strategic urban pockets for homeless/stranded people. - Coordinate with charitable organizations/NGOs running night shelters(Rain Basera)in the municipal areas for homeless/stranded people.	- NGOs and Charitable Trusts

	Fuel, Food and Warm Clothing Provision	- Provide adequate fuel supply, food supply and quilts/blankets at night shelters (Rain Basera) for homeless/stranded people. - Provide adequate fuel supply and quilts/blankets to identified vulnerable households (Single Women, HHs/Women Headed HHs/Transgender).	Food and Civil Supplies Department District Administration
Mitigation			
	Structural mitigation measures	1. Construct new infrastructure including night shelters as per the emerging need from HRVA spatial population vulnerability data. 2. Initiate repair of lifeline buildings including schools, health care centres, night shelters for saving lives of the vulnerable people from extreme climate events including cold wave.	1. ULB 2. PWD 3. Ward Functionaries Volunteers/NGOs/Charitable Trusts
	Non-structural mitigation measures	1. Promote health insurance among communities for enhanced coping capacities in case of illness due to extreme climate conditions including cold wave. 2. Promote community-based groups by ICDS in urban poor pockets to ensure good nutrition status of the affected population. 3. Promote low cost and eco-friendly heating facilities at household and community level in collaboration with CBO	1. ULB 2. PWD 3. Ward Functionaries Volunteers/NGOs/Charitable Trusts
Role of Health & Family Welfare Department in the Cold Wave management			
S. No.	**Action**	**Operating Procedure**	**Coordinating Agencies**
Risk Analysis			
	Conduct risk analysis of the departmental services and infrastructure with special reference to climate related hazards	- Map infrastructural vulnerabilities of PHCs, CHCs, cottage hospitals, maternity wards and Civil Hospital which may cause suffering to the patients during extreme climatic conditions including coldwave. - Map cold wave related illnesses based on past data during extreme winter. - Conduct capacity mapping of the HR in terms of treatment of cold wave related illnesses. - Include the data and risk analysis in the HRVCA part of DDMP in coordination with DDMA.	- Health Department - DDMA - District Administration
Early Warning			

	Disseminate 5-Day and Daily weather (severe cold wave/fog) warning to ward level officials	- Health Department to receive 5-day and daily weather (severe cold /fog) forecast from SDMA or DDMA or IMD. - Health Department to disseminate cold wave forecast and Dos and Don'ts to PHCs, CHCs and frontline workers.	Health Department SDMA/DDMA/IMD
Preparedness			
	Capacity building for medical Staff	- Health department to build capacity at PHC and block level health facilities for treatment of coldwave related illness patients (hypothermia(subnormal body temperature); uncontrolled shivering, memory loss, disorientation, incoherence, slurred speech, drowsiness	Health Department

Role of Health & Family Welfare Department in the Cold Wave management			
S. No.	**Action**	**Operating Procedure**	**Coordinating Agencies**
Preparedness			
	Capacity building for medical Staff	and apparent exhaustion) - Health department to develop/review protocol for cold wave/frostbite cases referrals. - Health department to organize coordination with private sector health providers, in case of surge capacity. - Health department to take stock of medicines and facilities related to cold wave treatment/frostbite. - Health department to review human resource and medical supply plan for Cold wave related illnesses treatment at health units.	
Response			

	Frontline Workers' Response	Ensure that ASHA and ANMs provide immediate first aid to the persons showing initial symptoms of Cold wave related illness (hypothermia (subnormal body temperature); uncontrolled shivering, memory loss, disorientation, incoherence, slurred speech, drowsiness and apparent exhaustion).	Health Department Panchayati Raj Department
	Medical Response to Cold Wave	Ensure ambulance service for FRUs (CHCs) and District Health Facility referral treatment to the Cold wave related patients. Monitor morbidity and mortality due to cold wave.	Health Department
Mitigation			
	Non-Structural	Ensure that all CHCs, PHCs have adequate heating facilities.	Health Department
	Structural	Conduct timely repair of the structures of PHCs and CHCs ensuring adequate safety of staff and patients from extreme climate events including cold wave	

Role of Animal husbandry Department in the Cold Wave management			
S. No.	**Action**	**Operating Procedure**	**Coordinating Agencies**
Risk Analysis			
	Data collection and risk analysis	1. Systematically collect the data of past impact of cold on livestock including impact on survival, illness and reproduction. 2. Identify vulnerabilities associated with cattle sheds, seasonal stresses on fodder availability and the nutrition status of the cattle. 3. Identify geographical hotspots of impact of coldwave on livestock. - Integrate the risk analysis with theDDMP.	- Animal Husbandry Department - PRIs - Community based Producer Groups - Dairies - Veterinary Colleges and Agriculture Universities
Early Warning			
	Disseminate 5-Day and Daily weather (severe cold wave/fog) warning to	- Animal Husbandry Department to receive 5-day and daily weather (severe cold /fog) forecast from SDMA or DDMA or IMD. - Animal Husbandry Department to disseminate cold wave forecast and Dos and Don'ts to cattle rearers.	- Animal Husbandry Department - SDMA/DDMA/IMD
Preparedness			

	Create awareness on Dos and Don'ts of cold waves related to animals	- Animal Husbandry Department to develop/update Dos and Don'ts of cold waves related to animals specific to UP before winter season. - Dos and Don'ts should have visual representations. - Disseminate these Dos and Don'ts through radio, TV especially programmes related to agriculture, social/cultural events. - Display Dos and Don'ts at APMC(markets). - Disseminate these Dos and Don'ts to Gram Panchayats through Panchayati Raj Deptt. - Coordinate with Agriculture Department for dissemination exercise.	- Animal Husbandry Department - Agriculture Department - Panchayati Raj Department - Gram Panchayat - Cable TV operators - Radio
Role of Animal husbandry Department in the Cold Wave management			
S. No.	**Action**	**Operating Procedure**	**Coordinating Agencies**
Preparedness			
	Preparedness for cold wave response for animals	- Animal husbandry department to identify hot spots based on past cases and seasonal cold wave forecasts by IMD/SDMA. - Prepare emergency response plan for stray animals in case of extreme cold wave. - Identify/create emergency shelter facilities for stray animals for protection from cold waves. - Take stock of fodder and related items for animals in case of long spell of cold waves affecting supply chain of fodder. - Check stock of medicines at veterinary hospitals and stockpile if required. - Create/update emergency contact list related to animal husbandry.	- Animal Husbandry Department
Response			
	Response to Cold Wave	- Ensure veterinary hospitals cater to ill animals in case of mass impact of cold wave on animals. - Conduct quick damage needs assessment of livestock for relief distribution.	Animal Husbandry Department Panchayati Raj Department
	Emergency Shelter	- Make provision of fodder for stray animals during cold wave in emergency shelter.	Animal Husbandry Department
Mitigation			

	Non-structural	- Promote livestock insurance schemes. - Ensure storage facilities and availability of nutritious fodder during cold wave.	1. Animal Husbandry Department 2. Panchayati Raj Department 3. Gram Panchayats
	Structural	- Development of low cost climate resilient cattle sheds from MGNREGS, RKVI and NRLM under GPDP.	
Role of Agriculture Department in the Cold Wave management			
S. No.	**Action**	**Operating Procedure**	**Coordinating Agencies**
Risk Analysis			
	Climate risk assessment of the agriculture	- Identify impact of climate related hazards including cold wave on the agricultural practices, cropping patterns and productivity. - Identify coping and adaptive capacity of the local farming capacities with special reference to climate related hazards including coldwave. - Integrate existing district agriculture contingency plan with DDMP.	- Agriculture Department - KVKs - Agriculture Universities - DDMA
Early Warning			
	Disseminate 5-Day and Daily weather (severe cold wave/fog)	- Agriculture Department to receive 5-day and daily weather (severe cold /fog) forecast from SDMA or DDMA orIMD. - - Agriculture Department to disseminate coldwave forecast and Dos and Don'ts to farmers.	- Agriculture Department - SDMA/DDMA/IMD
Preparedness			
	Create awareness on Dos and Don'ts related to crop for cold wave/frost	- Agriculture department to develop UP specific Dos and Don'ts related to crop for coldwave/frost. - The Dos and Don'ts should have visual representations. - Disseminate the se Dos and Don'ts through TV& radio especially progarmme like Krishi darshan or related. - Disseminate Dos and Don'ts through social/cultural events.	- Agriculture Department - Panchayati Raj Department - Agriculture University - Animal Husbandry Department - Gram Panchayat - Cable TV operators Radio
	Relief to Affected Farmers	- Coordinate with DDMA, KVK and helpline for immediate technical assistance to farmers for crop protection in case of major impact. - Conduct quick damage needs assessment to crop damage for relief distribution.	- Agriculture Department
Mitigation			

	Non-structural mitigation (Research)	1. Promote research, monitoring and information systems consistent with the anticipated GACC impacts 2. Develop Database management system relating to Climate Change & cold wave	- 1. Agriculture Department
	Non-structural mitigation Promote crop insurance to reduce loss from cold wave/frost	1. Agriculture department to take stock of existing crop insurance schemes and its coverage of cold wave/frost, type of crops covered, insurance premium, claim settlement process. 2 Crop insurance schemes to be revised, if required, for easy and affordable access to crop insurance for farmers. 3. Create awareness on crop insurance using generic 1. Advertisement in partnership with crop insurance companies. 2. Agriculture department to prepare/update plan for providing swift assistance to farmers especially poor farmers in case of damage to crop due to cold wave through existing scheme	1 Agriculture Department 2 Agriculture Insurance Companies 3 Agriculture/Cooperative Bank 4 Panchayati Raj Department 5 Agriculture University - NGOs/CBOs
	Mainstreaming of climate adaptation and DRR	Mainstreaming of Rashtriya Krishi Vikas Yojana (RKVY), , Mission for Integrated Development of Horticulture (MIDH), National Food Security Mission (NFSM), Pradhan Mantri Krishi Sinchayee Yojana (PMKSY) in GPDP towards enhanced coping and adaptive capacities of marginal farmers including men andwomen.	- Agriculture Department - Gram Panchayats - Panchayati Raj Department - Agriculture University - NGOs/CBOs

Annexure-I

Cold Wave

Do's and Don'ts for common people

Before

- Follow all media outlets like radio/TV/newspapers for local weather forecast to know if a cold wave is likely to occur in next few days.
- Stock adequate winter clothing. Multiple layers of clothing are more helpful.
- Keep emergency supplies – like food, water, fuel, battery, chargers, emergency light, and basic medicines ready.
- Ensure proper closure of door and windows so that cold winds do not get in the home.
- An increased likelihood of various illnesses like flu, running/stuffy nose or nosebleed, which usually set in or get aggravated due to prolonged exposure to clod. Consult the local health workers or doctor for symptoms like this.

During

- Follow weather information and emergency procedure information closely and act as advised by government agencies
- Stay indoors as much as possible and minimize travel to prevent exposure to clod wind, rain, snow
- Wear multiple layers of loose fitting, lightweight; windproof nylon/cottons outside and warm woollen clothing inside rather than one layer of heavy clothing. Tight clothing reduces blood circulation – avoid them
- Keep yourself dry. If wet then cover your head, neck, hands and toes adequately as majority of heat loss occurs through these body parts. Change wet clothes immediately
- Prefer mittens (without fingers) over gloves with fingers. Mittens provide more warmth and insulation from cold, as fingers share their warmth and expose less surface area to the cold. Cover your mouth & nose to protect your lungs. Wear mask when going out to protect form COVID-19 and other respiratory infections
- Use cap/hats and mufflers to prevent heat loss, wear insulated/waterproof shoes. Cover your head as most body heat is lost through the top of the head
- Eat healthy food
- Eat fruits and vegetables rich in Vitamin C to maintain adequate immunity
- Drink hot fluids regularly, as this will maintain body heat to fight cold
- Moisturize your skin regularly with oil, petroleum jelly or body cram
- Take care of elderly people, new-borns and children and check neighbours who live alone, especially the elderly about their wellbeing
- Store essential supply as per requirement. Store adequate water as pipes may freeze
- Conserve energy. Restrict the use of room heater to heat rooms only when necessary
- Do heating appliances such as room heater is used, ensure adequate ventilation
- Do not burn coal indoors for generating heat – if you have to burn coal or wood have proper chimney so that smoke goes out. Coal burning in closed spaces could be dangerous as it can produce carbon monoxide which is very poisonous and can kill persons in the room

- Follow the guide on heat insulation for non-industrial buildings and take necessary preparedness measures to prevent heat loss
- Move pet-animals indoors. Likewise, protect livestock or domestic animals from cold weather by moving them inside – or cover them with blankets
- Avoid prolonged exposure to cold

- Don’t drink alcohol. It reduces your body temperature, it actually narrows your blood vessels, particularly those in the hands, which can increase the risk of hypothermia
- Do not massage the frostbitten area. This can cause more damage to skin
- Do not ignore shivering. It is the first sign that the body is losing heat – get indoors
- Do not ignore shivering. It is the first sign that the body is losing heat – get indoors
- Do not give the affected person any fluids unless he or she is fully alert
- Watch out for symptoms of frostbite like numbness, white or pale appearance on fingers, toes, ear lobes and the tip of the nose, while exposed to clod wave
- Prolonged exposure to cold can turn skin to pale, hard and numb, and red blisters on exposed body parts such as fingers, toes, nose and/ or earlobes, Red colour of the skin may change to black when the part becomes dead. This is very dangerous and called gangrene – it is irreversible. So on first signs of frost bite immediately consult the Doctor. Even before that try to immediately warm the part with heat source taking care not to over-heat or the part may get burns
- Treat the areas affected by frostbite in warm (not hot) water (the temperature should be comfortable to touch for unaffected parts of the body)
- Do not ignore shivering. It is an important first sign that the body is losing heat and is a signal to need for quickly returning to indoors for warmth
- Get the person into a warm place and change clothes if wet or very cold
- Warm the person’s body with skin-to-skin contact, dry layers of blankets, clothes, towels, or sheets. Keep him near a heater or fire place
- Give warm drinks to help increase body temperature. Do not give alcohol as it will reduce the body temperature
- Exposure to cold wave can lead to Hypothermia – a decrease in body temperature which can cause shivering, difficulty in speaking, sleepiness, stiff muscles, heavy breathing, weakness and/or loss of consciousness. Hypothermia is a medical emergency that needs immediate medical attention
- Seek medical attention as soon as possible for someone suffering from Frostbite/Hypothermia.
- Consult doctor or health worker for symptoms like running/stuffy nose particularly during the period COVID-19.
- Follow NDMA pp on FAST for basic First Aid.

Agriculture

Cold wave and frost damages crops by causing physical injury to cells, there by pest and disease are likely to invade the crop. Cold wave also causes variety of physiological disruptions, mostly when the crop is in seedling stage or reproductive stage. Prolonged cold may affect germination, growth, flowering and yield.

Do’s

- Undertake curative measures to avoid disease invasion due to cold injury by spraying Bordeaux mixture or Copper Oxi-chloride. Application of phosphorus (P) and potassium (K) fertilizers post cold wave will activate better root growth and help crop to recover fast from cold injury
- Provide light and frequent surface irrigations during the cold wave. Due to high specific heat of water irrigation protects plant from cold injury
- Sprinkler irrigation will also help reduce cold injury to plants as the condensation of water droplets release heat into the surrounding
- Cultivate of cold/frost resistant plants/crops/varieties
- Grow intercropping in perennial orchards
- Mixed cropping of vegetables, vis., tomato, brinjal with tall crop like mustard/pigeon pea will provide necessary shelter against cold winds

- Mulching nursery beds of soil near main trunk with black or silver plastic sheets increase radiation absorption and provide warmer thermal regime during winter. In case plastic mulch is not available, making thatches *(jhuggies)* of straw or *sarkanda*grass or organic mulching will also protect crops from cold.
- Planting wind breaks/shelter belts around field reduce wind speed, there by minimize cold injury
- Providing smoke also gives protection to orchard crops against cold injury

Animal Husbandry/Livestock

During cold waves animals and livestock require more food for sustenance as the energy requirement goes up. Extreme variations in temperature may affect the fertility rate animals, during the optimum breeding season for buffaloes/cattle.

Do's

- Cover the animal habitat from all sides during night in order to avoid direct exposure of animals to cold winds
- Cover the animals especially smaller ones during cold days
- Protect livestock and poultry form cold weather by keeping them inside
- Improving livestock feeding practice and dietary additives
- Use of high-quality forage or pastures
- Provide fate supplements – concentrate ratio on feed intake, feeding, and chewing behaviour
- Construction of Climate smart sheds which allow maximum sunlight during winters and low radiation during summers
- Selecting animal breeds especially fit for these conditions
- Apply some bedding materials such as dry straw under animals during winters.

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Annexure-II

शीतलहर
(सुरक्षा उपाय)

- शीतलहर के दौरान घर के अंदर सुरक्षित रहें ।
- स्थानीय रेडियो प्रसारण केन्द्र के माध्यम से मौसम की जानकारी लेते रहें ।
- शरीर में ऊष्मा के प्रवाह को बनाये रखने के लिय पोषक आहार एवं गर्म पेय पदार्थो का सेवन करें ।
- शरीर पर कई स्तरों वाले ऊनी एवं गर्म कपड़ो को पहनें ।
- शरीर को सूखा रखें । कपड़े गीले होने की स्थिति में शरीर से ऊष्मा का ह्रास हो सकता है ।
- कमरों में कैरोसीन, हीटर या कोयले की अंगीठी का प्रयोग करते हुए, धुएँ के निकास का उचित प्रबन्ध करना सुनिश्चित करें ।
- यदि आपके पास अलाव इत्यादि न हो, तो नजदीकी जन–आश्रय केन्द्र में जाएं जहाँ अलाव की व्यवस्था हो ।
- अपने सिर को ढक कर रखें, क्योंकि सिर के माध्यम से शरीर की ऊष्मा का ह्रास हो सकता है । अपने मुँह को भी ढक कर रखें, इससे आपके फेफड़ो को ठंड से सुरक्षा मिलेगी ।
- क्षमता से ज्यादा कार्य न करें, इससे हृदयाघात का खतरा उत्पन्न हो सकता है ।
- शीतदंश के लक्षणों पर नजर रखें, जैस शरीर के अंगो का सुन्न पड़ना, हाथों–पैरों की उंगालियों, कान, नाक आदि पर सफेद या पीले रंग के दाग उभर आना इत्यादि ।
- हाइपोथर्मिया के लक्षणों पर नजर रखें जैसे याद्दाश्त का कमजोर पड़ना, असीमित ठिठुरना, सुस्ती, थकान, तुतलाना, असंबद्धता तथा कार्य में भटकाव इत्यादि ।

हिमाचल प्रदेश राज्य आपदा प्रबंधन प्राधिकरण,
राजस्व विभाग-आपदा प्रबंधन प्रकोष्ठ, हिमाचल प्रदेश सरकार द्वारा जनहित मे जारी।
राज्य आपदा प्रबंधन हैल्पलाईन (टॉल फ्री) - 1070
Email: sdma-hp@nic.in, Website: www.hpsdma.nic.in Follow us: www.facebook.com/sajaghimachal
राजकीय मुद्रणालय, हि० प्र०, शिमला-1252-राजस्व/16-15-9-2016-100 प्रतियां।

Acknowledgment : NIDM, New Delhi

Cold Wave

Safety Tips :

- Keep ready the Emergency Kit along with snow shovels, wood for your fireplace and adequate clothing.
- Listen to local Radio Station for weather updates. Stay indoors; minimize travel.
- Keep dry. Change wet clothing frequently to prevent loss of body heat.
- Watch for symptoms of frostbite like numbness, white or pale appearance on fingers, toes, ear lobes, and the tip of the nose.
- Maintain proper ventilation when using kerosene heaters or coal oven to avoid toxic fumes.
- Go to a designated public shelter, if your home loses power or heat during extreme cold.
- Protect yourself, from frostbite and hypothermia by wearing warm, loose fitting, lightweight clothing in layers.

Disaster destructs,
Preparedness protects.

Himachal Pradesh State Disaster Management Authority
Telephone No. 0177-2629688, 2629439, 2629939, 2628940
Toll Free Helpline No-1070
Website: www.hpsdma.nic.in

Format 1: for reporting for cold wave & frost
(District Report to State Government)

Name of the District: …….. **Period of Reporting: ……..** **Year: ……..**

SN	General Information for affected family						Health			Agriculture/ horticulture				Livestock				Affected social activities			Economic	Total estimated cost of losses	Remarks
	Name, village, block of affected persons	Name, Age / Sex (M, F, T)	Occupation (Farmers, Labours, Sellers,Student etc)	Category (BPL/ APL)	Weather Early warning information received?	Weather Know Dos' and Don't for Cold wave/frost received?	Illness (M/F/T)	Deaths (M/F/T)	Date/ of the deaths Incident	Name of crops and Net Crop area (in Hect)	Affected Crops and area (in Hect)	Types of damage (physical/pest/diseases)	Crop wise -Percentage of crop loss	Total livestock (types of animal)	Total livestock affected (types of animal)	Livestock deaths (types of animal)	Percentage of Livestock affected/ deaths	Affected Child Education (No. of days)	Affected daily essential activities like watersupply, electricity etc. (No. of days/hours)	Affected daily social activities (No. of days)	Closing Shop /reduced labour/ employments/Wages loss		
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**
	Total																						

Others relevant information (if

Name: ……..…….. Designation: ……..…….

Submitted

Format 2: Format for reporting for cold wave & frost assessment
(To be Compiled at the State Level and sent to the Central Government)

Name of the District: ……..Period of Reporting: ……..…… Year: ……

SN	Name of the District	Total affected Population					Health		Agriculture				Livestock			Affected social activities				Mitigation measures						
		Farmers	Labourers	Hawkers	Others	Total	Illness	Deaths	No of Affected farmers	Major crops affected	Crop wise area affected (in hect.)	Crop wise percentage of crop loss	Total livestock affected (types of animal)	Livestock deaths (types of animal)	Percentage of Livestock affected/	Affected Institution (No. of days for	Average days for affected essential	Affected road/rail transport (No.of	Average days for affected Closing Shop /reduced labour/employments	No. of Shelters in working	No. of peoples stay in Shelters home	Facilities available in shelter homes	No of Blankets distribution	Early warning	IEC Campaign/ Do's and Don'ts	Others measures
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**

Others relevant information (if any):……

Name: ……..Designation: ……. Signature with Date:…….. Submitted to: