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Ministry of Health and Family Welfare  
Government of India



## STATE ACTION PLAN FOR CLIMATE CHANGE & HUMAN HEALTH

### **Chhattisgarh**

(Revised Version- 06.10.2022)



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and Family Welfare  
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# State Action Plan for Climate Change and Human Health 2022-2027

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# Chhattisgarh



National Centre for  
Disease Control  
Government of India



National Programme  
on Climate Change  
and Human Health

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## Executive Summary

Climate change is a growing concern for sustainable development. The sustainable development Goal 13 emphasises to take urgent action to combat climate change and its impacts. Climate change poses several threats to health of the population. The health effects of climate change occur either through Direct effect (changes in temperature and precipitation and occurrence of heat waves, floods, droughts, and fires etc) or Indirect effect (Ecological disruptions resulting in crop failures, shifting patterns of diseases' vectors or displacement of populations).

National Action Plan on Climate Change and Health (NAPCCHH) has been drafted and it called for state specific action plans. It is true that adaptation challenges are experienced most acutely at the state level. The demographic, socio-economic and physiographic situations in the states determine their specific vulnerabilities towards climate change and in such circumstances, it is imperative to work on the precautionary and anticipatory measures for facing the expected changes and adapting to the changes in the long term.

The health impact of climate change is already evident in Chhattisgarh as the state experienced extreme weather events, droughts in the past few years. Chhattisgarh also witnessed emergence and re-emergence of many infectious diseases including vector borne and zoonotic diseases. Acute Respiratory Infections (ARI) has increases in recent years remarkably. Due to epidemiological transition, a large proportion of population in the state is susceptible to water borne diseases like hepatitis leading to explosive outbreaks even with mild water contamination. In Chhattisgarh, the health of human populations is sensitive to shifts in weather patterns and other aspects of climate change, rapid urbanization, depletion of forest cover, high energy consumption, variation in food production, vector borne diseases, widespread water contamination, inadequate sewage & waste management and issues of inaccessibility to health care some marginalised population. In the view of the above requirement, Government of Chhattisgarh has been working on a strategy for action in the state in response to Climate Change and human health.

The State Action Plan for Climate Change and Human Health (SAPCCHH) proposes a multi-pronged approach to address the health-related aspects of climate change. It envisioned strengthening health of citizens of Chhattisgarh against climate sensitive illness. The goal is to reduce morbidity, mortality, injuries and health vulnerability to climate variability and extreme weathers. The objective is to build capacity of healthcare services against adverse impact of climate change.

This SAPCCHH endeavours to seek coordination and synergies with other departments and initiatives. Chhattisgarh State Nodal Officer-Climate Change and Human Health is in-charge of overseeing the implementation of the state action plan, focusing on the following areas and programs from the year 2020 onwards: a) Air Pollution and Health b) Heat and Health c) Vector-borne Diseases d) Climate Resilient Health Infrastructure and e) Disaster related illnesses and impacts. Efforts will be made to train the community members and health workforce on understanding the impacts of climate change on human health. This would be primarily executed through trainings under Panchayat Raj Institutions (PRI) for the community and engagement with health institutions for the health workforce.

## ACKNOWLEDGEMENT

The guidance and oversight provided by T.S. Singh Deo, Hon'ble Minister for Health, Dr. Manindar Kaur, Principal Secretary (Health), Ministry of Health and Family Welfare, Chhattisgarh and senior officials the from the Chhattisgarh State and National Centre for Disease Control to develop the Chhattisgarh Strategic Action Plan for climate change and Human Health is gratefully acknowledged.

This document is based on inputs provided by officials and experts from the Chhattisgarh State Departments of Health & Family Welfare, Environment, Disaster Management Authority. Active contributors include the experts from the Directorate of Health Services, Chhattisgarh, Department, Community Medicine Department, Pt. J L N Medical College Raipur, and State Pollution Control Board & UNDP, Healthy Energy Initiative India (HEI). The strategies and activities were planned under the guidance and administrative support Dr Neeraj Bansod, Directorate of Health services, Dr. Priyanka Shukla, MD, NHM Chhattisgarh.

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## Chapter 1

### Introduction

Climate change is defined as: “*a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods.*” It affects social and environmental determinants of health like –clean air, safe drinking water, sufficient food and secure shelter.

Climate change may negatively affect human health through a number of ways, but the commonly experienced are increased frequency and intensity of heat waves leading to rise in heat related illnesses and deaths, increased precipitation, floods, droughts and desertification costing lives directly. High temperature is known to increase the level of ‘ground level ozone’ and other ‘climate altering pollutants’ other than carbon dioxide, which further exacerbate cardio-respiratory and allergic diseases and certain cancers. Beside these, there is increase in transmission and spread of infectious diseases, changes in the distribution of water-borne, food borne and vector-borne diseases and effects on the risk of disasters and malnutrition.

The *United Nations Framework Convention on Climate Change (UNFCCC)* came into force on 21<sup>st</sup> March 1994. Since then many steps were initiated to reduce the effect of climate change at meetings like “Rio Convention 1992”, *Kyoto protocol 1997*”, “*Male’ Declaration 1998*”, “Convention of Parties”, “*Cancun Agreement 2010*”, “*Durban Platform 2011*”, “Nationally Determined Contributions” (NDCs) at Conference of Parties 21”.

India is signatory to “*Male’ Declaration*” wherein health sector has to be strengthened so as to make it climate resilient. According to *Male’ Declaration*, it is desired that health-care facilities should be prepared & climate-resilient, particularly in promoting to encourage that these are able to withstand any climatic event, and that essential services such as water, sanitation, waste management and electricity are functional during such events. Further, for climate resilient, the health department has to undertake measures to initiate the greening of the health sector by adopting environment-friendly technologies, and using energy-efficient services.

Initiatives undertaken by Government of India are: a) Identification of Ministry of Environment, Forest & Climate Change (MOEF&CC) as nodal ministry; b) Formulation of National Environmental Policy 2006; c) Formulation of Prime Minister’s Council on Climate Change for matters related to Climate Change.

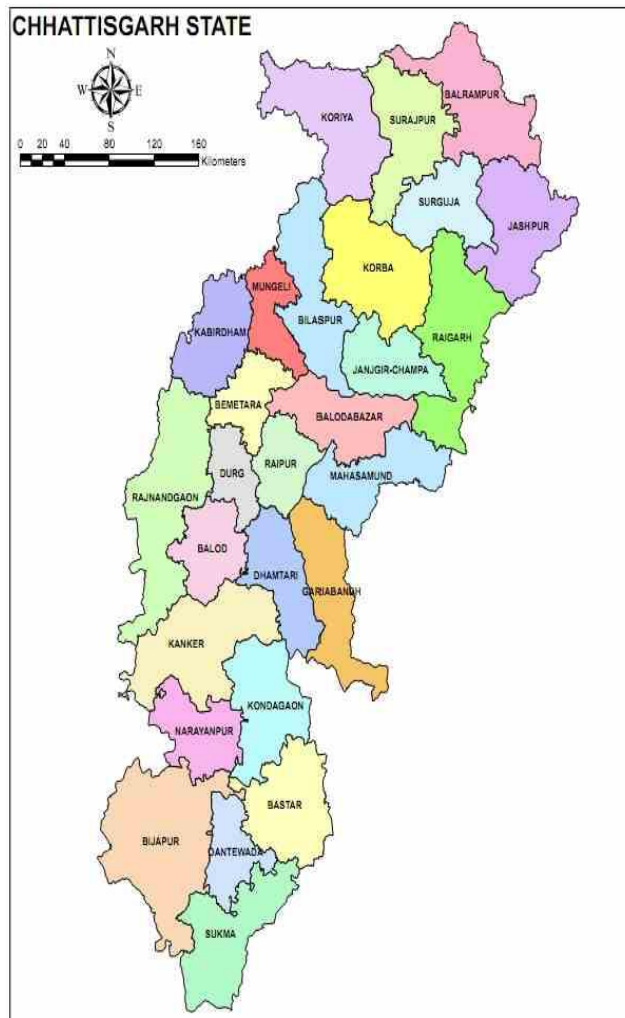
MoEFCC has developed National Action Plan on Climate Change with eight missions. Later on four new missions (including Health Mission) were identified. The *Health Mission* aims to reduce climate sensitive illnesses through integration with other missions under National Action Plan for Climate Change (NAPCC) as well as through programmes run by various ministries. As a follow-up action, Ministry of Health and Family Welfare (MoHFW) constituted a National Expert Group on Climate Change & Health (NEGCCH) to prepare National Action Plan on Climate Change and Human Health (NAPCCHH) and recommend strategies for indicators, mitigation, capacity building etc.

National Centre for Diseases Control (NCDC) is identified as the ‘technical nodal agency’ by MoHFW for the proposed National Mission on Health. The Centre for Environmental and Occupational Health Climate Change & Health (CEOH&CCH), NCDC, Delhi, is implementing the National Programme of Climate Change and Human Health (NPCCHH), under which Chhattisgarh has prepared its State Action Plan on Climate Change and Human Health (SAPCCHH). The SAPCCHH is a long-term vision and planning document prepared by the Department of Health & Family Welfare, Chhattisgarh, applicable for up till the year 2027. Based on this document, district specific action plans will also be prepared. The Chhattisgarh SAPCCHH highlights the current and future vulnerabilities to climate change in the state, the disease burden and the initiatives to be undertaken by the state to reduce the disease burden and develop a climate responsive and sustainable healthcare ecosystem in the

state.

**Geography and Demography of Chhattisgarh:** Chhattisgarh is located in the centre-east of the country. It is the ninth-largest state in India, with an area of 135,192 km<sup>2</sup> (52,198 sq mi), with a population of 32.2 million as of 2020. Chhattisgarh is the 17th-most populated state in the country.

The northern Rajnandgaon and southern parts of the state are hilly, while the central part is a fertile plain. The highest point in the state is the Gaurkata near samri, Balrampur-Ramanujganj district. Deciduous forests of the Eastern Highlands Forests cover roughly 44% of the state. The state animal is the *van bhainsa*, or wild Asian buffalo. The state bird is the *pahari myna*, or hill myna. The state tree is the Sal (Sarai) found in Bastar division.





The natural environment of Koriya in Chhattisgarh includes forests, mountains, rivers and waterfalls. Koriya was a princely state during the British rule in India. Koriya is also known for its mineral deposits. Coal is also found in this part of the country. The dense forests are rich in wildlife.

According to NHFS 5 2020-21 Fact Sheet Chhattisgarh (A), SRS Survey 2017 – 19 (B) and Officer Registrar General (C) the health indicators are as follows

<b>Health Indicator</b>	<b>Rate (per 1000 population)</b>
Crude Birth Rate	22.2 (C)
Crude Death Rate	7.3 (C)
Maternal Mortality Rate (MMR)	160 (Per 100000 Live Birth) (B)
Infant Mortality Rate (IMR)	44.3 (Per 1000 Live Birth) (B)
Neo Natal Mortality Rate	32.4 (A)
U-5 Mortality Rate	50.4 (A)
Total Fertility Rate	1.8 (A)

The Total Fertility Rate of the State is 1.8. The IMR for the state has come down currently to 44.3 from previous figure of 54 (NFHS 2015-16 Factsheet Chhattisgarh). This is a major achievement for the state considering the fact that any reduction in IMR requires synergistic efforts from several departments and improvement in social status. The Maternal Mortality Rate is 160 which is higher than the national MMR i.e 103 (SRS 2017-19). The Sex Ratio in the State is 1015 (NHFS 5 2020-21 Fact Sheet Chhattisgarh)

Over the last ten years, the state has taken several strides to improve the delivery of health services and has been able to achieve some progress in bringing down its adverse health indicators. Sectoral allocation for Public health currently stands at 5% of Plan Expenditure and 0.7% of the National Strategic Development Plan (NSDP).

## Chapter 2

### Climate Vulnerability

Chhattisgarh state experiences a tropical type of climate. The state is situated in central part of India. The geographical factors like distance from the Sea and altitude of the state have influences the Chhattisgarh climate. The climate of Chhattisgarh is mainly tropical, humid, and sub – humid. The Climate is hot because of its position on the tropic of cancer. May is the hottest month while December and January are the coldest ones. The climatic condition during summer is hot and gusts of dry wind blows over the state. During winter the temperature falls to some extent. The period from November to March is generally pleasant over the state except during a few spells when severe cold waves associated with western disturbances affect northern parts of the state in winter months. April and May months are hot, very dry and generally uncomfortable. Due to lower temperatures, some areas of plateau and Northern Hills regions are however comparatively less uncomfortable in summer. Weather tends to be oppressive during June due to high order of humidity and temperature. The next three months (July, August and September) are fairly comfortable due to reduced dry temperatures, although the humidity continues to be high.

The Climate of state varies from subtropical monsoon, mild and dry winter, hot summer over northern hilly areas and adjoining plains (Korea, Surajpur, Balrampur, Sarguja districts and northern parts of Bilaspur, Korba and Jashpur Districts) to tropical monsoon, hot and seasonally dry over central and southern parts of the State. Some parts of Dantewada district only comes under the climate type tropical monsoon, hot and seasonally excessive rainfall.

#### Temperature:

Pre -monsoon season is the hottest season while winter is the coldest season. Day temperatures are more or less uniform over the plains except during winter when temperature increase south – wards.

May is the hottest month with mean maximum temperature of 39.4 degree Celsius. In the plains recording 1-3 degree Celsius higher while over plateau regions elevated places recording 2-5 degree Celsius lower. In May, mean maximum temperature ranges from 31.8 degree Celsius to 42.6 degree Celsius over the state, the highest values are observed over central plain area. The highest maximum temperature ever recorded at any individual station was 49.3 degree Celsius at Bilaspur observatory 22<sup>nd</sup> May 2017. On the same day 44.9 degree Celsius was recorded Raipur.

December and January are the coldest months. The lowest minimum temperature ever recorded at any individual station was 1-3 degree Celsius at Jashpurnagar on 7<sup>th</sup> December 1971.

#### Humidity

Summer is the driest part of the year when relative humidity in the afternoon is generally ranges between 26 degree Celsius and 31 degree and morning relative humidity ranges between 44

degree and 49 degree. During southwest and post monsoon season relative humidity is generally high when morning humidity ranges between 68 degree and 87 degree Celsius and afternoon relative humidity ranges between 54 degree and 80 %. During winter season relative humidity is moderate and it ranges between 61 % and 69 % in the morning and between 39 % and 51 % in the afternoon.

**Rainfall:**

The total annual precipitation for the state as whole is about 1250-1300 mm. The precipitation in the state occurs in the form of rain. North eastern and Southern parts of the state receive more rain than Central part of the state with large variation due to topography variation in the state.

Bijapur district in the southern part of the state received the maximum amount of precipitation i.e. about 1945 mm, whereas Kabirdham district in the central part of the state received the minimum amount of precipitation i.e. about 640 mm in this year (Southwest monsoon 2018).

South west monsoon season is the main rainy season over the state. Of the total amount of rainfall, about 90 % is received in the southwest monsoon season (June to September), 2% is received in the winter season (December to February), 3 % in pre – monsoon season (March to May) and 5 % in post monsoon season (October to November).

**Table : Rainfall data**

S.No	Divisions	Districts	Rainfall
1	Raipur	Raipur, Mahasamund, Gariaband, Balodabazar, Dhamtari	1000-1300 mm
2	Durg	Durg, Balod, Bemetara, Rajnandgaon, Kabirdham	650-1200 mm
3	Bilaspur	Bilaspur, Korba, Mungeli, Janjgir, Raigarh	900-1250 mm
4	Sarguja	Sarguja, Jashpur, Surajpur, Balrampur, Korea	1100-1400 mm
5	Bastar	Bastar, Kanker, Kondgaon, Narayanpur, Dantewada, Bijapur, Sukma	1400-1900 mm

In recent years the State is facing extreme threats of Climate Change, especially due to erratic weather and rainfall. This is greatly affecting the lives of people. As per several studies, Chhattisgarh is one of the most vulnerable areas to the impacts of Climate Change.

## Chapter 3

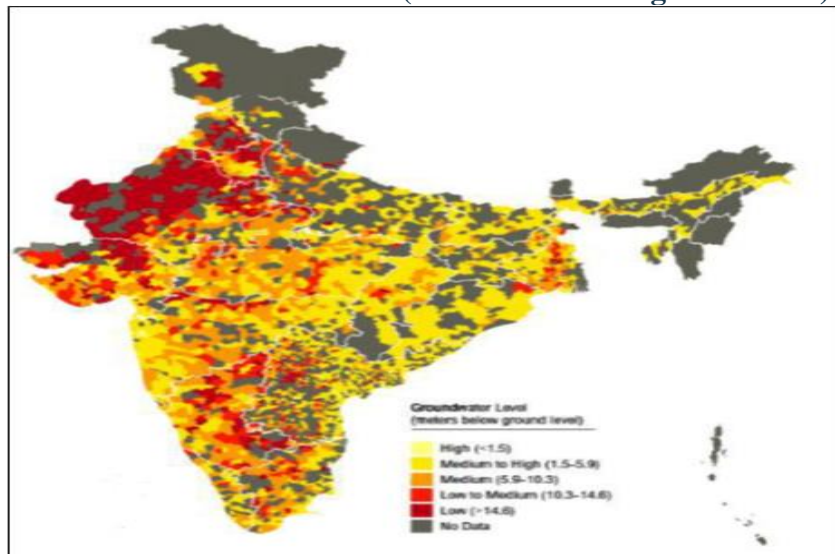
### Climate-sensitive health impacts and diseases in the State of Chhattisgarh

#### 3.1 Food Security and Nutrition:

The World Food Summit in 1996 defined food security thus: “Food security exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food which meets their dietary needs and food preferences for an active and healthy life.”<sup>(15)</sup> According to this definition, there are three main dimensions to food security: food availability, access to food, and food absorption. Thus, adequate food production alone is not a sufficient condition for a country’s food security.<sup>(16)</sup>

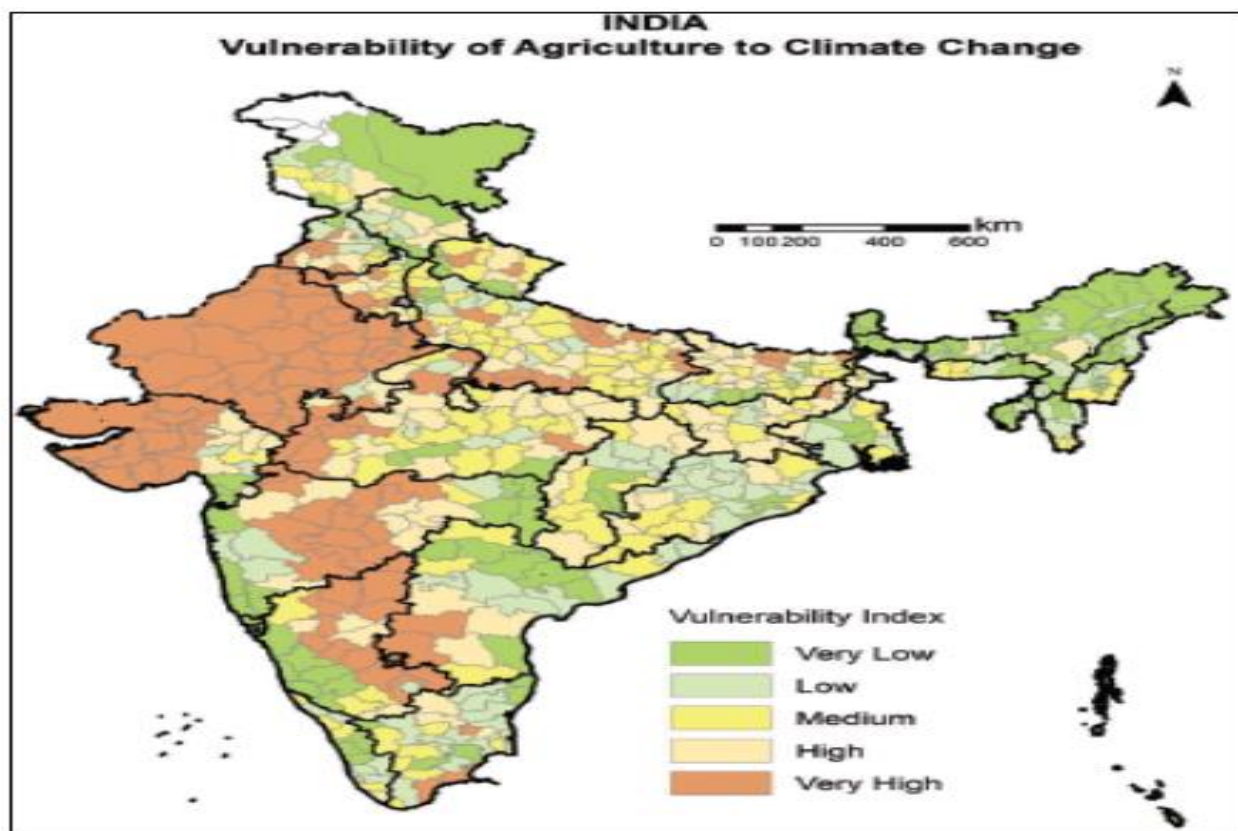
Climate change affects food security in complex ways. It impacts crops, livestock, forestry, fisheries and aquaculture, and can cause grave social and economic consequences in the form of reduced incomes, eroded livelihoods, trade disruption and adverse health impacts. However, it is important to note that the net impact of climate change depends not only on the extent of the climatic shock but also on the underlying vulnerabilities. According to the Food and Agriculture Organization (2016), both biophysical and social vulnerabilities determine the net impact of climate change on food security<sup>(17)</sup>. The impact of climate change on water availability will be particularly severe for India because large parts of the country already suffer from water scarcity, to begin with, and largely depend on groundwater for irrigation<sup>(16)</sup>.

**Groundwater level in India (meters below the ground level)**



Source: [World Resources Institute](#)

## Vulnerability of Indian agriculture to Climate Change (2021-2050)



Source: CA Rama Rao et al (2013) <sup>(18)</sup>

Climate change amplifies the economic drivers of food insecurity. Variation in the length of the crop growing season and higher frequency of extreme events due to climate change and the consequent growth of output adversely affect the farmer's net income. India is particularly vulnerable because its rural areas are home to small and marginal farmers who rely on rain-fed monocropping, which provides barely a few months of food security in a normal year. <sup>(18)</sup>

Climate change will also have an adverse impact on the livelihoods of fishers and forest-dependent people.

Landless agricultural labourers wholly dependent on agricultural wages are at the highest risk of losing their access to food.<sup>(19) (20)</sup>

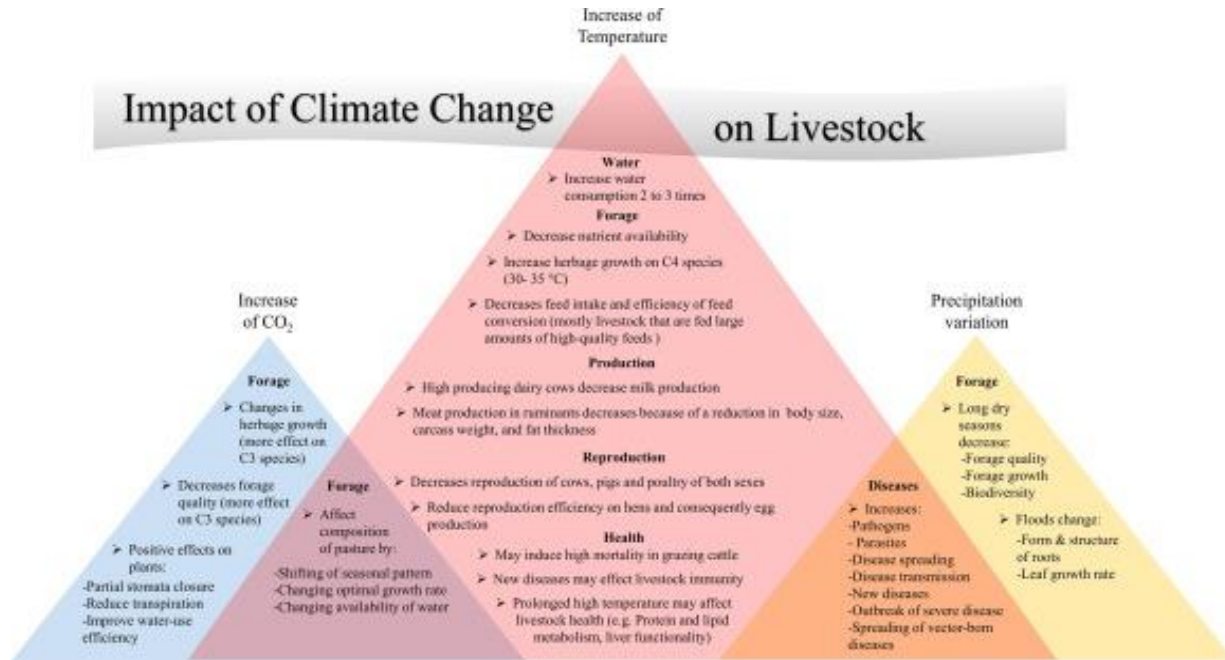
Yet the impact of climate change on food access is not limited to rural areas. Urban food insecurity is also a critical issue because poor households from rural and coastal regions typically migrate to urban areas for livelihood options. Ramachandran observes that hunger often triggers off a wave of migration towards cities, relocating entire families to urban slums<sup>(21)</sup>. These



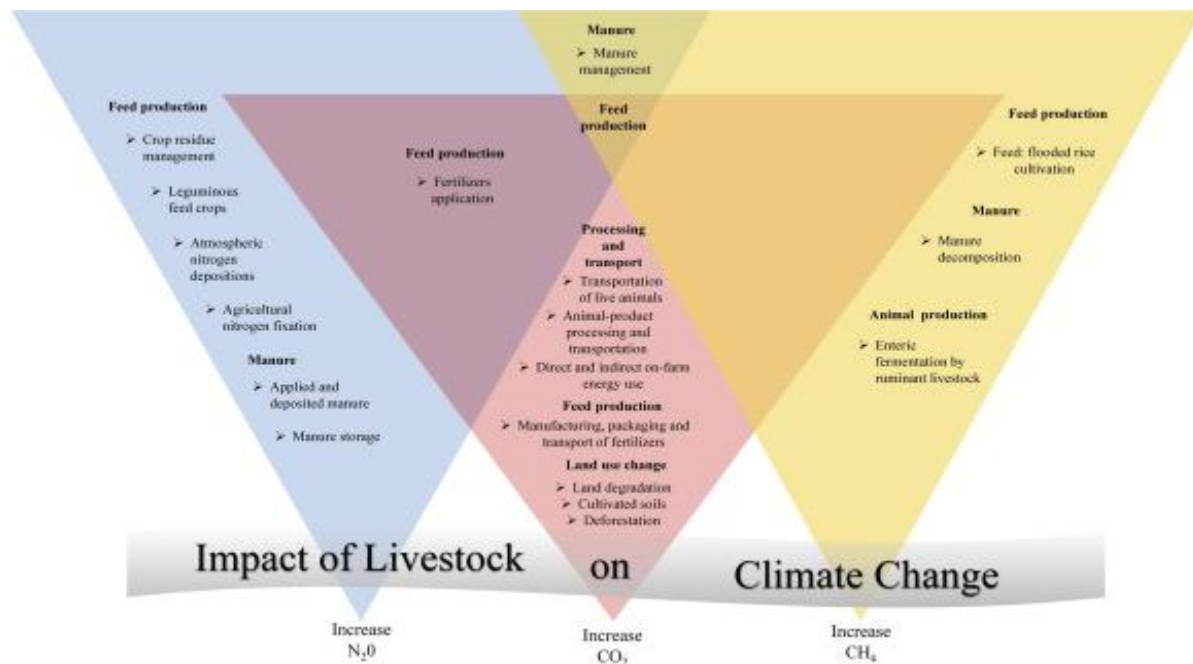
migrants mostly join the ranks of poorly paid workers in the urban informal sector, where there is no security of tenure and wages fall below the legal minimum. India's urban food insecurity indicators present an alarming picture. For example, over 30 percent of children below five years are underweight in urban Bihar, Madhya Pradesh and Karnataka. The proportion of urban children who are stunted and wasted is high even in Karnataka and Maharashtra, which are relatively prosperous states.

Given that food is the single largest expenditure for poor urban households, displacement, loss of livelihood or damage to productive assets due to any such extreme weather event will have a direct impact on household food security<sup>(22)</sup>. The urban poor has also been identified as the group most vulnerable to increases in food prices following production shocks and declines that are projected under future climate change <sup>(23)</sup>. It is estimated that 22.5 million people are displaced annually by climate or weather-related disasters, and these figures are expected to increase in the future. Climate-induced human mobility has a socioeconomic cost with mental and social problems to individuals and communities<sup>(12)</sup>

### 3.1.1 Livestock:



Livestock Diseases, Heat Stress, Food nutrient utilization and food intake, Animal Production, Reproduction, Manure Production, Food security.



## 3.2 Air Pollution

Climate change can also have significant combined effect on regional air quality as it affects the conditions that effect pollutant transport like changes in chemical reaction rates and boundary layer mixing. Carbon-dioxide (CO<sub>2</sub>), one of the major drivers of climate change can slow down the dispersal of air pollutants and increase the frequency of stagnation episodes, which results in the degradation of air quality<sup>1</sup>. It also enhances the production rate of pollutants such as Ozone and PM<sub>2.5</sub>, especially in the urban areas.

Chhattisgarh is a state with highest mines and mineral based industries and Air Pollution is one of the biggest threats to the health of the population. Air pollution has a wide range of health effects, such as - cardiovascular diseases, respiratory diseases, hypertension, diabetes and obesity. Air pollution has also been linked to have a detrimental impact on food productivity - for instance, increase in ground level ozone pollution affects the crop yield. Similarly traditional methods of food preservation like sun drying of vegetables for use in lean seasons, is no longer viable in coal mining and power plant areas due to coal dust and fly-ash pollution.

In addition to all the big cities in the state, districts of Raipur, Bilaspur, Korba, Durg and Raigarh are particularly vulnerable to the effects of air pollution.

**3.2.1 Acute Respiratory Illness:** Acute Respiratory Illness (ARI) is a cause of death globally, causing approximately 19% of all deaths before the age of 5 years, according to a World Health Organization estimate. Indoor air pollution from biomass fuels, which is strongly poverty-related, has long been regarded as an important risk factor for ARI morbidity and mortality.<sup>(1)</sup>

Long-term exposure to high concentrations of PM<sub>2.5</sub> may increase risk for acute respiratory problems in small children.<sup>(2)</sup>

The first meeting of the Technical Advisory Group on Acute Respiratory Infections (ARI) was held in Geneva, Switzerland, on March 7-11, 1983. In keeping with the targets of the Seventh General Program of Work, the Group discussed the feasibility and guiding principles of controlling ARI based on information now available and advised on priorities and strategies for the program.

During the past few years, considerable progress had been made in understanding the ARI problem and its susceptibility to intervention. In particular, the importance of bacteria rather than viruses as the principal cause of mortality from severe acute lower respiratory infections in developing countries is now clear; the effectiveness of antimicrobial and supportive treatment may avert these deaths; existing clinical experience has been consolidated into simple case-

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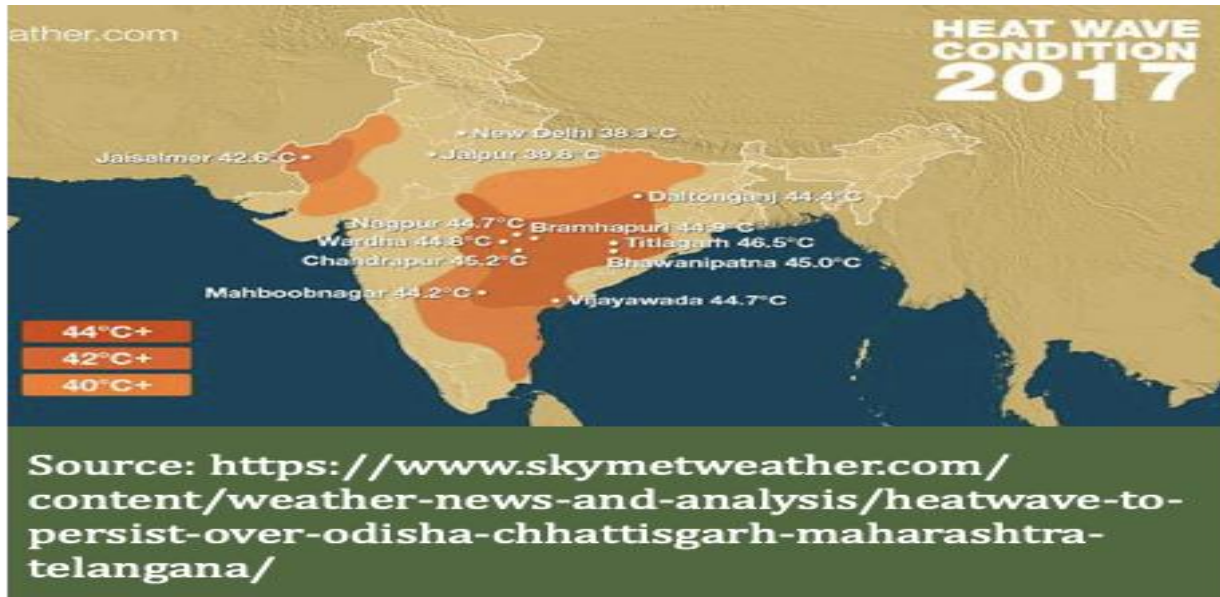
<sup>1</sup> M. Jacobson, "Enhancement of Local Air Pollution by Urban CO<sub>2</sub> Domes," *Environ. Sci. Technol.*, pp. 44, 2497-2502, 2010.

management plans, and the primary health care (PHC) infrastructure required to utilize these plans is being strengthened rapidly. The Group concluded that sufficient knowledge and technology were already available for countries to phase in an ARI control program. The ARI control program, consisting of both a service and a research component, should be started by introducing simple measures at the PHC level and should progressively provide technical support at higher levels. <sup>(3)</sup>

National Clean Air Programme (NCAP), launched in 2019, is India's flagship program for better air quality in 122 cities. This review evaluates the scientific, legislative, financial, and institutional framework of the 102 publicly available clean air action plans submitted under NCAP<sup>(7)</sup>. From the state of Chhattisgarh Raipur, Bilai and Korba are included in NCAP. Chhattisgarh State National Program of Climate Change and Human Health has identified eight sites for ARI surveillance based on the poor air quality. Eight districts are proposed for ARI surveillance out of which presently seven are considered vulnerable in association with poor air quality, except Sarguja.

### **3.3 Heat Waves and Heat related morbidity and mortality:**

*A heat wave is a period of unusually hot weather that typically lasts two or more days. The temperatures have to be outside the historical averages for a given area.* The United Nations has warned of more heatwave deaths across the world, especially in tropical countries as climate change pushes up temperatures. 2016, closely followed by 2019 was declared as the top two warmest years by the world meteorological organization. In 2019 alone, more than 65% of Indians were exposed to heatwaves. India will see a four-fold rise in heat waves if global temperature rise is restricted to 1.5 deg C by the turn of this century, according to a November 2018 study by Indian Institute of Technology-Gandhinagar researchers.



Although health promotion and heat wave warning systems have been developed to address public health due to heat waves, the effectiveness of acute measures in response to heat waves have not yet been formally developed. The frequency and intensity of heat waves are only expected to increase due to climate change. Measures including adequate and safe housing, management of diseases, care for the elderly and vulnerable in an institutional manner is said to be necessary to reduce health impacts.

In May 2019, almost all big cities in Chhattisgarh experienced heatwave-like situations. According to news reports high temperatures in some of the cities in May 2019 were:

Bilaspur: 45 deg C

Rajnandgaon: 45 deg C

Raipur: 44.3 deg C

Durg: 42.6 deg C

Pendra Road: 41.5 deg C

Ambikapur: 41 deg C

Jagdalpur: 41 deg C

Raipur, Bilaspur, Raigarh, Janjgir and Durg districts were particularly affected and all of them recorded a temperature of 46 deg C on 9th and 10 May 2019. In addition to the increase in temperatures exacerbates the heat island effect in urban areas causing additional stress to the urban population.



## Heat Stroke statistics of Chhattisgarh from 2016 to 2019

The table below indicates that cumulative number of cases admitted due to heat related illness in District Hospital has increased from 150 to 210 recorded from 2016 to 2019 in the months between Aprils to June every year.

Directorate of Health Services, Chhattisgarh					
Heat related illness- Report dated 07.05.2016					
S.No.	Name of the District (Name of all districts)	New cases admitted due to heat related illness in the District since the last reporting period	Cumulative no. of cases admitted due to Heat Related illness in the District since 1 <sup>st</sup> April 2019	Deaths reported due to Heat Related Illness in the District since the last reporting period	Cumulative no. of deaths due to Heat Related Illness in the District since 1 <sup>st</sup> April 2019
1	Balod	0	3	0	0
2	Balodabajar	0	2	0	0
3	Balrampur	0	5	0	0
4	Bastar Jagdalpur	0	1	0	0
5	Bemetara	0	0	0	0
6	Bijapur	0	0	0	0
7	Bilaspur	3	15	0	0
8	Dantewada	0	0	0	0
9	Dhamtari	0	4	0	0
10	Durg	1	4	0	0
11	Gariyaband	0	27	0	1
12	Jangjir	1	2	0	0
13	Jashpur	0	31	0	0
14	Kabirdham	0	0	0	0
15	Kanker	0	5	0	0
16	Kondagoan	1	12	0	0
17	Korba	0	1	0	0
18	Korea	0	2	0	0
19	Muhasamund	0	5	0	0
20	Mungeli	0	1	0	0
21	Narayanpur	0	0	0	0
22	Rajgarh	0	9	0	0
23	Raipur	0	2	0	0
24	Rajnandgaon	0	6	0	0
25	Sukma	0	0	0	0
26	Surajpur	1	14	0	0
27	Surguja	Not reported	2	0	0
	<b>Total</b>	<b>7</b>	<b>153</b>	<b>0</b>	<b>1</b>

## Directorate of Health Services, Chhattisgarh

Heat related illness- Report dated 28.05.2019

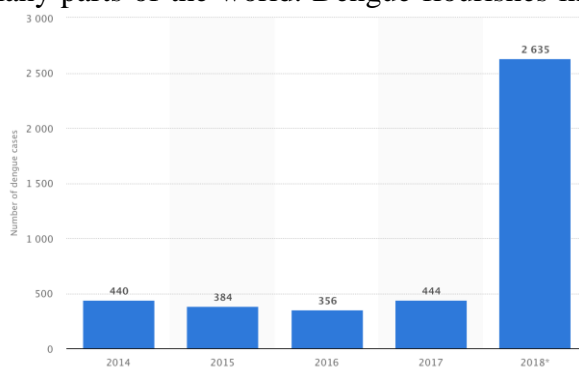
S.No.	Name of the District (Name of all districts)	New cases admitted due to heat related illness in the District since the last reporting period	Cumulative no. of cases admitted due to Heat Related illness in the District since 1 <sup>st</sup> April 2019	Deaths reported due to Heat Related Illness in the District since the last reporting period	Cumulative no. of deaths due to Heat Related Illness in the District since 1 <sup>st</sup> April 2019
1	Balod	4	33	0	0
2	Balodabajar	1	1	0	0
3	Balrampur	1	6	0	0
4	Bastar Jagdalpur	0	1	0	0
5	Bemetara	0	36	0	0
6	Bijapur	7	14	0	0
7	Bilaspur	0	3	0	0
8	Dantewada	0	4	0	0
9	Dhamtari	0	0	0	0
10	Durg	0	0	0	0
11	Gariyaband	0	2	0	0
12	Jangjir	0	0	0	0
13	Jashpur	0	19	0	0
14	Kabirdham	0	3	0	0
15	Kanker	0	0	0	0
16	Kondagoan	0	17	0	0
17	Korba	0	11	0	0
18	Korea	0	0	0	0
19	Muhasamund	0	8	0	0
20	Mungeli	0	0	0	0
21	Narayanpur	0	0	0	0
22	Rajgarh	5	7	0	0
23	Raipur	0	1	0	0
24	Rajnandgaon	0	33	0	0
25	Sukma	0	1	0	0
26	Surajpur	0	10	0	0
27	Surguja	0	0	0	0
	<b>Total</b>	<b>18</b>	<b>210</b>	<b>0</b>	<b>0</b>

### 3.4 Vector borne Diseases

In Chhattisgarh there are few vector borne diseases outbreaks every year they are:

**3.4.1 Malaria:** Malaria is caused by *Plasmodium* parasites. The parasites are spread to people through the bites of infected female *Anopheles* mosquitoes, called "malaria vectors." There are 5 parasite species that cause malaria in humans, and 2 of these species – *P. falciparum* and *P. vivax* – pose the greatest threat<sup>2</sup>. The southern and north eastern districts of the state including Bijapur, Dantewada, Bastar, Sukma, Kanker, Kondagaon, Jagdalpur, Sukma, Narayanpur, Jashpur and Koriya are particularly vulnerable to malaria.

**3.4.2 Dengue:** Dengue is a mosquito-borne viral infection causing a severe flu-like illness and, sometimes causing a potentially lethal complication called severe dengue<sup>3</sup>. Dengue Fever is caused by the dengue virus which is transmitted through the Aedes type of mosquitoes. Dengue is fast emerging pandemic-prone viral disease in many parts of the world. Dengue flourishes in urban poor areas, suburbs and the countryside but also affects more affluent neighbourhoods in tropical and subtropical countries. During the rainy seasons, survival of the virus increases which leads to outbreak of the disease, almost throughout the state. Dengue cases have increased 5 fold from 2014 to 2018<sup>4</sup> in the state and at least 15 deaths due to dengue were reported in Chhattisgarh in 2018<sup>5</sup>.



Source: www.statista.com

**3.4.3 Filariasis:** Filariasis is caused by several round, coiled and thread-like parasitic worms belonging to the family filaridea. These parasites after getting deposited on skin penetrate on their own or through the opening created by mosquito bites to reach the lymphatic system. The disease is caused by the nematode worm, either *Wuchereria bancrofti* or *Brugia malayi* and transmitted by ubiquitous mosquito species *Culex quinquefasciatus* and *Mansonia annulifera/M.uniformis* respectively. The disease manifests often in bizarre swelling of legs, and hydrocele and is the cause of a great deal of social stigma. Filariasis is caused by several round, coiled and thread-like parasitic worms

<sup>2</sup> <https://www.who.int/news-room/fact-sheets/detail/malaria>

<sup>3</sup> <https://www.who.int/denguecontrol/disease/en/>

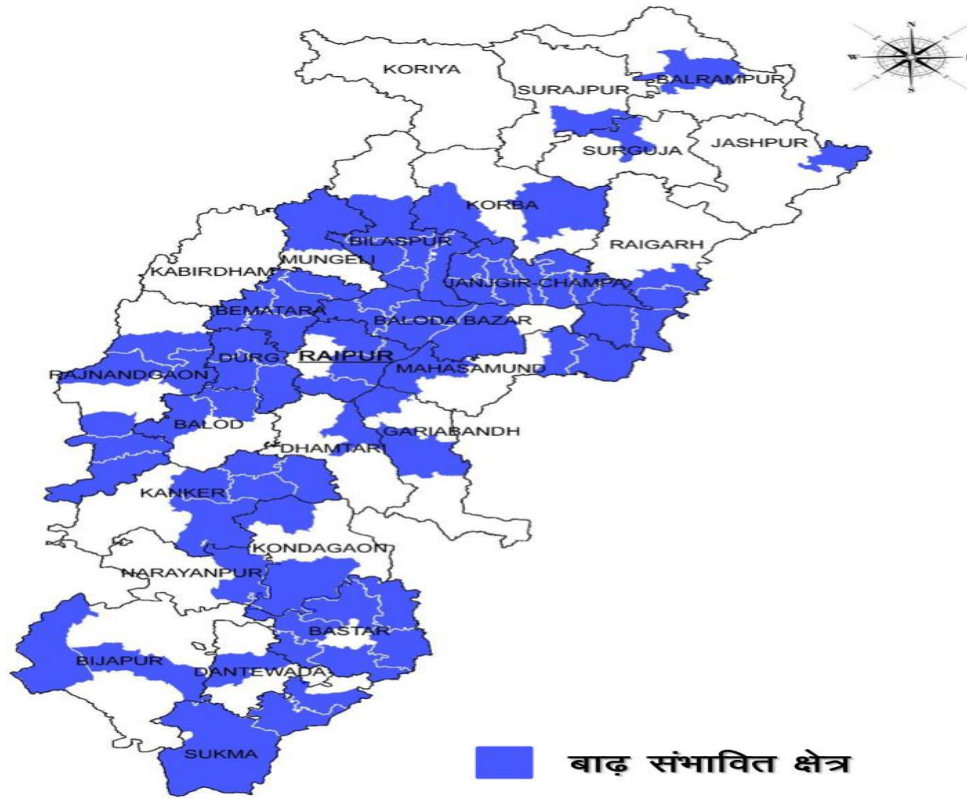
<sup>4</sup> <https://www.statista.com/statistics/865290/india-number-of-dengue-cases-in-chhattisgarh/>

<sup>5</sup> <https://www.newindianexpress.com/nation/2018/aug/14/chhattisgarh-15-dengue-deaths-surpasses-five-year-record-of-twin-cities-durg-bhilai-1857830.html>

belonging to the family filaridea. These parasites after getting deposited on skin penetrate on their own or through the opening created by mosquito bites to reach the lymphatic system<sup>6</sup>. Filaria endemic districts in Chhattisgarh<sup>7</sup> are Ambikapur/ Surguja, Bilaspur, Dhamtari, Durg, Janjgir, Jashpur Nagar, Mahasamund, Raigarh, Raipur.

**3.5 Water borne Diseases :** Water borne diseases are caused by the toxic contaminants, micro-organism in the water<sup>8</sup>. During rainy seasons and floods the outbreak of water borne diseases occurs. Common water borne diseases in Chhattisgarh is Acute Diarrheal Disease (ADD).

**FLOOD VULNERABILITY ZONES OF CHHATTISGARH**



Flood prone regions

Source: UNICEF

<sup>6</sup> <https://www.nvbdcp.gov.in/WriteReadData/1892s/15482335681533040303.pdf>

<sup>7</sup> <https://www.nvbdcp.gov.in/WriteReadData/1892s/15482335681533040303.pdf>

<sup>8</sup> Waterborne Diseases [Internet]. [cited 2019 Jun 25]. Available from: [https://www.niehs.nih.gov/research/programs/geh/climatechange/health\\_impacts/waterborne\\_diseases/index.cfm](https://www.niehs.nih.gov/research/programs/geh/climatechange/health_impacts/waterborne_diseases/index.cfm)

**3.5.1 Acute Diarrheal Disease (ADD):** Diarrhea is defined as the passage of three or more loose or liquid stools per day (or more frequent passage than is normal for the individual). According to the World Health Organization (WHO), “diarrheal disease is the second leading cause of death in children under five years old, and is responsible for killing around 525 000 children every year. Diarrhea can last several days, and can leave the body without the water and salts that are necessary for survival. In the past, for most people, severe dehydration and fluid loss were the main causes of diarrhea deaths. Now, other causes such as septic bacterial infections are likely to account for an increasing proportion of all diarrhea-associated deaths. Children who are malnourished or have impaired immunity as well as people living with HIV are most at risk of life-threatening diarrhea<sup>9</sup>

According to Integrated Disease Surveillance Program (IDSP) weekly reports of 2019 districts of Kawardha, Janjgir, Balodabazar, Balod, Rajnandgaon, Mahasamund, Kanker and Durg have reported outbreaks of ADD in Chhattisgarh.

## **3.6 Emerging Climate Sensitive Health Impacts and Diseases**

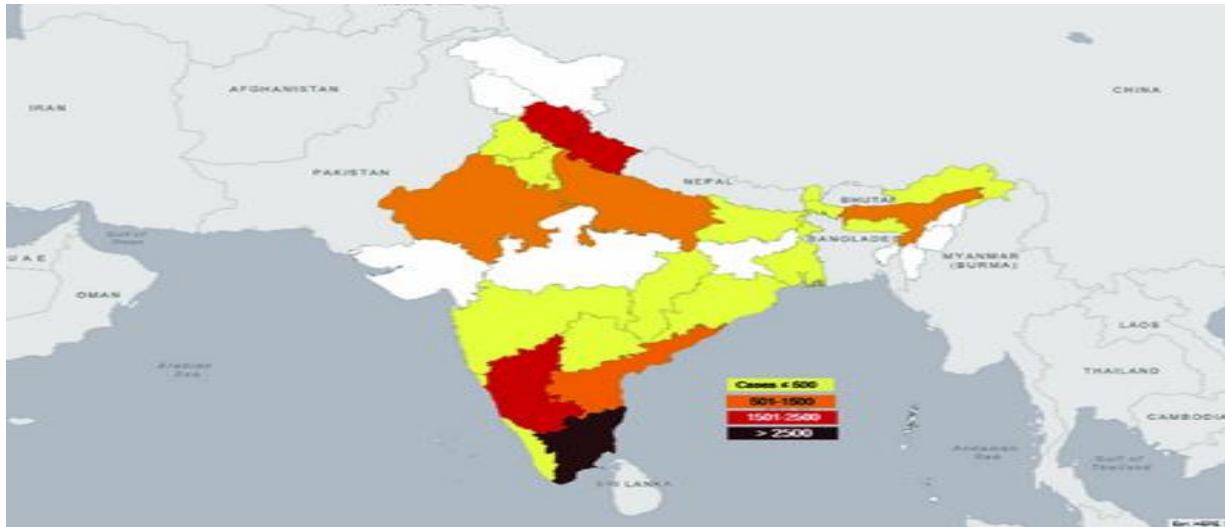
**3.6.1 Zoonotic Disease:** Emerging infectious diseases (EIDs), especially those with zoonotic potential, are a growing threat to global health, economy, and safety. The influence of global warming and geoclimatic variations on zoonotic disease epidemiology is evident by alterations in the host, vector, and pathogen dynamics and their interactions.

**3.6.1.1 Scrub Typhus:** Scrub typhus is a vector-borne zoonotic disease caused by *Orientia tsutsugamushi*. This organism is transmitted by infected trombiculid mites, *L. pallidum* and *L. scutellare*. The most common symptoms of scrub typhus include fever, headache, body aches, and sometimes rash. Scrub typhus lasts for 14 to 21 days without treatment. Severe infections may be complicated by interstitial pneumonia, pulmonary edema, congestive heart failure, circulatory collapse, and a wide array of signs and symptoms of central nervous system dysfunction, including delirium, confusion, and seizures.

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<sup>9</sup> <https://www.who.int/news-room/fact-sheets/detail/diarrhoeal-disease>



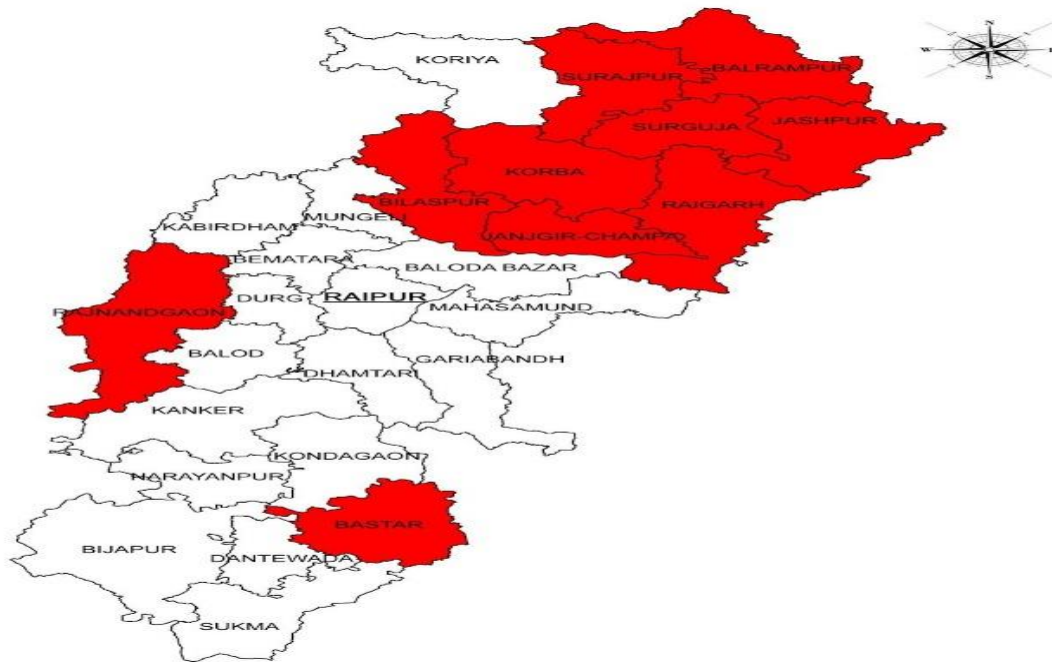


*Mapping the regional distribution of scrub typhus in India. Number of scrub typhus cases less than or equal to 500 is represented as yellow, 501-1500 cases is represented as orange, 1501-2500 cases is represented as red and more than 2500 cases is represented as maroon. This map was created in the free version of ARC GIS by the first author. Please see the ARC GIS link <https://arcg.is/1iDvKu>. The base layer map was used from the Survey of India, Department of Science & Technology which gives open access to the general public <https://indiamaps.gov.in/soiapp/>.*

The natural environment including climate conditions could affect the development and survival of larva mites. Climate change may have an effect on the increasing trend of Scrub typhus. <sup>(22)</sup> The study also indicates that the incidence of Scrub typhus is affected by climate elements changed by global warming.

**3.6.1.2 Snake Bites:** Snakebite is the only WHO-listed, not infectious neglected tropical disease (NTD), although its eco-epidemiology is similar to that of zoonotic infections: envenoming occurs after a vertebrate host contacts a human. Accordingly, snakebite risk represents the interaction between snake and human factors, but their quantification has been limited by data availability.<sup>(23)</sup> Snakebites are on the rise as snakes migrate with climate change. As the climate changes, snakes are on the move and snakebites are becoming more common. Over the last decade, an estimated 30 million people worldwide have been bitten by snakes, with nearly 5.4 million bites in the last year alone. And these worrisome numbers are underestimated, since most bites are never reported, especially in poor rural areas. A few things should be done — and urgently. We need to update the maps of snake habitats and educate communities about new threats they may face from venomous snakes. Because different

<http://sdma.cg.gov.in/SnakeBite.jpg> 1



antivenoms are needed for different snakebites, this mapping will also help determine what antivenoms are needed where.

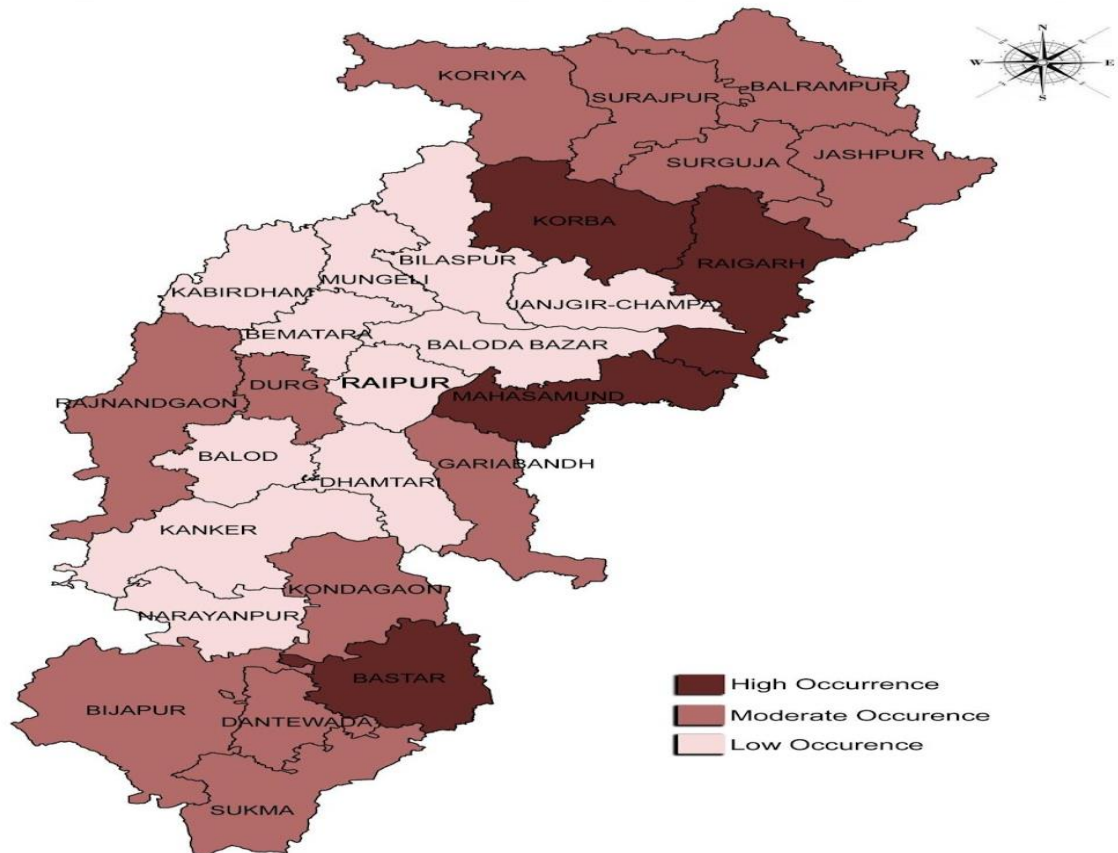
Governments should consider providing manufacturers with incentives like tax breaks to resume the production of antivenoms and to lower their prices for these drugs. Unscrupulous producers should be identified and prosecuted.

In Chhattisgarh Bastar, Rajnandga, Bilaspur, Korba, Janjgir-Champa, Raigarh , Surguja, Jashpur, Balrampur and Surajpur are the districts which have high reporting of zoonotic diseases like Snake Bites and other animal bites. Scrub Typhus is tending to be reported more in rural and forest-dominated areas. Early Detection through diagnostics and surveillance would be the key strategies for prompt interventions to reduce the impact of climate change on human health.

### **3.6.1.3 Lightening – Burnt and Deaths**

Scientists are starting to recognize that lightning has a broader story to tell. Lightning frequency is changing, as the climate is changing. For example, lightning's close relationship to thunderstorms and precipitation makes it a valuable indicator for storminess, which makes lightning a particularly useful means of observing a variable and changing climate [*Price*, 2013; *Williams*, 2005]. What's more, lightning is not only an indicator of climate change; it also affects the global climate directly. Lightning produces nitrogen oxides, which are strong greenhouse gases [*Price et al.*, 1997].

## LIGHTNING VULNERABILITY ZONES OF CHHATTISGARH



<http://sdma.cg.gov.in/LightningVulnerabilityZonesofChhattisgarhcopy.jpg>

Lightning is a symptom and a cause of climate change. A recently established task team is working to make lightning data available and useful for climate science and service applications.

In efforts to better understand how these variabilities, as well as changing lightning frequencies, affect climate change, lightning has been added to the Global Climate Observing System's (GCOS) list of Essential Climate Variables (ECVs) [*Global Climate Observing System, 2016*]. These ECVs provide the empirical evidence needed to understand and predict the evolution of climate as well as to guide mitigation and adaptation measures in support of scientists, governments, agencies, and the international climate policy in general under the United Nations Framework Convention on Climate Change (UNFCCC) and its Intergovernmental Panel on Climate Change [*Bojinski et al., 2014*].<sup>(24)</sup>

*Non Communicable diseases/Cardiovascular /Allergens/ Mental Health and Occupational hazards are the other important emerging health impacts that are being felt in the rural and urban belts of Chhattisgarh. The correlation with climate change is yet to established.*

## Chapter 4

### NPCCHH: Vision, Goal & Objectives

#### 4.1 Vision

Strengthening of healthcare services for all the citizens of the state especially vulnerable like children, women, elderly, tribal and marginalized population against climate sensitive illnesses.

#### 4.2 Goal

To Reduce morbidity, mortality, injuries and health vulnerability due to climate variability and extreme weather

#### 4.3 Objective

To strengthen health care services against adverse impact of climate change on health.

#### Specific Objectives

##### 4.3.1 Objective 1

To create awareness among general population (vulnerable community), health-care providers and Policy makers regarding impacts of climate change on human health.

##### 4.2.2 Objective 2

To strengthen capacity of healthcare system to reduce illnesses/ diseases due to variability in climate.

##### 4.2.3 Objective 3

To strengthen health preparedness and response by performing situational analysis at national/ state/ district/ below district levels.

##### 4.2.4 Objective 4

To develop partnerships and create synchrony/ synergy with other missions and ensure that health is adequately represented in the climate change agenda in the country in coordination with the Ministry of Health & Family Welfare.

##### 4.2.5 Objective 5:

To strengthen state research capacity to fill the evidence gap on climate change's impact on human health



**NPCCHH: Organisational Framework**

**5.1 NATIONAL LEVEL**

Key Nodal Agency  
Head, NPCCHH  
(NCDC, MoHFW)

Prime Minister's Council on  
Climate Change (PMCCC)

Health Mission

Ministry of Health and Family  
Welfare (MoHFW), Govt of India

**5.2 STATE LEVEL**

Key Nodal Point  
SNO-CC

State Governing Body -  
Environmental Health

State level Task Force -  
Environmental Health

State Environmental Health Cell  
(EHC)

**5.3 DISTRICT LEVEL**

Key Nodal Point  
DNO-CC

District Task Force –  
Environmental Health

District Environmental Health Cell  
(EHC)

**5.4 BLOCK LEVEL**

(DNO-CC)

CHC Level

**5.6 VILLAGE LEVEL**  
(DNO-CC)



***5.7 State Level - Governing Body - Environmental Health***

The state level governing body for policy level decision shall be working under Chairmanship of Honourable State Health Minister. The other members may be as follows:

Honourable State Health Minister	Chairman
Principal Secretary (Health)	<i>Vice Chairman</i>
Director Health Services/Head of Health System	Member Secretary
Mission Director-National Health Mission	Member
Principal Secretary, Ministry of Revenue (Disaster)	Member
Principal Secretary, Ministry of Agriculture	Member
Principal Secretary, Ministry of Water and Sanitation	Member
Principal Secretary, Ministry of Transport	Member
Principal Secretary, Ministry of Animal Husbandry	Member
Principal Secretary, Ministry of Environment and Forests	Member
Principal Secretary, Ministry of Women and Child Development / Social Justice	Member
Principal Secretary, Ministry of Science and Technology/ Earth Sciences	Member
Principal Secretary, Ministry of Education	Member
Principal Secretary, Ministry of Human Resource Development	Member
Principal Secretary, Ministry of Public Works Department	Member
Principal Secretary, Ministry of Power	Member
Principal Secretary, Ministry of Urban Development (Municipalities)	Member
Principal Secretary, Ministry of Finance	Member
Principal Secretary, Ministry of Law	Member

Principal Secretary, Ministry of Food and Civil Supplies	Member
Principal Secretary, Ministry of Panchayati Raj	Member
Regional Director -Health & Family Welfare (GoI)	Member
Director Medical Education and Research	Member
State Nodal Officer- Climate Change	Member
Head – NAPCCHH, CEOH&CCH Division, NCDC	Member

### **5.8 State Level Task Force - Environmental Health**

This task force shall be working under the guidance of Principal Secretary (Health) of the state. It shall be directly overseeing the implementation of the State Action Plan for Climate Change and Human Health (SAPCCHH) in their state/UT. It shall be working through Directorate of Health Services (DHS) of the state, which will be the implementing agency for SAPCCHH.

The State level Task Force shall have inter-ministerial members which are suggested as:

Principal Secretary (Health)	Chairperson
Mission Director-National Health Mission	Vice Chairman
Director Health Services/Head of Health System	Member Secretary
Director/ Chairman - Department of Revenue (Disaster)	Member
Director/ Chairman - Department of Agriculture	Member
Director/ Chairman - Department of Water and Sanitation	Member
Director/ Chairman - Department of Transport	Member
Director/ Chairman - Department of Animal Husbandry	Member
Director/ Chairman - Department of Environment and Forests	Member
Director/ Chairman - Department of Women and Child Development / Social Justice	Member
Director, Meteorological department of State/UT	Member
Director/ Chairman - Department of Public Works Department	Member
Director / Chairman – Department of Urban Development (Municipalities)	Member
Director/ Chairman - Department of Education	Member
Director/ Chairman - Department of Food and Civil Supplies	Member
Director/ Chairman - Department of Human Resource Development	Member
Director/ Chairman - Department of Power	Member

Director/ Chairman - Department of Finance	Member
Director/ Chairman - Department of Law	Member
Director/ Chairman - Department of Panchayati Raj	Member
Director/ Chairman - State Ground Water Board	Member
Head - State disaster Management Authority	Member
Environmental Engineer/ Scientist from Ministry of Environment	Member
Chairman, State Pollution Control Board	Member
Regional Director -Health & Family Welfare (GoI)	Member
Director Medical Education and Research	Member
State Nodal Officer- Climate Change	Member
Director, ICMR Institute/Centre (If any branch in the State/UT)	Member
State Surveillance Officer	Member
Head – NAPCCHH, CEOH&CCH Division, NCDC, MoHFW	Member
Head, NCDC Branch of the state	Member

The Task force of the State/ UT's Environmental Health Cell will coordinate with the Centre (MoHFW, NCDC ) for execution of state/ UTs SAPCCHH.

DHS will create an *Environmental Health Cell* within State Health Department, and will identify a *Nodal Officer* from Health department which preferably should be a senior Public Health Expert of the state.

The proposed State Level Structure of the Environmental Health Cell is as follows:

### **5.9 Structure at State/ UT Environment Health Cell:**

Nodal Officer (Public Health Expert - State Health Department)	<b>1</b>
Consultant-Capacity building/ Training/ HR Management	<b>1</b>
Consultant-Environmental Health	<b>1</b>
Data Manager & Analyst	<b>1</b>
Secretarial Assistants cum Data entry Operator	<b>1</b>

### 5.10 State Executive Members of EHC of Chattisgarh NPCCHH

<b>SNo.</b>	<b>Nominee/Representative Details</b>	<b>Member Details</b>
1	Director / NHM	Chairperson
2	State Nodal Officer - CG NPCCHH	Member Secretary
3	State Surveillance Officer	Member
4	State Nodal Officer – NVBDCP	Member
5	Consultant – SHSRC	Member
6	State Consultant – CG NPCCHH	Member
7	Consultant – SHSRC	Member
8	Consultant – IEC	Member
9	State Epidemiologist – IDSP	Member
10	State Veterinary Consultant	Member
11	State Microbiologist – IDSP	Member

### 5.11 Roles and Responsibilities of the State/ UT Environmental Health Cell

- Preparation and Implementation of State Action Plan for Climate Change and Human Health
- Conduct Vulnerability assessment and risk mapping for commonly occurring climate-sensitive illnesses in the state/ UT.

- Assessment of needs for health care professionals (like training, capacity building) and organise training, workshop and meetings.
- Maintain State and District level data on physical, financial, epidemiological profile for climate sensitive illnesses.
- Ensure Convergence with NHM activities and other related programs in the State / District
- Monitor programme, Review meetings, Field observations.
- Timely issue of warning/ alerts to health professionals and related stakeholders as well as general public through campaign or using mass media (Electronic or printed),
- Social mobilization against preventive measures through involvement of women's self-help groups, community leaders, NGOs etc.
- Advocacy and public awareness through media (Street Plays, folk methods, wall paintings, hoardings etc.)
- Conduction of operational research and evaluation studies for the Climate change and its impact on human health.

## 5.12 District Level:

The DHS will appoint the District Medical Officer/ Chief Medical Health Officer as the District Nodal Officer – Climate Change. A District Level Task Force will be constituted by the District Nodal Officer- Climate Change in consultation with the SNO-CC.

### 5.12.1 Structure of District Level Task Force- Environmental Health

District Collector	Chairman
Dean – Govt Medical College in the district/ Head- Department of Community Medicine of the Medical College	Vice Chairman
Chief Medical Officer/ District Medical Officer / District Nodal Officer – Climate Change.	<i>Member Secretary</i>
District Surveillance Officer	Member
District Programme Manager – NHM	Member
District Head, Department of Revenue (Disaster)	Member
District Head, Department of Agriculture	Member
District Head, Department of Water and Sanitation	Member
District Head, Department of Transport	Member
District Head, Department of Animal Husbandry	Member
District Head, Department of Environment and Forests	Member



District Head, Department of Women and Child Development / Social Justice	Member
District Head, Department of Science and Technology/ Earth Sciences	Member
District Head, Department of Education	Member
District Head, Department of Food	Member
District Head, Department of Human Resource Development	Member
District Head, Department of Public Works Department	Member
District Head, Department of Power	Member
District Head, Department of Finance	Member
District Head, Department of Law	Member
District Head, Department of Panchayati Raj	Member

The District Environmental Health Cell will be constituted by the District Nodal Officer- Climate Change in consultation with the SNO-CC At District level, a District Environmental Health Cell shall be constituted; which shall be comprise of the following:

#### **5.12.2 Structure at District Environment Health Cell:**

District Nodal Officer- Climate Change	Chairman
District Veterinary officer	Member
District Surveillance Officer/ District Epidemic Officer	Member
District RCH officer/FW Officer	Member
District Epidemiologist	Member
District Microbiologist	Member
District Immunisation Officer	Member
District Training Officer	Member
Data entry operator	Supporting staff

#### **5.12.3 Roles and Responsibilities of the District Environmental Health Cell**

- Preparation and Implementation of District Action Plan for Climate Change and Human Health.

- Conduct Vulnerability assessment and risk mapping for commonly occurring climate sensitive illnesses in the district.
- Maintain and update district database of illnesses identified in the district.
- Assess needs for health care professionals and conduct sub-district/ CHC level training/ workshop and meetings for capacity building.
- Ensure appointment of contractual staff and engage them in the assigned task of data management under the NAPCCHH.
- Maintain District level data on physical, financial, epidemiological profile for these illnesses.

### 5.13 Community Health Centre Level

The proposed CHC Level Structure is as under:

- Medical Superintendent (CHC Hospital) : Chairman
- Taluka Health Officer/ Talukas Health Officer : Member Secretary
- Health Education Officer/ Similar Post : Member
- Block Development Officer : Member
- Health Supervisor : Member

#### 5.13.1 Health Facility Level (PHC):

At the health facility, the responsibility for implementation will lie with the Medical Officer (In-charge) of the facility. The existing machinery of NHM will be utilised for the related activities. The Rogi Kalyan Samiti (RKS) would be reviewing and monitoring implementation at the health facility level. The ANM, ASHA and Anganwadi worker will assist in activities related to implementation of action plan at local level.

S no.	Designation	Role and Responsibilities
1	State Nodal Officer	<ul style="list-style-type: none"> <li>➤ Head the NPCCHH and state EHC at the state level</li> <li>➤ Preparation and Implementation of State Action Plan for Climate Change and Human Health</li> <li>➤ Maintain State and District level data on physical, financial, and epidemiological profile climate-sensitive illnesses.</li> <li>➤ Ensure Convergence with NHM activities and other related programs in the State / District</li> <li>➤ Monitor program, Review meetings, and field observations.</li> <li>➤ Timely issue of warning/ alerts to health professionals and related stakeholders as well as general public campaigns or using mass media (Electronic or printed),</li> <li>➤ Conduction of operational research and evaluation studies on climate change and its impact on human health.</li> </ul>

2	<b>District Nodal officer</b>	<ul style="list-style-type: none"> <li>➤ Head NPCCHH and District EHC at district level.</li> <li>➤ Preparation and Implementation of District Action Plan for Climate Change and Human Health.</li> <li>➤ Maintain and update the district database of illnesses identified in the district.</li> <li>➤ Assess needs for health care professionals and conduct sub-district/ CHC level training/workshops and meetings for capacity building.</li> <li>➤ Maintain District level data on physical, financial and epidemiological profile for these illnesses.</li> <li>➤ Coordinate with the state team and EHC on NPCCHH</li> <li>➤ Organizes and observe important events and days</li> </ul>
3	<b>Block Medical Officer</b>	<ul style="list-style-type: none"> <li>➤ Monitor the implementation of the SAPCCHH at the block level</li> <li>➤ Conduct training and Workshops at block levels with ANM/Mitanins/ Aganwadi Workers</li> <li>➤ Organise and observe important days</li> </ul>

## **Part II: Adaption plan on Climate sensitive Health Issues**

### **Chapter 6**

#### **Health Adaptation Plan For Acute Respiratory Illnesses Attributed to Air Pollution**

##### **6.1 Air Pollution**

Climate change can also have significant combined effect on regional air quality as it affects the conditions that effect pollutant transport like changes in chemical reaction rates and boundary layer mixing. Carbon-dioxide (CO<sub>2</sub>), one of the major drivers of climate change can slow down the dispersal of air pollutants and increase the frequency of stagnation episodes, which results in the degradation of air quality<sup>10</sup>. It also enhances the production rate of pollutants such as Ozone and PM2.5, especially in the urban areas.

Chhattisgarh is a state with highest mines and mineral based industries and Air Pollution is one of the biggest threats to the health of the population. Air pollution has a wide range of health effects, such as - cardiovascular diseases, respiratory diseases, hypertension, diabetes and obesity. Air pollution has also been linked to have a detrimental impact on food productivity - for instance, increase in ground level ozone pollution affects the crop yield. Similarly traditional methods of food preservation like sun drying of vegetables for use in lean seasons, is no longer viable in coal mining and power plant areas due to coal dust and fly-ash pollution.

Air pollution is a major environmental risk to health. The formation, transport and dispersion of many air pollutants is determined partly by climate and weather factors such as temperature, humidity, wind, storms, droughts, precipitation and partly by human activities known to produce various air pollutants. It is thus logical to assume that climate change will influence the dynamics of air pollution. By reducing air pollution levels, states can reduce the burden of disease from stroke, heart disease, lung cancer, and both chronic and acute respiratory diseases, including asthma<sup>29,30</sup>.

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<sup>10</sup> M. Jacobson, "Enhancement of Local Air Pollution by Urban CO<sub>2</sub> Domes," *Environ. Sci. Technol*, pp. 44, 2497-2502, 2010.

### **6.1.1 Two major types of Air Pollution:**

1. Ambient (Outdoor) Air Pollution
2. Household (Indoor) Air Pollution

### **6.1.2 Define Ambient (Outdoor) Air Pollution and Household (Indoor) Air Pollution**

Ambient (outdoor air pollution) in both cities and rural areas was estimated to cause 3.7 million premature deaths worldwide in 2012. Air pollution also affects health by causing acid rain; eutrophication due to nitrogen oxides, emission in air from power plants, cars, trucks, and other sources; Haze; toxic effects on wildlife; Ozone depletion; Crop and forest damage etc. Over 4 million people die prematurely from illness attributable to the household air pollution from cooking with solid fuels. 3.8 million premature deaths annually from non-communicable diseases including stroke, ischemic heart disease, chronic obstructive pulmonary disease (COPD) and lung cancer are attributed to exposure to household air pollution.

### **6.2. Study conducted by the state govt on air pollution may be described here in short with data.**

- b) The The State Climate Change and Human Health (SCCHH) in coordination with Pt. J L N medical College Raipur conducted a study in Baloda Bazar on air pollution in 2019.
- c) The State Climate Change and Human Health technical cell - State Health Resource Center (SHRC) has conducted studies on air pollution and health in the districts of Raipur, Raigarh and Korba since 2016.  
Link: <http://shsrc.org/wp-content/uploads/2020/04/Korba-Study-SHRC-2020.pdf>
- d) Technical Cell of SCCHH study of air pollution in Raipur city and possible sources of the pollution and released its report in April 2019 and 2020. This was followed up with interdepartmental consultation on the issue and way forward.  
Link: <http://shsrc.org/wp-content/uploads/2020/05/Korba-AQ-report-2020.pdf>
- d) Since 2018, the technical cell (SHRC) has been engaged in a study titled Participatory Environmentalism: Mobilizing Citizens for Air Pollution Mitigation and Improved Environmental Health in India.
- e) The cell conducted a study on Sigdi use in Korba, to understand the pattern of the use and strategies for shifting the behavior of usage from coal to cleaner fuel like LPG.

### 6.3 Prominent causes of Ambient Air Pollution in Chhattisgarh:

1. Pollution by Automobiles
2. Industrial Emission – Sponge iron
3. Thermal Power Plants
4. Mining
5. Transportation of Coal in open trucks
6. Waste Burning

### 6.4 Prominent causes of Household Air Pollution in Chhattisgarh:

1. Use of biomass, kerosene as fuel for cooking
2. Burning of waste, cow dung, coal, tyre, Chena
3. Sigdi (coal stove)
4. Firewood

### 6.5 Other factors contributing to increase/ decrease of Ambient/ Household air pollution in the polluted cities in the (name) state.

1. Building Construction (Outdoor Pollution)
2. Mosquito coil/Agarbatti (Indoor Pollution)

**6.6 Air Quality Index:** Air Quality Index is a tool for effective communication of air quality status to people in terms, which are easy to understand. It transforms complex air quality data of various pollutants into a single number (index value), nomenclature and colour.

#### Air Quality Index

PM <sub>10</sub> (24hr)	PM <sub>2.5</sub> (24hr)	AQI Category (Range)	Associated Health Impacts
0–50	0–30	Good	Minimal impact
51–100	31–60	Satisfactory	May cause minor breathing discomfort to sensitive people.
101–250	61–90	Moderately polluted	May cause breathing discomfort to people with lung diseases such as asthma, and discomfort to people with heart disease, children, and older adults.
251–350	91–120	Poor	May cause breathing discomfort to people on prolonged exposure, and discomfort to people with heart disease.



351–430	121–250	Very poor	May cause respiratory illness to the people on prolonged exposure. The effect may be more pronounced in people with lung and heart diseases.
430+	250+	Severe	May cause respiratory impact even on healthy people, and serious health impacts on people with lung/heart disease. The health impacts may be experienced even during light physical activity.

PM2.5 Range	Air Quality	Health Implications		
		Healthy Person	Elderly; Pregnant Women; Children	Persons with chronic Lung disease, Heart disease
0 - 30	Good	Normal activities	Normal activities	Normal activities
31-60	Satisfactory	Normal activities	Normal activities; however, there may be a moderate health concern for a very small number of people who are unusually sensitive to air pollution.	Normal activities; however, there may be a moderate health concern for a very small number of people who are unusually sensitive to air pollution.
61-90	Moderately Polluted/ Unhealthy	Reduce prolonged or strenuous outdoor physical exertion	Minimise prolonged or strenuous outdoor physical exertion	Avoid prolonged or strenuous outdoor physical exertion
91-120	Poor/ Unhealthy	Avoid prolonged or strenuous outdoor physical exertion	Minimise outdoor activity	Avoid outdoor activity
121-250	Very Poor / Hazardous	Minimise outdoor activity	Avoid outdoor activity	Avoid outdoor activity
> 250	Severe / Hazardous	Minimise outdoor activity	Avoid outdoor activity	Avoid outdoor activity

## HEALTH ADAPTATION PLAN

### 1.AWARENESS GENERATION

#### IEC Campaign

- a) Audio Visual communication packages on air pollution and health impacts and measures to protect health, will be developed and disseminated at all DH and CHC levels.
- b) Sustained public awareness campaigns will be conducted throughout the year through community outreach, workshops and trainings, to create awareness about air pollution and its health impacts.
- c) Street plays in low-income communities

- d) Carry out mass media campaigns and Engage local and regional media (community radio, TV)
- e) Promote a culture of risk prevention, mitigation, and better risk management
- f) Promote attitude and behavior change in the awareness campaigns linking air pollution and climate change.

### IEC DISSEMINATION PLAN FOR 5 YEARS 22-27

SL. no	IEC Content	Priority Districts	Dissemination Plan for 5 years	Timeline	Budget (in lakhs) for 5 years				
					22 to 23	23 to 24	24 to 25	25 to 26	26 to 27
1.	Posters	Raipur, Korba, Raigarh, Balodabazar,	2 Posters for Healthcare facilities in all districts	July to September					
2.	Audio	Janjgir-Champa, Bilaspur, Durg-Bhillai,	Social Media ( Facebook, Instagram, Twitter etc.)	August to October	7.5	7.5	7.5	7.5	7.5
3.	Videos								
4.	GIF's								
5.	Public Health Advisories								

#### Public Health Advisories

Health advisories are issued to alert the population of the potentially harmful impact of air pollution. Advisories are issued at central level and will be forwarded to all the districts through the state for public dissemination. District is to ensure timely dissemination of health advisories and if required translate in locally acceptable language.

#### Observation of Special Days

Special Day	Date	Key planned activities
International Day on Clean Air for Blue Sikes	7 <sup>th</sup> of September	District and sub-districts levels are recommended to arrange community engagement activities as: <ul style="list-style-type: none"> <li>• Health facility based: plantation, awareness sessions</li> <li>• Community setting based: mass meetings, rallies, local/community radio programmes, street plays.</li> <li>• Sports events: athletics, cycling</li> <li>• Competition and quiz</li> </ul>

## 2.Capacity Building

- a) Training on air pollution and health response will be provided for doctors, nurses and para medical staff from DH and Community Health Centre (CHC) at AIIMS Raipur and Pt Jawahar Lal Nehru Medical College. Technical training will be provided to the spirometry staff at all DH on operating and maintaining the equipment

- b) Necessary medicines and equipment will be made available to all health centres and hospitals to cope with any air pollution related health situation. Spirometers and a trained staff to handle it will be made available at the CHC level.
- c) Capacity building of Mitanins and Panchayati Raj Institutions on Climate change and health impacts
- d) **Sensitization/knowledge building workshops** will be planned for seeking updates on various air pollution related health issues between district officials, medical officers and academic institutions working on climate change impact.

**Training on air pollution and various health impacts of air pollution:**

**NPCCHH TRAINING PLAN AT THE DISTRICT LEVEL**

Training Programme	Trainer	Participants	Training Content
<b>Medical Officers (3 Days)</b>	DNO	MO (DH,CHC,PHC)	Air pollution related illness <ul style="list-style-type: none"> <li>• Air pollution-health impact, prevention measures</li> <li>• Surveillance case identification, reporting and analysis with AQI</li> <li>• Health facility preparedness</li> </ul>
<b>Community Health Care Workers (HWC) (2 Days)</b>	MO	Community Health Workers (MPHW, ASHA)	
<b>Panchayati Raj Institutions (1 Day)</b>	MO, MLHP	Panchayati Raj Institutions, communities	

**SCHEDULE PLAN FOR TRAINING FOR 5 YEARS 22-27**

Sl. no	Training program	Timeline	Target	Priority Districts	Budget (in lakhs) for 5 years 15 % increase each year				
					22 to 23	23 to 24	24 to 25	25 to 26	26 to 27
01	DNO	August	100%	The entire State of Chhattisgarh					
02	MO	September-October	100%	Raipur/Durg/Bilaspur/JanjgirChampa/Korba/Raigarh/Balodabazar/Sarguja	6.0	6.0	6.0	6.0	6.0
03	Community Health Workers	October-November	100%	The entire State of Chhattisgarh					
04	Panchayati Raj Institutions	November	100%	The entire State of Chhattisgarh					

**3.Surveillance**

- a) ARI Surveillance Activity at District and State Level
- b) Pilot Air Monitoring and Health Advisories will be conducted for 8 most vulnerable districts in the first year. These districts are Raipur, Raigarh, Bilaspur, Korba, Balodabazar, Janjgir-Champa, Durg, Sarguja. IDSP has initiated ARI surveillance that

will be strengthened further. Air pollution and health impact studies will also be carried out in these districts along with the monitoring. IDSP division will be oriented to track ARI incidences in these regions.

- c) Mortality and Morbidity Data Related to ARI
- d) Data analysis of different non-communicable and communicable diseases reported to the department of health and family welfare.
- e) Necessary health advisories will be issued by the Chief Medical Officer and Collector based on the air quality data, as and when required.

**Acute Respiratory Illness:** Acute Respiratory Illness (ARI) is a cause of death globally, causing approximately 19% of all deaths before the age of 5 years, according to a World Health Organization estimate. Indoor air pollution from biomass fuels, which is strongly poverty-related, has long been regarded as an important risk factor for ARI morbidity and mortality.

Long-term exposure to high concentrations of PM<sub>2.5</sub> may increase risk for acute respiratory problems in small children.

The first meeting of the Technical Advisory Group on Acute Respiratory Infections (ARI) was held in Geneva, Switzerland, on March 7-11, 1983. In keeping with the targets of the Seventh General Program of Work, the Group discussed the feasibility and guiding principles of controlling ARI based on information now available and advised on priorities and strategies for the program.

During the past few years, considerable progress had been made in understanding the ARI problem and its susceptibility to intervention. In particular, the importance of bacteria rather than viruses as the principal cause of mortality from severe acute lower respiratory infections in developing countries is now clear; the effectiveness of antimicrobial and supportive treatment may avert these deaths; existing clinical experience has been consolidated into simple case-management plans, and the primary health care (PHC) infrastructure required to utilize these plans is being strengthened rapidly. The Group concluded that sufficient knowledge and technology were already available for countries to phase in an ARI control program. The ARI control program, consisting of both a service and a research component, should be started by introducing simple measures at the PHC level and should progressively provide technical support at higher levels.

National Clean Air Programme (NCAP), launched in 2019, is India's flagship program for better air quality in 122 cities. This review evaluates the scientific, legislative, financial, and institutional framework of the 102 publicly available clean air action plans submitted under NCAP. From the state of Chhattisgarh Raipur, Bhilai and Korba are included in NCAP. Chhattisgarh State National Program of Climate Change and Human Health has identified eight sites for ARI surveillance based on the poor air quality, out of which presently seven are considered vulnerable in association with poor air quality, except Sarguja.

## The operational guidelines at the ARI surveillance identified sites

The ARI surveillance will be implemented in the eight identified sites within a set of guidelines with the existing human resources and infrastructure. This would require

S.no.	Human Resource	Numbers of staff	Role and responsibility
1	Nodal Officer: Pulmonary specialist only in the absence of the Pulmonary specialist MD Medicine OR MBBS is preferred	1	Supervise the process of surveillance from time to time.
2	Staff Nurse or Paramedics	1	To assist the nodal officer in the process and taking the details of the patients diagnosed with COPD/Asthma/Bronchitis/Pneumonia/TB
3	Data entry operator	1	Enter the data required in the given format in Annexure A in the surveillance portal or link provided on monthly basis.

### **SENTINEL HOSPITALS SELECTED FOR ARI SURVEILLANCE ACTIVITY:**

8 health facilities are identified as the sentinel hospitals for the surveillance for ARI:

SL. NO	NAME OF THE DISTRICT	NAME	DESIGNATION	SENTINEL HOSPITAL FOR ARI	PHONE
01.	Raipur		MO	District Hospital	
02.	Korba	Dr. Chandrakant Bhaskar	Assistant Professor	GMC Medical College, Korba	94084 42075
03.	Raigarh	Dr. Yogesh Patel	CMHO, Office	Raigarh Distrcit Hospital	99818 46933
04.	Bilaspur	Dr. Aniket Kaushik	Medical Officer	Bilaspur District Hospital	9839171346
05.	Durg	Dr. Devendra Kumar Sahu	MD Medicine	Durg District Hospital	99810 79993
06.	Janjgir-Champa	Dr. Akash Thawat	Medical Officer	District Hospital, Janjgir	90981 13160
07.	Balodabazar	Dr. Narendra	Medical Officer	District Hospital, Balaodabazar	93025 36808
08.	Sarguja	Dr. Rajesh Kumar	Medical Officer	District Hospital, Sarguja	87180 49006

*The list is subject to be updated as per the changes due to government orders regarding transfers and other requirements.*

### **ROLES AND RESPONSIBILITIES**

In accordance with the action plan on air pollution and its impact on human health, the following roles and responsibilities have been identified to be implemented at the state, district, block as well as healthcare facility level-

<b>Responsibilities</b>	
<b>SNO</b>	<ul style="list-style-type: none"> <li>• Finalization of IEC material and dissemination Plan</li> <li>• Organize IEC campaigns at state level on observance of important environment-health days</li> <li>• Organize training sessions for district level and surveillance nodal officer</li> <li>• Facilitate training of medical officers in clinical aspects of air pollution's health impact</li> <li>• Real time air quality data dashboard in proposed cities</li> <li>• Monitor AQI levels in states especially in hotspots and NCAP cities</li> <li>• Ensure reporting from sentinel hospitals and DNO</li> <li>• Ensure necessary health facility preparedness</li> <li>• Review surveillance reporting and monthly report submission by DNO</li> <li>• Submit report of activities</li> <li>• Review implementation of IEC and surveillance activities at all levels</li> <li>• Evaluate and update relevant section of SAPCCHH with support from the State Task Force</li> <li>• Liaison with State Pollution Control Board for AQI alerts and its dissemination</li> <li>• Liaison with Department of Environment for combined IEC campaigns and information sharing on health indicators for targeted air pollution reduction activities</li> <li>• Awareness and action plan input sharing with the local bodies of cities with high AQI</li> <li>• Create organization support and strengthen Environmental Health cell to implement NPCCHH vision, Goal and Objectives</li> <li>• Organize sensitization workshops for other stakeholders and line departments</li> <li>• Organize Seminars on Air Pollution and Conference to share knowledge and action under NPCCHH.</li> <li>• Collaborate with academic institute/s for support in updating SAPCCHH</li> <li>• Surveillance activity monitoring, vulnerability assessment and applied research</li> <li>• Advocate for reduction in source of air pollution</li> </ul>
<b>DNO</b>	<ul style="list-style-type: none"> <li>• Ensure IEC dissemination to the community level</li> <li>• Facilitate community level IEC activities</li> <li>• Organize training for Block health officers, Medical officer, Sentinel hospital nodal officers with relevant training manuals</li> <li>• Organize training of vulnerable groups: police officers, outdoor works, women, children</li> <li>• Organize IEC campaigns at district level on observance of important environment-health days</li> <li>• Collect and monitor AQI levels in states especially in hotspots and NCAP cities</li> </ul>



	<ul style="list-style-type: none"> <li>• Ensure daily reporting from Sentinel hospitals and compile the data</li> <li>• Analyze daily health data with AQI level to monitor trends and hotspot in health impacts</li> <li>• Submit analysed monthly report to SNO, NPCCHH Headquarter and other departments for necessary action</li> <li>• Submit report of activities</li> <li>• Update DAPCCHH with support from District Task Force</li> <li>• Advocate for reduction in source of air pollution</li> </ul>
<b>Surveillance hospital nodal officer</b>	<ul style="list-style-type: none"> <li>• Train hospital staff and clinician responsible for daily reporting in case indentation and reporting flow</li> <li>• Compile daily reports for the health facility and submit it to DNO and NPCCHH, Headquarter</li> </ul>
<b>Block health officer</b>	<ul style="list-style-type: none"> <li>• Conduct community level IEC activities</li> <li>• Ensure training of medical officers</li> <li>• Organize PRI sensitization workshop and training for vulnerable groups</li> </ul>
<b>Medical officer</b>	<ul style="list-style-type: none"> <li>• Conduct health facility-based IEC activities</li> <li>• Support community level IEC activities</li> <li>• Be aware of AQI levels and health impact of air pollution</li> <li>• Ensure necessary health facility preparedness in early diagnosis and management of cases</li> </ul>

## Chapter 7

### Health Adaptation Plan on Heat

In India, heat wave is considered if maximum temperature of a station reaches at least 40°C or more for plains, 37°C or more for coastal stations and at least 30°C or more for hilly regions. Following criteria are used to declare a heat wave:

**a) Based on Departure from Normal**

o *Heat Wave*: Departure from normal is 4.5°C to 6.4°C

o *Severe Heat Wave*: Departure from normal is >6.4°C

**b) Based on Actual Maximum Temperature (for plains only)**

o *Heat Wave*: When actual maximum temperature  $\geq 45^\circ\text{C}$

o *Severe Heat Wave*: When actual maximum temperature  $\geq 47^\circ\text{C}$

The adverse health effects of hot weather and heat-waves are largely preventable. Prevention requires a portfolio of actions at different levels, these actions can be integrated in a defined heat–health action plan.

National Disaster Management Authority (NDMA) prepared Guidelines for Preparation of Action Plan-prevention and management of Heat wave-2017, wherein the roles and responsibilities of various agencies were identified. Emergency Medical Relief (EMR), Ministry of Health and Family Welfare prepared detailed guidelines on prevention and management of heat related illnesses – 2015 wherein patho-physiology, risk factors, clinical manifestations, management, prevention and public health action plan for managing heat related illnesses has been explained.

#### 7.1 Types of heat related illnesses

Clinical Entity	Age Range	Setting	Cardinal Symptoms	Cardinal / Important Signs	Pertinent Negative findings
<b>Heat rash/ prickly heat/ Miliaria</b>	All, but frequent ly children	Hot environment; +/- insulating clothing or swaddling (wrap in tight clothes)	<b>ITCHY RASH</b> with <b>SMALL RED BUMPS</b> at pores in the skin. Seen in setting of heat exposure; bumps can sometimes be filled with clear or white fluid	<b>DIFFUSED RED COLOUR SKIN OR VESICULAR RASH</b> , itching of the skin without visible eruption	<b>NOT FOCALLY DISTRIBUTED</b> like a contact dermatitis
<b>Heat cramps</b>	All	Hot environment, <b>TYPICALLY WITH EXERTION</b> , +/- insulating clothing	<b>PAINFUL SPASMS</b> of large and frequently used muscle groups	Uncomfortable appearance, may have <b>DIFFICULTY FULLY EXTENDING AFFECTED</b>	No contaminated wounds/tetanus exposure; no seizure activity

				LIMBS/JOINTS	
<b>Heat exhaustion</b>	All	Hot environment; +/- exertion; +/- insulating clothing or swaddling (wrap in a tight clothes)	Feeling overheated, light headedness, <b>EXHAUSTED AND WEAK</b> , unsteady, feeling of <b>VOMITING, SWEATY AND THIRSTY</b> , inability to continue activities	<b>SWEATY</b> /diaphoretic; flushed skin; hot skin; <b>NORMAL CORE TEMPERATURE</b> ; +/- dazed, +/- generalized weakness, slight disorientation	No coincidental signs and symptoms of infection; no focal weakness; no difficulty in swallowing food or speech; no overdose history
<b>Heat syncope</b>	Typically adults	Hot environment; +/- exertion; +/- insulating clothing or swaddling (wrap in a tight clothes)	Feeling hot and weak; light headedness followed by a <b>BRIEF LOSS OF CONSCIOUSNESS</b>	Brief, generalized loss of consciousness in hot setting, short period of disorientation, if any	<b>NO SEIZURE ACTIVITY</b> , no loss of bowel or bladder continence, no focal weakness, no difficulties in food swallowing or speech
<b>Heat Stroke</b>	All	Hot environment; +/- exertion; +/- insulating clothing or swaddling (wrap in a tight clothes)	Severe overheating; profound weakness; <b>DISORIENTATION, NOT FULLY ALERT, CONVULSION, OR OTHER ALTERED MENTAL STATUS</b>	Flushed, <b>DRY SKIN</b> (not always), <b>CORE TEMP <math>\geq 40^{\circ}\text{C}</math> OR <math>104^{\circ}\text{F}</math></b> ; altered mental status with disorientation, incoherent behaviour, <b>COMA, CONVULSION</b> ; tachycardia; +/- hypotension	No coincidental signs and symptoms of infection; no focal weakness; no difficulties in swallowing food or speech, no overdose history

## 7.2. Heat Waves Records in Chhattisgarh

Directorate of Health Services, Chhattisgarh													
Heat Stroke Report year 2015-2019													
Name of the State: Chhattisgarh													
S.No.	Name of the District (Name of all districts)	2015		2016		2017		2018		2019 (As On 31/06/2019)		total	
		Case	Death	Case	Death	Case	Death	Case	Death	Case	Death	Case	Death
1	Balod	53	0	23	0	29	0	5	0	41	0	151	0
2	Balodabajar	0	0	4	0	29	0	2	0	2	0	37	0
3	Balrampur	0	0	6	0	35	0	2	0	10	0	53	0
4	Bastar	0	0	11	0	1	0	1	0	1	0	14	0
5	Bemetara	6	0	1	0	1	0	1	0	43	0	52	0
6	Bijapur	0	0	3	0	16	0	1	0	31	0	51	0
7	Bilaspur	1	0	39	0	6	0	11	0	5	0	62	0
8	Dantewada	12	0	0	0	13	0	2	0	11	0	38	0

9	Dhamtari	4	0	7	0	0	0	0	0	0	0	11	0
10	Durg	6	0	7	0	4	0	0	0	6	0	23	0
11	Gariyaband	14	0	37	1	3	0	5	0	3	0	62	1
12	Jangjir	71	0	5	0	3	0	1	0	2	0	82	0
13	Jashpur	35	0	55	0	60	0	3	0	35	0	188	0
14	Kabirdham	7	0	0	0	24	0	0	0	3	0	34	0
15	Kanker	0	0	5	0	9	0	0	0	0	0	14	0
16	Kondagaon	1	0	20	0	16	0	0	0	17	0	54	0
17	Korba	7	0	1	0	9	0	8	0	17	0	42	0
18	Korea	18	0	9	0	0	0	2	0	0	0	29	0
19	Mahasamund	6	0	9	1	14	0	11	0	22	0	62	1
20	Mungeli	5	0	1	0	20	0	2	0	0	0	28	0
21	Narayanpur	2	0	0	0	0	0	0	0	0	0	2	0
22	Raigarh	34	0	16	0	33	0	9	0	15	0	107	0
23	Raipur	1	1	4	0	15	0	0	0	2	0	22	1
24	Rajnandgaon	74	0	8	0	22	0	0	0	84	0	188	0
25	Sukma	0	0	1	0	0	0	0	0	2	0	3	0
26	Surajpur	6	0	36	0	9	0	10	0	13	0	74	0
27	Surguja	5	0	2	0	19	0	15	0	0	0	41	0
	<b>Total</b>	<b>368</b>	<b>1</b>	<b>310</b>	<b>2</b>	<b>390</b>	<b>0</b>	<b>91</b>	<b>0</b>	<b>365</b>	<b>0</b>	<b>1524</b>	<b>3</b>

In May 2019, almost all big cities in Chhattisgarh experienced heatwave like situations. According to news reports high temperatures in some of the cities in May 2019 were<sup>11</sup>:

Bilaspur: 45 deg C

Rajnandgaon: 45 deg C

Raipur: 44.3 deg C

Durg: 42.6 deg C

Pendra Road: 41.5 deg C

Ambikapur: 41 deg C

Jagdapur: 41 deg C

Raipur, Bilaspur, Raigarh, Janjgir and Durg districts were particularly affected and all of them recorded a temperature of 46 dec C on 9th and 10 May 2019. In addition to the increase in temperatures exacerbates the heat island effect in urban areas causing additional stress to the urban population.

<sup>11</sup> <https://zeenews.india.com/chhattisgarh/imd-issues-heatwave-warning-in-chhattisgarh-for-next-48-hours-2202084.html>

## HEALTH ADAPTATION PLAN ON HEAT RELATED ILLNESS

### Awareness Generation

#### IEC Campaign:

- a) So far the heat alerts are received and delivered by the State through IDSP. Even though we have a Heat Wave State Action Plan for the State and for Raipur city, it needs to be disseminated further.
- b) Audio Visual communication packages on heat stress and health impacts and measures to protect health, will be developed and disseminated at all DH and CHC levels. Formulation and dissemination of Heat Wave Action Plans for districts vulnerable to heat waves in collaboration with IDSP.
- c) Sustained campaign in coordination with Education Dept and AYUSH for school and anganwadi interventions. Public awareness programs will be conducted throughout the year through community outreach, workshops and trainings, to create awareness about heat stress and its health impacts.
- d) **Public Health Advisories** :Health advisories are issued to alert population of potential harmful impact of increasing heat. Advisories are issued at central level and forwarded to Districts through State/UTs for public dissemination. District should ensure timely dissemination of health advisories in locally acceptable language.

#### IEC dissemination plan

SL. no	IEC Content	Priority Districts	Dissemination Plan	Timeline	Budget (in lakhs) for 5 years with				
					22 to 23	23 to 24	24 to 25	25 to 26	26 to 27
1.	Posters	Bilaspur, Rajnandgaon , Raipur, Durg, Pendra Road , Ambikapur, Jagdalpur, Raigarh, Janjgir -	1 Poster for Healthcare facilities/Schools/ Construction workers/ Farmers/travellers in all districts	Feb to May	7.5	7.5	7.5	7.5	
2.	Audio	Champa,	Social Media	Feb to					
3.	Videos	Gariyaband,	(Facebook,	May					
4.	GIF's	Dantewada,	Instagram etc.)						
5.	Public Health Advisories	Mahasamund, Bemetra E	1 Health advisories for Healthcare facilities/Schools/ Construction workers/ Farmers /travellers in all districts	Feb to May					

## Public Health Advisories:

Health advisories are issued to alert population of potential harmful impact of increasing heat. Advisories are issued at central level and forwarded to Districts through State/UTs for public dissemination.

District should ensure timely dissemination of health advisories in locally acceptable language.

## Capacity Building:

- Organizing State and District level meetings with Task Force on Heat Action Plans before the summer season to ensure awareness and preparedness for responding to the heat wave scenarios.
- Training on heat stress and health response will be provided for doctors, nurses and para medical staff from DH and Community Health Centre (CHC) at AIIMS Raipur and Pt Jawahar Lal Nehru Medical College.

### Training on various health impacts of heat is as follows

#### NPCCHH TRAINING PLAN AT DISTRICT LEVEL

<i>Training Programme</i>	<b>Trainer</b>	<b>Participants</b>	<b>Training Content</b>
<i>Medical Officers (3 Days)</i>	DNO	MO (DH,CHC,PHC)	<ul style="list-style-type: none"> <li>Heat related illness</li> <li>Heat-health impact, prevention measures</li> <li>Surveillance case identification and reporting</li> <li>Health facility preparedness</li> <li>Clinical management of HRI</li> <li>Indoor and outdoor mitigation measures</li> </ul>
<i>Community Health Care Workers (HWC) (2 Days)</i>	MO	Community Health Workers (MPHW, ASHA)	
<i>Panchayati Raj Institutions (1 Day)</i>	MO, MLHP	Panchayati Raj Institutions, communities	

#### SCHEDULE PLAN FOR TRAINING

<i>Sl. no</i>	<b>Training programme</b>	<b>Timeline</b>	<b>Target</b>	<b>Priority Districts</b>	<b>Budget (in lakhs) for 5 years with increasing 15% each year</b>				
					<b>22 to 23</b>	<b>23 to 24</b>	<b>24 to 25</b>	<b>25 to 26</b>	<b>26 to 27</b>
<i>01</i>	DNO	February	100%	Bilaspur, Rajnandgaon, Raipur, Durg, Pendra Road, Ambikapur, Jagdalpur, Raigarh, Janjgir - Champa, Gariyaband, Dantewada	6.0	6.0	6.0	6.0	6.0
<i>02</i>	MO	March	100%						
<i>03</i>	Community Health Workers	April	100%						
<i>04</i>	Panchayati Raj Institutions	April - May	100%						



- c. **Sensitization/knowledge building workshops** will be planned for seeking updates on various heat related health issues between district officials, medical officers and academic institutions working on climate change impact.

### 7.5 Surveillance:

Surveillance of heat for advisories is in existence and the data is also regularly shared with National Center for Disease Control under the National Program of Climate Change and Human Health.

- a) Creating Heat Stress Response Corners in the Hospital. These will be special section in the hospitals equipped with material, ORS and Water and drugs and technical staff to create awareness and respond to heat related emergencies.
- b) Issuing Health advisories by the Directorate of Health and Family Welfare and District Collectors during extreme heat situations. These advisories will contain the Do's and Dont's for the general public.

### Roles and responsibilities

The roles and responsibilities of the state staff to implement the action plan for heat related illnesses is defined below-

	Responsibilities
SNO	<ul style="list-style-type: none"> <li>• Disseminate early warnings to the district level</li> <li>• Finalization of IEC material and dissemination Plan</li> <li>• Liaison with IMD for weather alerts and its dissemination</li> <li>• Liaison with other departments for combined IEC campaigns, coordinated response and information sharing of health indicators for targeted action</li> <li>• Organize the IEC campaigns at state level on observance of important environment-health days</li> <li>• Organize training sessions for the district level and the surveillance nodal officers</li> <li>• Facilitate training of medical officers in clinical aspects of heat-health impact</li> <li>• Ensure daily surveillance reporting from district level</li> <li>• Ensure submission and analysis of heat related death at state and district level</li> <li>• Monitor daily health data with temperature and humidity levels to monitor trends and hotspots in the state</li> <li>• Review health facility preparedness and ambulance services to manage HRI</li> <li>• Identify health facilities at different levels that can have heat illness wards with necessary treatment/cooling facilities</li> <li>• Keep existing Rapid Response Teams under IDSP prepared to manage HRI if needed for emergency response to extreme heat</li> <li>• Review implementation of the IEC and surveillance activities at all levels</li> <li>• Evaluate and update relevant section of SAPCCHH with support from State</li> </ul>

	<p>Task Force</p> <ul style="list-style-type: none"> <li>• Create organizational support and strengthen Environmental Health cell to implement NPCCHH vision, Goal and Objectives</li> <li>• Organize sensitization workshops for other stakeholders and line departments</li> <li>• Organize seminars and conference to share knowledge and action under NPCCHH.</li> <li>• Collaborate with academic institute/s for support in updating SAPCCHH, Surveillance activity monitoring, training of health care professionals, vulnerability assessment and applied research</li> <li>• Submit report of activities on heat-health under NPCCHH</li> <li>• Advocate for reduction in source of greenhouse gas emissions</li> </ul>
<b>DNO</b>	<ul style="list-style-type: none"> <li>• Disseminate early warning to block and health facility level</li> <li>• Ensure IEC dissemination to community level and facilitate community level IEC activities</li> <li>• Liaison with IMD to receive daily observed temperature and relative humidity information</li> <li>• Liaison with other departments for combined IEC campaigns, coordinated response and information sharing of health indicators for targeted action</li> <li>• Conduct training for block health officers, medical officers, with relevant training manuals</li> <li>• Conduct sensitization of vulnerable groups: police officers, outdoor works, women, children etc</li> <li>• Organize IEC campaigns at district level on observance of important environment-health days</li> <li>• Ensure daily reporting from health facilities and compile the data</li> <li>• Analyze daily health data with temperature and humidity levels to monitor trends and hotspots in the district</li> <li>• Support timely suspected heatstroke death analysis and its reporting</li> <li>• Submit analyzed weekly report to SNO, NPCCHH, Hq and other departments for necessary action</li> <li>• Coordinate with other agencies for response</li> <li>• Update DAPCCHH with support from District Task Force</li> <li>• Submit report of activities on heat-health under NPCCHH</li> <li>• Advocate for reduction in source of greenhouse gas emissions</li> </ul>
<b>Block health officer</b>	<ul style="list-style-type: none"> <li>• Conduct community level IEC activities</li> <li>• Ensure training of medical officers</li> <li>• Organize PRI sensitization workshop and training for vulnerable groups</li> <li>• Implement heat mitigation efforts</li> </ul>
<b>City health department</b>	<ul style="list-style-type: none"> <li>• Support in development and implementation of city-specific heat-health action plan</li> </ul>
<b>Medical officer</b>	<ul style="list-style-type: none"> <li>• Conduct health facility-based IEC activities</li> <li>• Support community level IEC activities</li> <li>• Be aware of AQI levels and health impact of air pollution</li> <li>• Ensure necessary health facility preparedness in early diagnosis and management of cases</li> </ul>
<b>Panchayati Raj Institutions</b>	<ul style="list-style-type: none"> <li>• Conduct community level IEC activities</li> </ul>

### Health Adaptation plan for Vector Borne diseases

#### 8.1. Vector Borne diseases

In Chhattisgarh there are few vector borne diseases outbreaks every year they are:

**8.1.1 Malaria:** Malaria is caused by Plasmodium parasites. The parasites are spread to people through the bites of infected female Anopheles mosquitoes, called "malaria vectors." There are 5 parasite species that cause malaria in humans, and 2 of these species – P. falciparum and P. vivax – pose the greatest threat. The southern and north eastern districts of the state including Bijapur, Dantewada, Bastar, Sukma, Kanker, Kondagaon, Jagdalpur, Sukma, Narayanpur, Jashpur and Koriya are particularly vulnerable to malaria.

**8.1.2 Dengue:** Dengue is a mosquito-borne viral infection causing a severe flu-like illness and, sometimes causing a potentially lethal complication called severe dengue. Dengue Fever is caused by the dengue virus which is transmitted through the Aedes type of mosquitoes. Dengue is fast emerging pandemic-prone viral disease in many parts of the world. Dengue flourishes in urban poor areas, suburbs and the countryside but also affects more affluent neighborhood in tropical and subtropical countries. During the rainy seasons, survival of the virus increases which leads to outbreak of the disease, almost throughout the state. Dengue cases have increased 5 fold from 2014 to 2018 in the state and at least 15 deaths due to dengue were reported in Chhattisgarh in 2018.

**8.1.3 Filariasis:** Filariasis is caused by several round, coiled and thread-like parasitic worms belonging to the family filaridea. These parasites after getting deposited on skin penetrate on their own or through the opening created by mosquito bites to reach the lymphatic system. The disease is caused by the nematode worm, either Wuchereria bancrofti or Brugia malayi and transmitted by ubiquitous mosquito species Culex quinquefasciatus and Mansonia annulifera/M.uniformis respectively. The disease manifests often in bizarre swelling of legs, and hydrocele and is the cause of a great deal of social stigma. Filariasis is caused by several round, coiled and thread-like parasitic worms belonging to the family filaridea. These parasites after getting deposited on skin penetrate on their own or through the opening created by mosquito bites to reach the lymphatic system. Filaria endemic districts in Chhattisgarh are Ambikapur/ Surguja, Bilaspur, Dhamtari, Durg, Janjgir, Jashpur Nagar, Mahasamund, Raigarh, Raipur.

Weather variables: temperature, rainfall, humidity, floods, drought, wind, daylight duration etc., Change in Vector / animal population due to change in growth, survival, feeding habits, seasonality, breeding sites, resistance etc, Change in interaction of vector/ animal & pathogen

due to change in susceptibility, Incubation period, or transmission, Change in demography, migration, land-usage practices, water projects, agricultural practices and Public health infrastructure and access to it.

### Adaptation strategy and action plan for Vector Borne diseases

1. Protective measures and greater community mobilization.
2. Increased technical capacity.
3. Increased Infrastructure.
4. Strengthened monitoring and Surveillance systems.
5. Case Management; Lab diagnosis and clinical management.
6. Vector management; environmental management for source reduction, chemical control, personal protection and legislation.

## HEALTH ADAPTATION PLAN ON VECTOR BORNE DISEASES

### IEC Campaign

- The Districts are aimed to create awareness through Information Education and Communication Activities (IEC) through development of locally and culturally more acceptable messages in posters, audio, video, organising public health events, issuing advisories related to vector borne disease.
- The content for the IEC for vector borne disease will be provided by the State NPCCHH division. The state will translate the content into the regional language, if required and the role of the districts is to utilize these materials and disseminate at all levels.
- Advertisement and promotion through IEC: Street plays , Hoards, billboards, as and other advertisement modes

### Capacity Building:

Refresher trainings of the Medical professional training:

- Expanded training of doctors and associate staff
- Increased training of NGOs and Asha workers

## NPCCHH TRAINING PLAN AT DISTRICT LEVEL

<i>Training Programme</i>	<i>Trainer</i>	<i>Participants</i>	<i>Training Content</i>
<b>Medical Officers (3 Days)</b>	<i>DNO</i>	<i>MO (DH,CHC,PHC)</i>	<i>Vector borne related illness</i>
<b>Community Health Care Workers (HWC) (2 Days)</b>	<i>MO</i>	<i>Community Health Workers (MPHW, ASHA)</i>	
<b>Panchayati Raj Institutions (1 Day)</b>	<i>MO, MLHP</i>	<i>Panchayati Raj Institutions, communities</i>	

**Sensitization/knowledge building workshops** should be planned for seeking updates on various air pollution related health issues between district officials, medical officers and academic institutions working on climate change impact.

### **Surveillance:**

- a) Monitoring of the cases in the Districts through collaborated affords with IDSP/Vector borne disease programs and district Nodal Officers of CG NPCCHH
- b) Monitoring and evaluation
  - Monthly Computerized Management Information System(CMIS)
  - Field visits by state by State National Program Officers
  - Field visits by Malaria Research Centers and other ICMR Institutes
  - Feedback to states on field observations for correction actions.

### **ROLES AND RESPONSIBILITIES**

In order to address the current as well as future exposure of the state to vector borne diseases due to changes in temperature and rainfall patterns, the following roles and responsibilities have been identified to be conducted by the departments at the state, district block and healthcare facility level-

<i>NVBDCP, Chhattisgarh</i>	<i>Overall guidance and policy formulation</i>	<ul style="list-style-type: none"> <li>• <i>Guide the state governments in resurgence and containment of any VBD</i></li> </ul>
<i>State Nodal Officer, Climate Change</i>	<i>To support the state govt. in control of VBDs particularly in climate sensitive states</i>	<ul style="list-style-type: none"> <li>• <i>Oversee vector control measures</i></li> <li>• <i>Oversee health sector preparedness</i></li> <li>• <i>Oversee VBD surveillance, control in post-disaster situations in community and relief camps</i></li> <li>• <i>Train DNO, DMO</i></li> <li>• <i>Sensitization workshops to increase awareness on climate change and its impact on VBD</i></li> </ul>
<i>India Meteorological Department</i>	<i>To provide meteorological data as and when required</i>	<ul style="list-style-type: none"> <li>• <i>To help the state govt. in building collaboration with any research institute, analysis of relationship between climatic factors and a particular VBD so as to forewarn the impending outbreaks</i></li> </ul>
<i>NGO at state and district level for reach to community</i>	<i>Health education at community level</i>	<ul style="list-style-type: none"> <li>• <i>Conduct workshops for IEC activities for different level of staff in the identified areas in consultation with the state govt.</i></li> </ul>
<i>State Programme Officer</i>	<i>Overall planning and execution of surveillance and intervention measures to control VBDs</i>	<ul style="list-style-type: none"> <li>• <i>Supervise and guide the DNOs in control of VBDs</i></li> </ul>
<i>State Entomologist</i>	<i>To provide guidance in vector control</i>	<ul style="list-style-type: none"> <li>• <i>Generate data on fortnightly fluctuations in density of vector species so as to guide the state</i></li> </ul>

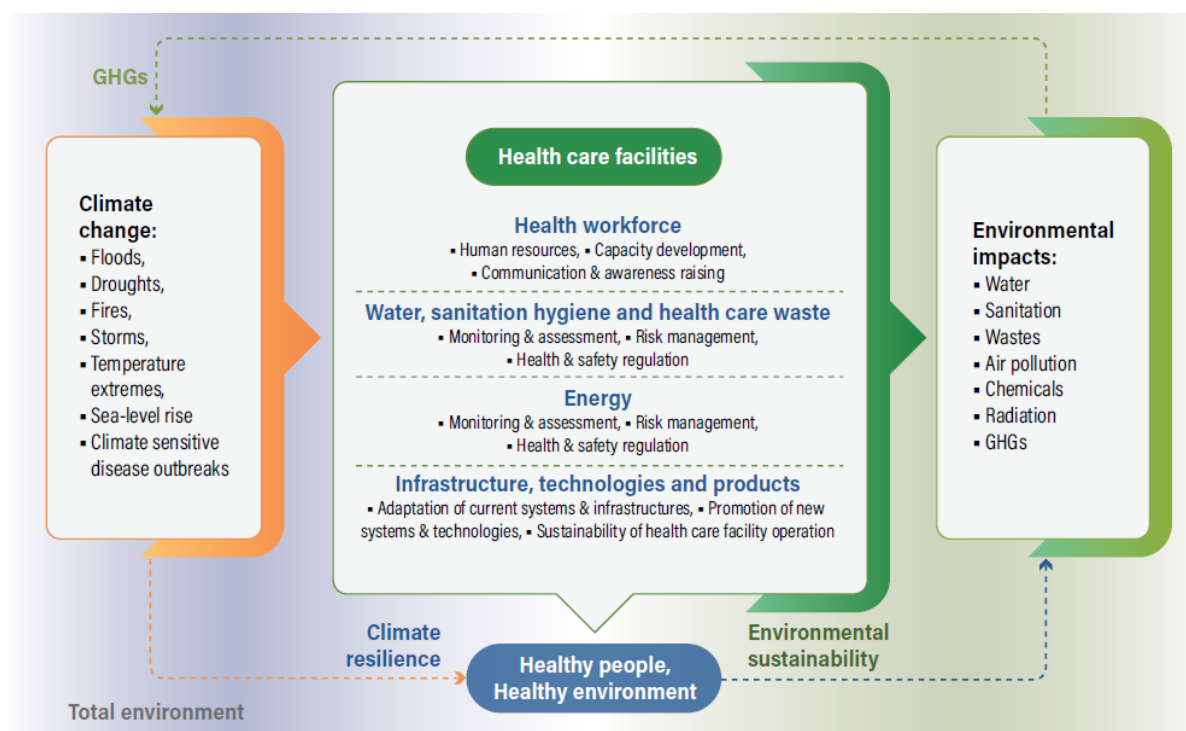
<p><b>Chief Medical Officer/District Malaria Officer/Disease Surveillance officer</b></p>	<p><i>Execution of task assigned by the SPO</i></p>	<p><i>government in choosing appropriate time of IRS activities. To generate data on susceptibility status of disease vectors for using appropriate insecticide for IRS/larvicide for vector control</i></p> <ul style="list-style-type: none"> <li>• <i>Supervise and guide surveillance and intervention measures for control of VBDs in the district.</i></li> </ul>
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### Health Adaptation Plan for Green and Climate Resilient Healthcare Facilities

“Climate-resilient and environmentally sustainable health care facilities anticipate, respond to, cope with, recover from and adapt to climate-related shocks and stresses, while minimizing negative impacts on the environment and leveraging opportunities to restore and improve it, so as to bring ongoing and sustained health care to their target population and protect the health and well-being of future generations. (WHO)”.

As the climate continues to change, risks to health systems and facilities – including hospitals, clinics, and community care centers – are increasing, reducing the ability of health professionals to protect people from a range of climate hazards. Health care facilities are the first and last line of defence against climate change impacts as they can be responsible for large emissions of greenhouse gases (GHGs), and because they provide the needed services and care to people harmed by extreme weather and other long-term climate hazards.

**Figure:** Framework for building climate-resilient and environmentally sustainable HCF.



**Source:** WHO Guidance for Climate-Resilient and Environmentally Sustainable Health Care Facilities



It is a cumulative process to build health system resilience to climate change. It starts with making resilience a goal and then, being responsive and efficient and providing social and financial protection to the people. For the whole health system to become more climate-resilient, its independent building blocks (i.e. leadership and governance, health workforce, health information systems, essential medical products and technologies, service delivery and financing) have to become climate resilient.

The National Programme on Climate Change and Human Health (NPCCHH) is engaging critically with strengthening the healthcare services and facilities to adapt to as well as mitigate the impacts of climate change. The key components recognized under the programme include –

1. **Environmentally Sustainable (Green) Measures at Health Care Facilities**
  - Energy Auditing
  - Installation of LED lighting at Health Care Facilities
  - Installation of Solar panels
  - Water Conservation Measures – Rain water Harvesting
2. **Climate Resilient Infrastructure at Health Care Facilities including Retro Fitting of Existing Health Care Facilities**

### 1. Environmentally Sustainable (Green) Measures at Health Care Facilities

#### a. Energy auditing

As per the Energy Conservation Act, 2001, Energy Audit is defined as "the verification, monitoring and analysis of use of energy including submission of technical report containing recommendations for improving energy efficiency with cost benefit analysis and an action plan to reduce energy consumption", which can be further evaluated with subsequent, annual energy audits to reach a goal of net-zero emissions. More information is available at <https://beeindia.gov.in/sites/default/files/1Ch3.pdf>

An energy audit identifies all energy end-uses within the building, estimates how much energy is used in each department, and determines the amount of energy used in relation to the desired values.

The guiding principles in this respect include:

- The HCFs would develop a plan for the energy audit to assess the level of energy consumption.
- The responsibility for the energy audit would be of the IPC committee of the facility. If the healthcare facility lacks qualified staff, then the energy audit would be conducted by the state health department as well.
- The energy audit would also consider load management, poor maintenance aspects, and extreme temperature to avoid fire-related accidents. Audit would be conducted in the facility biannually.
- Installing sub-meters in the facility premises would be useful in understanding how much energy is used across the healthcare facility

The work would be carried out in Collaboration with Chhattisgarh Renewal Energy Development Agency for solarization, water harvesting, energy efficient equipment's and cool roof.

**b. Replace existing (non-LED) lighting with LED**

LED stands for light-emitting diode (LED). This specialized electronic component is assembled into a lamp or bulb for use in light fixtures. LED bulbs have the following advantages:

- LED bulbs are energy efficient. As compared to the incandescent bulbs, LEDs consume up to 90% less power.
- Lesser consumption of power also means lesser emission of CO<sub>2</sub>, and thus reduced carbon footprints.
- Use of LED bulbs naturally is indicative of a dramatic decrease in power costs.
- LED bulbs are long lasting. A single bulb may last as long as 20 years. Thus, usage of the same also results in time-efficiency.
- Money and energy is saved in maintenance and replacement costs due to the long LED lifespan.

Replacing the incandescent bulbs with LEDs leads to 75% less energy consumption. Each LED light saves approximately INR 700-1400 over the course of a year.

The guiding principle in this respect would be:

- Healthcare facilities would have a policy on purchasing and using energy- efficient equipment and devices. The facilities would gradually phase out the incandescent bulbs with LEDs.
- Incandescent light bulbs or other inefficient bulbs should be replaced with LED bulbs in all suitable places in a health facility.

*State and District Nodal Officers will coordinate with State/ District level Bureau of Energy Efficiency representatives to conduct energy audits and energy conservation*

**c. Installation of solar panels:** Healthcare facilities both in urban and rural areas consume a lot of energy throughout the day as the electrical equipment used directly or indirectly to treat patients requires uninterrupted power.

The guiding principle in this area would be:

- The state would, in a phased manner, install PV solar panels in unused spaces like the roof of the facility. This would reduce grid-based electricity consumption and decrease the peak demand of a facility, which means the organization has lower operating costs, and hence these saved costs can be utilized for better patient care.

Photovoltaic (PV) (solar panels) systems capture energy from the sun and convert it into electricity, thereby reducing energy generated via fossil fuels and leading to reduced GHG emissions and air pollution. Solarization of health facilities also reduces dependence on insufficient or intermittent electricity supply in rural areas. If solar power is used as backup, the services of prime importance – emergency, essential services, childbirth, freezer for cold chain maintenance (vaccines), new-born care corners etc. will be provided 24x7. Solar water heating is another way to use solar energy in HCF apart from solar photovoltaics for power generation.

Chhattisgarh is the leader in the country in solarizing its health centers. The Chhattisgarh Renewable Energy Development Authority (CREDA) has so far achieved more than 90% solarizing targets for PHCs and CHCs in the state. Solarizing the health centers make them energy independent and helps reduce their carbon footprint and hence truly climate resilient. CREDA is a partner for the Department of Health and Family Welfare of the State in making our health infrastructure more climate resilient.

The survey was conducted on the public health facilities based on the list received by CREDA by State Health Resource Center, Rapiur (Technical cell for CG NPCCHH). The list listed around one thousand one hundred and ninety eight (1198) public health facilities. Few of the health facilities were repeated due to increase in KV or for minor reasons. Out of 1198 public health facilities the surveyors visited nine thousand nine hundred and eighty eight and have reported against them on solarization.

### **Findings and recommendations made in the report are as follows**

1. 99% of public health facilities were found to be solarized.
2. Solar plants were found to be functional in 90% solarized health facility.
3. Good mechanism for receiving and addressing the complaints exists at CREDA
4. Smaller centers were found to utilize solar energy well.

### **Gaps identified**

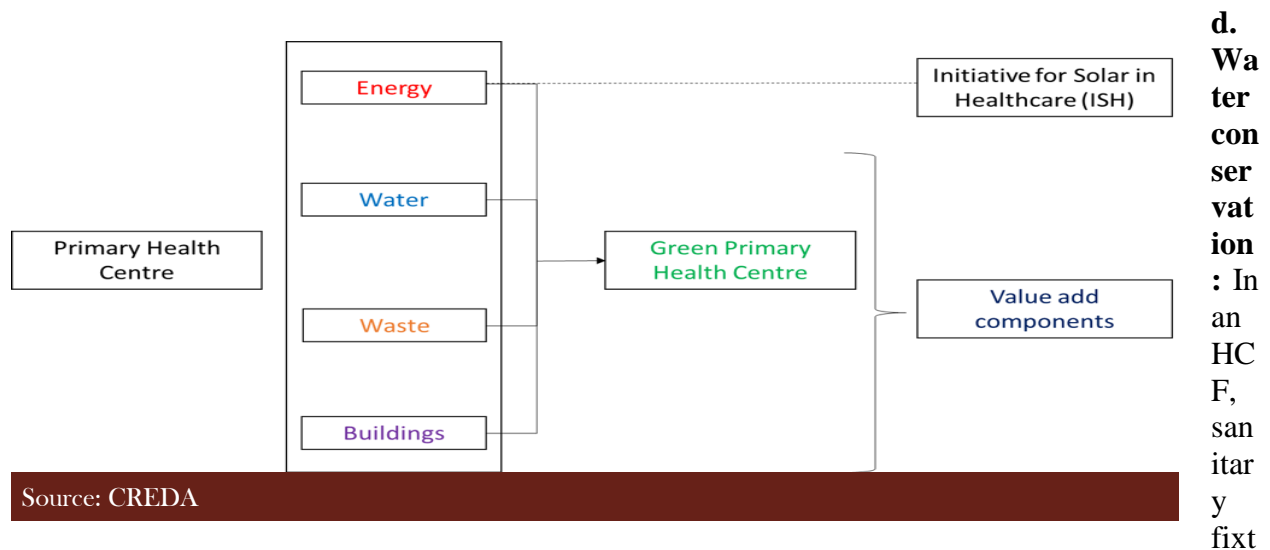
- A. 47% of health facilities use solar energy only during power failures.
- B. Partial use of solar energy for equipment in health facility is identified.

### **Recommendations**

1. Powering rural healthcare infrastructure with decentralized renewable energy is an obvious choice now and in the future. The solarization of the sub health center would not only facilitate to deal with the ongoing or any pandemic situation but also to meet the challenge of climate change.
2. There is ample evidence that access of electricity is crucial for the health centers to discharge their duties. Enhancements are being planned in the rural health infrastructure in the aftermath of the COVID-19 pandemic provides a unique opportunity to direct critical public funding towards electrifying the SHCs.
  - a) Rural Health Facility – Sub Health Centers and Primary Health Centers should be given the priority for solarization, as smaller centers are being found to use the solar energy well.
  - b) Guidance document / Guidelines for Solarization of the health Facility – defining role and responsibility for Selection criteria or identification of the public health facility for solarization, using vulnerability assessment for health infrastructure.
  - c) Orientation of the health facility staff for solar energy for its potential use and climate resilience.
  - d) Accountability – capacity building of the point person. Indicators for potential use of solar energy need to be defined for future assessment.
  - e) A designated staff at the health center level should be appointed by the health center to manage and maintain the solar power plant and coordinate with the engineers at CREDA.

- f) Monitoring and maintenance of solar energy should be encouraged through the health system with the technical support for repairing and other major breakdowns can suggested to CREDA.
- g) Health facility energy audit should be facilitated from time to time.

**Green measures :** Proposal to develop organic food, medicinal and herbal gardens at all HWCs and Health Centers.



ures consume 42 per cent of water while heating ventilation and air conditioning (HVAC) consumes 23 per cent of water, thus, major water-consuming area needs to be focused on reducing water consumption.

Rainwater harvesting for healthcare facilities has the potential to save thousands of litres of water every year. This in turn can result in substantial cost savings in addition to adopting climate-smart practices.

The guiding principles for water conservation in a HCF would be as follows:

- The healthcare facility would develop a strategy for the optimum usage of water.
- The HCFs would develop a plan for the conservation of water. e.g., water- efficient fixtures, dual flush mechanism, sensor-operated urinals, waterless urinals, rainwater harvesting
- The HCFs would have a plan for wastewater treatment. e.g., sewage treatment plant and effluent treatment plant at sites of generation of contaminated grey water, like pathology.
- The HCFs would develop a programme/plan for the conservation of water
- The HCFs would have a water management programme for the conservation of water by establishing a team, setting goals with timelines, conducting water audits, determining the cost of water, and preparing an action plan
- The HCFs would have an ongoing educational programme for the efficient usage and conservation of water for all the stakeholders (staff, patients and visitors)

- The HCFs would have a plan to train the staff on water savings techniques
- The HCFs would develop a wide variety of methods to communicate through IEC materials, new and/or revised operating guides and manuals

### **Installation of Rainwater harvesting system**

Rainwater harvesting system to reduce climate change vulnerability has two goals: first, to be one of the alternatives for clean water source during a disaster/drought, and second, provide adaptation actions to reduce flooding. Hospitals can also adopt a strategy of simple artificial recharge techniques in rural areas like Percolation Tanks, Check Dams, Recharge Shafts, Dug Well Recharge and Sub-surface Dykes and adopt Rooftop rainwater harvesting in urban areas.

Water harvesting methods are of following two types:

1. Surface run-off harvesting: During heavy downpours, the water flows away as surface runoff. This runoff water can be collected and used for recharging aquifers.
2. Rooftop harvesting: In this system, the roof itself becomes the catchment and rainwater can be collected from the roof of the building. The water can either be stored for utilization or it can be diverted to an artificial recharge system. In this method, water can be collected without much expense. This method is highly effective and it can also help in the recharge of groundwater level.

The rainwater harvesting potential of a site depends on rainfall quantity, area of catchment, and runoff coefficient. Additionally, the decision of whether to store or recharge groundwater using harvested rain depends upon the rainfall pattern, requirements, surface geology of a particular region, groundwater quality etc<sup>4</sup>. Efforts should be made to increase dependence on harvested rainwater and redirect excess water to groundwater recharge.

Kayakalp guidance document also provides more information and important consideration on rainwater harvesting in HCF. <http://qi.nhsrindia.org/sites/default/files/Implementation%20Guidebook%20for%20Kayakalp%20final%20version.pdf>

***State and District Nodal Officers will coordinate with State/ District level Drinking water department representatives for solarization in the state for solarization of HCF***

Important considerations for water storage tanks

- It should not be located close to a source of contamination, such as a septic tank etc.
- It should be located on a lower level than the roof to ensure that it fills completely
- It should be accessible for cleaning
- A rainwater system should include installation of an overflow pipe which empties into a non-flooding area. Excess water may be used for recharging the aquifer through dug well or abandoned hand pump or tube well etc.
- A speed breaker plate should be provided below inlet pipe in the filter so as not to disturb the filtering material
- The inlet into the storage tank should be screened in such a way that it can be cleaned regularly
- Water be filtered and disinfected before using for drinking purpose by chlorination or boiling etc.

More information is available at <https://megphed.gov.in/resolution.htm>

## **2. Climate Resilient Infrastructure at Health Care Facilities including Retro Fitting of Existing Health Care Facilities**

It is essential that HCF planning and designing should be responsive to local climate and hazard profile of the district. Strong focus should be given to designing all aspects of infrastructure and services as per relevant IS standards, building codes and local byelaws, and history of emergencies in the district to ensure patient safety and continuity of health service during emergencies. Few key interventions that would be undertaken to make the HCFs into green buildings would include:

### **New Buildings**

- Climate risk assessment at the time of planning and designing the building.
- Use of high-performance glass on windows, doors, and roofs to prevent the heat inside and allows sunlight and fresh air to enter the room.
- Use double glazing glass on windows; it provides thermal and optical properties to the building and reduce the noise level.
- Insulation of building from inside and outside in colder regions of the country.
- Ensure the plinth level is above the high flood level as known locally or storm surge level ( in costal districts) and make the building accessible with ramps and railing to create a barrier free environment.
- Installation of Rainwater Harvesting System
- Installation of alternative energy systems
- Installation of STP & ETP

### **Existing Infrastructure**

- Introduction of electronic patient records in the facility to reduce the use of paper.
- Availability of 10-30 per cent area for the herbal garden in the facility.
- Floor and wall finishes are conducive for infection prevention control practices.
- Modifications in the critical care rooms to make them functional during disasters.
- Installation of Rainwater Harvesting System
- Installation of alternative energy systems
- Installation of STP & ETP

**Cooling measures for HCF (Climate Resilient measures in heat vulnerable areas):** Retrofitting for heat resilient measures is recommended in heat vulnerable areas and should be prioritized based on the gap analysis.

- a. Cool roofs are a simple and cost-effective solution to reduce temperatures inside a building in comparison with traditional roofs.
- b. Benefits: Depending on the setting, cool roofs can help keep indoor temperatures lower by 2 to 5°C (3.6-9°F). They conserve energy by reducing cooling load on fans, coolers, air conditioners, in turn reducing contribution to emissions. Cool roofs enhance the durability and appearance of roofs.

- c. How they work: Cool roofs are better at reflecting sunlight and absorb less heat. They are prepared, covered or coated with materials that have characteristics that enable them to warm up less than regular roofs. Light-coloured paints, roof tiles, coatings are usually used for this purpose. Reflective paint is a cost-effective cool roof coating. For example, locally-available simple white lime paint costs as little as ₹0.5 per square foot to more expensive reflective coatings or membranes. White lime paint is being used in various Cool Roof Programmes in different states. (<https://ncdc.gov.in/WriteReadData/1892s/57166105751632287688.pdf>) and ([https://tsredco.telangana.gov.in/PDFs/Telangana\\_Cool\\_Roofs\\_Policy\\_for\\_Public\\_Comments.pdf](https://tsredco.telangana.gov.in/PDFs/Telangana_Cool_Roofs_Policy_for_Public_Comments.pdf)).

## IMPLEMENTATION PLAN:

### HEALTH SECTOR PREPAREDNESS FOR 5 YEARS 22-27

Objective	Activities	Priority districts	Identified Health facilities for 5 years for each	Timeline	Budget ( in lakhs) for 5 years with 15% increasing each year					Target for 5 years 22 - 27							
					22 to 23	23 to 24	24 to 25	25 to 26	26 to 27	22 to 23	23 to 24	24 to 25	25 to 26	26 to 27			
<b>Strengthening Health care System</b>	Energy Audit	Entire Chhattisgarh	PHC's / SHC/ HWC	February-April	18.9	18.9	18.9	18.9	18.9	20%	35%	50%	75%	100%			
	Led installation-			April-May						20%	35%	50%	75%	100%			
	Solar Panels installation			May-August						20%	35%	50%	75%	100%			
	Rain water Harvesting			August-October						20.0	20.0	20.0	20%	40%	60%	80%	100%
	Retrofitting of Health care facilities			October-December						20%	40%	60%	80%	100%			



## Roles and responsibility

The table below highlights the roles and responsibilities of the associated staff to help support green climate and resilience infrastructure development in order to strengthen healthcare infrastructure.

<i>Responsibilities</i>	
<i>SNO</i>	<ul style="list-style-type: none"> <li>● <i>Finalization of IEC material and dissemination Plan</i></li> <li>● <i>Organize training sessions for the district-level officers and trainers</i></li> <li>● <i>Identify health facilities for priority implementation based on disaster and health facility vulnerability</i></li> <li>● <i>Identify relevant state level nodal agencies and collaborate with them for assessment of health facilities for implementation of measures</i></li> <li>● <i>Facilitate and monitor necessary assessments at the health facility level</i></li> <li>● <i>Facilitate implementation of structural and functional measures at the health facility level</i></li> <li>● <i>Monitor the implementation of the activities</i></li> <li>● <i>Support districts to identify sources of funding</i></li> <li>● <i>Advocate for reduction in source of greenhouse gas emissions</i></li> </ul>
<i>DNO</i>	<ul style="list-style-type: none"> <li>● <i>Conduct training for block health officers, medical officers, with relevant training manuals</i></li> <li>● <i>Support conduction for the following assessment at the health facility level</i> <ul style="list-style-type: none"> <li>- <i>Energy audit</i></li> <li>- <i>Water audit</i></li> <li>- <i>Disaster-vulnerability assessment</i></li> </ul> </li> <li>● <i>Support the following functional measures at the health facility level</i> <ul style="list-style-type: none"> <li>- <i>Water committee</i></li> <li>- <i>Sustainable procurement committee</i></li> <li>- <i>Operational measures to make health facilities function during the disasters or power cut</i></li> </ul> </li> <li>● <i>Coordinate with other agencies for assessment and implementation of identified structural and functional measures</i></li> <li>● <i>Update DAPCCHH with support from District Task Force</i></li> </ul>
<i>Block health officer</i>	<ul style="list-style-type: none"> <li>● <i>Ensure training of medical officers</i></li> <li>● <i>Organize PRI sensitization workshop</i></li> <li>● <i>Coordinate with other agencies for assessment and implementation of identified structural and functional measures</i></li> </ul>
<i>Medical officer</i>	<ul style="list-style-type: none"> <li>● <i>Conduct health facility assessment</i> <ul style="list-style-type: none"> <li>- <i>Energy audit</i></li> <li>- <i>Water audit</i></li> <li>- <i>Disaster-vulnerability assessment</i></li> </ul> </li> <li>● <i>Lead following functional measures</i> <ul style="list-style-type: none"> <li>- <i>Water committee</i></li> <li>- <i>Sustainable procurement committee</i></li> <li>- <i>Operational measures to make health facility functioning during disasters or power cut</i></li> </ul> </li> <li>● <i>Support community level IEC activities</i></li> <li>● <i>Identify local funding opportunities: e.g. CSR initiative, NGO funding</i></li> </ul>

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Institution*

- *Support retrofitting and new health facilities with local funding source and community involvement*

## **AWARENESS GENERATION**

- Awareness and sensitization on Climate Change events on Heat wave, flooding, air pollution events, waste management.
- Sensitization workshop on Sustainable Procurement
- Awareness on energy efficient measures and water conservation measures

## **CAPACITY BUILDING**

- Training of ToTs, DNO-CC and Medical officers on guidelines and operational framework of Green and Climate resilient measures in Health Care Facilities.

## Chapter 10

### Health Action Plan for climatic outbreaks and disaster management

Disasters adversely affect life and after the occurrence of disaster, destruction, plight, panic arises. It takes several decades for disaster affected people to come back to rehabilitation. Low level of livelihood and less awareness has not only increased the adverse effects of disasters, but also the serious consequence of interruption in economic development.

#### Disasters in Chhattisgarh State

**10.1 Drought :** Drought is a serious threat to the state. Based on the available data of last 17 years, it was seen that there is a variety of drought patterns in the state, sometimes affecting the whole state, sometimes to some areas, and sometimes to some districts. However, four district have been identified as severe drought prone district, which includes Baloda Bazar, Bemetara, Mungeli, Kabirdham. which is drying up for a long period.

According to statistics in year 2017-18, 96 tehsils in 21 districts of the State were affected from Drought and this affect around 9,58,411 farmers of the State.

**10.2 Flood:** Out of all the natural hazards, flood affects the state most and is one of the devastating natural disaster. In other words, danger of flood is very high in the state. According to the available data by department of Revenue and Disaster Management, the state has faced severe floods in 2005, 2007, and 2018. It was also observed that more than 80 percent of the annual rainfall is centered on the period of three months of monsoon. This leads to poor discharge of heavy silt, flash flood and flood water, and for this reason the embankment is sometimes broken.

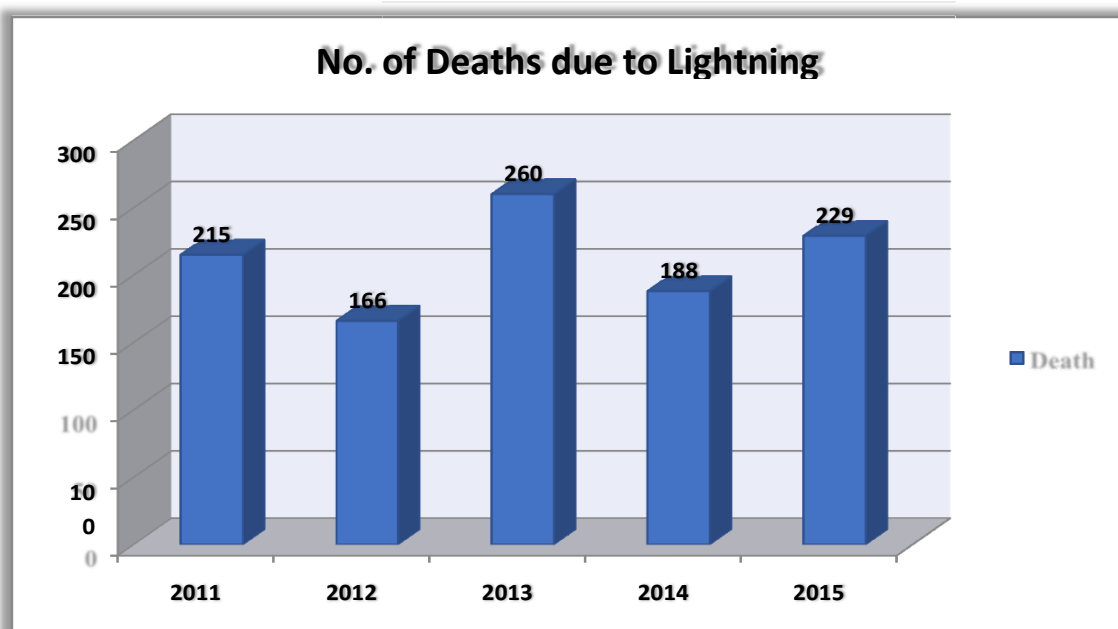
**Table-10.1: Rivers of the state which are Susceptible to Flooding**

Flood				
Rivers of the state which is susceptible to flooding				
S.No	District	Tehsil	River	Total No. of Village
1	Sukma	Sukma, Chhindgarh, Konta	Shabri river	50
2	Jagdalpur	Jagdalpur, Lohandhiguda, Bastar, Bakawand	Indrawati, Narangi river	37
3	Narayanpur	Narayanpur	Kukur river, Orchha river	14

4	Bijapur	Bijapur, Bhopalpatnam Bhairamgarh	Mingachal river, Irandravati river, Chintabagu river, Godavari river, Marahi river, Berudi river Talperu	90
5	Dantewada	Gidam, Dantewada	Indravati, Sankini,Dankini river	17
6	Kanker	Kanker, Narharpur, Charama, Bhanupratappur Pankhajur, Antagad, Durgukondal	Dudh River, Mahanadi, Khandi River, Kotari River, Mendhaki River	79
7	Surajpur	Premnagar, Surajpur Bhatgaon, Bhaiyathan, Pratappur, Odhgi	Atem, Gej, Hasdeo, Rend River, Mahan River, Baanki River, Andhruva River	64
8	Raipur	Raipur, Arang, Abhanpur, Tilda	Kharun River, Mahanadi	69
9	Gariyaband	Gariyaband, Rajim,Chhura, Mainpur, Devbhog	Pairi River, SondhurRiver, Mahanadi	39
10	Dhamtari	Dhamtari, Kurud Magarlod, Nagari	Mahanadi, Jonk River,	77
11	Balodabazar	Kasdol, Simga, Bilayigarh, Baloda bazaar, Palari, Bhatapara, Simga	Jonk river, Mahanadi, Shivnath river	101
12	Durg	Durg, Dhamdha, Patan	Shivnath river, Tandula reservoir, Amner river, Kharun river	92
13	Balod	Balod	Tandula river	3
14	Bemetara	Bemetara, Navagarh, Berla, Saza, Thankhamharria	Shivnath river, Haaf river, Kharun river	110
15	Rajnandgaon	Rajnandgaon, Ambagarh chowki, Khairagarh, Chhuria, Dongargaon, Mohala	Shivnath river, Bhanpuri river, Amner river, Muskaan river	75

### 10.3 Lightning

This is a natural disaster, in the context of Chhattisgarh state, most of the lightning incidents occur in monsoon season, apart from this, due to sudden changes in weather, the possibility of lightning also arises. As a result, there is huge loss of animal as well as public money takes place at large scale. Adverse affects of lightning are seen in Korba, Raigarh, Mahasamund, Bastar districts. Between 2011-2015, 1058 people died due to lightning in the state.



**Graph10.1: No. of Deaths in the state by lightning**

### 10.4 Earthquake

Earthquake is an natural disaster which is also concerned as big threat to the state. In major parts of the state, earthquake is moderately high. In particular, in recent times, some incidents triggered the whole state. After this earthquake is being taken here very seriously. However, according to the India's vulnerability Atlas 2007 Korba, Korea, Raigarh, Sarguja, Bijapur district comes under Zone-3, and Sukma, Dantewada, Raipur, Mahasamund districts under Zone-2. Therefore, on the basis of India's vulnerability atlas, and recent earthquake studies, the districts have been classified into medium and low risk prone areas.

### 10.5 Storm

Storms are natural disaster, which causes loss of public money at a large-scale. Neighbour states of Chhattisgarh, like Odisha, Andhra Pradesh and Telangana are engaged in the sea side areas, these states are experiencing large scale storms. The effect of which has been seen on the districts of Chhattisgarh state like Sukma, Raigarh, Bastar, Bijapur.

## 10.6 Heat wave

During summer, maximum temperature often reaches to 45 degrees celsius leading to severe heat wave conditions. This results in loss of life of many people particularly, homeless, gardeners, daily wanderers who work under direct sun, auto drivers, etc.

In May, 2019 a temperature of 49 degree celsius is recorded in Bilaspur district. The districts with **maximum temperature** are mainly **Jangjir Champa, Durg, Baloda Bazar, Raipur, Bilaspur**. The districts with **minimum temperature** are mainly **Korea, Surajpur, Balrampur, Sarguja, Jashpur**.

## 10.7 Cold Wave

The effect of cold wave in the state of Chhattisgarh remains from December to January, In the districts of Ambikapur, Korea, Jashpur, Surajpur, the highest cold wave occurs, there has not been any major loss due to the cold wave.

**10.8 Zoonotic Disease:** Emerging infectious diseases (EIDs), especially those with zoonotic potential, are a growing threat to global health, economy, and safety. The influence of global warming and geoclimatic variations on zoonotic disease epidemiology is evident by alterations in the host, vector, and pathogen dynamics and their interactions.

**10.8.1 Scrub Typhus:** Scrub typhus is a vector-borne zoonotic disease caused by *Orientia tsutsugamushi*. This organism is transmitted by infected trombiculid mites, *L. pallidum* and *L. scutellare*. The most common symptoms of scrub typhus include fever, headache, body aches, and sometimes rash. Scrub typhus lasts for 14 to 21 days without treatment. Severe infections may be complicated by interstitial pneumonia, pulmonary edema, congestive heart failure, circulatory collapse, and a wide array of signs and symptoms of central nervous system dysfunction, including delirium, confusion, and seizures.

The natural environment including climate conditions could affect the development and survival of larva mites. Climate change may have an effect on the increasing trend of Scrub typhus. 22 The study also indicates that the incidence of Scrub typhus is affected by climate elements changed by global warming.

### 10.8.2 Snake Bites:

Snakebite is the only WHO-listed, not infectious neglected tropical disease (NTD), although its eco-epidemiology is similar to that of zoonotic infections: envenoming occurs after a vertebrate host contacts a human. Accordingly, snakebite risk represents the interaction between snake and human factors, but their quantification has been limited by data availability.<sup>23</sup> Snakebites are on the rise as snakes migrate with climate change. As the climate changes, snakes are on the move

and snakebites are becoming more common. Over the last decade, an estimated 30 million people worldwide have been bitten by snakes, with nearly

5.4 million bites in the last year alone. And these worrisome numbers are underestimated, since most bites are never reported, especially in poor rural areas. A few things should be done — and urgently. We need to update the maps of snake habitats and educate communities about new threats they may face from venomous snakes. Because different antivenoms are needed for different snakebites, this mapping will also help determine what antivenoms are needed where.

In Chhattisgarh Bastar, Rajnandga, Bilaspur, Korba, Janjgir-Champa, Raigarh , Surguja, Jashpur, Balrampur and Surajpur are the districts which have high reporting of zoonotic diseases like Snake Bites and other animal bites. Scrub Typhus is tending to be reported more in rural and forest-dominated areas. Early Detection through diagnostics and surveillance would be the key strategies for prompt interventions to reduce the impact of climate change on human health.

## 10.9 Other events

Climate variability and frequent change in weather and extreme events affects have been linked to an increasing in illnesses of tin lungs and cardio-vascular system.

The IPCC AR5 mention few studies which states that ultraviolet radiation (UVR) are linked to higher incidence of few skin carcinoma for every 1°C increment in average temperatures<sup>36</sup>. However, exposure to the sun also has beneficial effects on synthesis of vitamin D, with important consequences for health. Accordingly the balance of gains and losses due to increased UV exposures vary with location, intensity of exposure, and other factors (such as diet) that influence vitamin D levels.

The excess of exposure to solar *ultraviolet radiation (UVR)* even within the ambient environmental range may results in sunburn, photo-ageing, cataracts, immune suppression and skin melanomas<sup>37</sup>. UVR induced immune-suppression may influence occurrence of various infectious diseases as well as affect vaccine efficacy. There is evidence to support a relationship between sunburn during childhood and adolescence and skin cancer in adulthood. The World Health Organization (WHO) has argued that school sun protection programmes should be emphasised, because a sizeable portion of lifetime sun exposure occurs during childhood and adolescence. Similarly, personal exposure studies among outdoor workers found that individuals engaged in road construction, horticulture, roofing and other outdoor occupations received ~20 - 26% of the total daily ambient solar UV radiation levels.

### Seasonality of Hazards

By understanding the estimated event of hazard, can activate the concerned departments and be prepared for the related threats. On the basis of that, the table below is only an indication of event origin.

Incident Month												
Risk	January	February	March	April	May	June	July	August	September	October	November	December
Flood												
Urban Flood												
Drought												
Lightning												
Rail/Road Accident												
Industrial Disaster												
Epidemic												
Forest Fire												
Fire												
Heat wave												
Cold wave												
Snake Bite												
Animal Conflict												
Storm												
Stampede												
Earthquake												
Land Slide												
	High Occurance				Moderate Occurance				Low Occurance			

*Table-10.2: Seasonality of Hazards*

**Table 10.3 District wise Hazard Analysis Summary of Chhattisgarh**



### District wise Hazard Analysis Summary of Chhattisgarh

S.No.	District Name	Flood	Drought	Lightning	MAH Units(industrial)	Accident	Over all Hazards
1	Raipur	High	Moderate	Low	High	High	High
2	Dhamatri	High	Moderate	Low	Low	Low	Moderate
3	Durg	Moderate	Moderate	Moderate	Moderate	High	High
4	Rajnandgaon	High	Moderate	Moderate	Low	Moderate	Moderate
5	Mahasamund	Low	Moderate	High	Low	Low	Low
6	Balod	Moderate	Moderate	Low	Low	Low	Low
7	Baloda bazar	Moderate	High	Low	Low	Moderate	Low
8	Sukma	High	Moderate	Moderate	Low	Low	Low
9	Dantewada	Moderate	Low	Moderate	Low	Low	Low
10	Narayanpur	Low	Moderate	Low	Low	Low	Low
11	Kondagaon	Low	Moderate	Low	Low	Low	Moderate
12	Kanker	Moderate	Moderate	High	Low	Low	Low
13	Jagdalpur	High	Low	High	Low	Low	Moderate
14	Bijapur	Moderate	Moderate	Moderate	Low	Low	Low
15	Kabirdham	Low	High	Low	Low	Low	Low
16	Bilaspur	Low	Moderate	Low	Low	High	High
17	Korba	High	Moderate	High	Low	Low	High
18	Janjgir-Champa	Moderate	Moderate	Low	Low	Moderate	High
19	Jashpur	Low	Moderate	Moderate	Low	Low	Low
20	Sarguja	Low	Low	Moderate	Low	Low	Low

21	Korea	Low	Moderate	Moderate	Low	Low	Low
22	Surajapur	Moderate	Low	Moderate	Low	Moderate	Low
23	Balrampur	Low	Low	Moderate	Low	Low	Low
24	Raigarh	Low	Moderate	High	Low	High	High
25	Mungeli	Low	High	Low	Low	Low	Low
26	Gariyaband	Moderate	Moderate	Moderate	Low	Low	Low
27	Bemetara	Moderate	High	Low	Low	Low	Low

#### **AWARENESS GENERATION:**

#### **IEC on emerging climate-sensitive health impacts and diseases**

- a) Under the programme, awareness generation among all the relevant stakeholders including the common population, vulnerable communities, healthcare providers, and policymakers around the impacts of disaster events.
- b) The districts are aimed to create awareness through Information Education and Communication Activities (IEC) through development of locally and culturally more acceptable messages in posters, audio, video, organising public health events, issuing advisories related to disaster management. The content for the IEC for the disaster management will be provided by the State NPCCHH division. The role of the districts is to utilize these materials, translate of required and disseminate at all levels.
- c) Sensitization of the health professionals/ communities on emerging climate sensitive health impacts and diseases.

#### **Observance of important environment-health days**

<b>Day</b>	<b>Activities on Heat-Health</b>
<ul style="list-style-type: none"> <li>• International Day for Disaster Risk Reduction</li> </ul>	<p>IEC Campaigns</p> <ul style="list-style-type: none"> <li>• Audio-video spots broadcasting</li> <li>• Targeted awareness sessions: women, children, occupational groups</li> <li>• Mock drill, disaster response exercise</li> <li>• Sports events</li> <li>• Competition: poster, poem/essay, quiz</li> </ul> <p>Health facility level activities</p> <ul style="list-style-type: none"> <li>• Health facility-based patient awareness sessions</li> <li>• Conduct assessment of disaster vulnerability/energy/ water conservation measures</li> </ul>

	<ul style="list-style-type: none"> <li>• Review of implementation of climate-resilient measures</li> </ul>
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## Capacity Building

- a) Refreshers trainings of the health professionals on diagnosis and treatment of Scrub Typhus/ Snake Bites
- b) Meetings the compensation process for family for the death of the person due to lightning.
- c) **Training on disaster management is as follows:**

**TABLE 1: NPCCHH TRAINING PLAN AT DISTRICT LEVEL**

Training Programme	Trainer	Participants	Training Content
Medical Officers (3 Days)	DNO	MO (DH,CHC,PHC)	Disaster Management
Community Health Care Workers (HWC) (2 Days)	MO	Community Health Workers (MPHW, ASHA)	
Panchayati Raj Institutions (1 Day)	MO, MLHP	Panchayati Raj Institutions, communities	

## Strengthening Health Sector Preparedness

- i. **Early warning:** Dissemination of early warnings for Heat Wave, Cold wave, Flood, Cyclone etc to health facility **level** and community level
- ii. **Surveillance**
  - a) Monitoring of the cases in collaborative efforts with IDSP/ Zoonotic Disease Department and State Disaster Management Authority.
  - b) Post-disaster health impact assessment.
- iii. **Health Facility Preparedness**
  - Vulnerability assessment of health facility in context of climate change-extreme weather events
  - Identify structural changes/retrofitting measures at the facility level to equip the healthcare facility
  - Formalize disaster management plan and committee
  - Emergency procurement arrangements & functioning of essential health services (safe water, immunization, maternal-child care etc)
  - Post-disaster damage assessment and referral plan in case of health facility damage
  - Ensure routine monitoring and maintenance of support functions (Water quality, waste management)

- Establish Sustainable procurement committee

### **Roles and Responsibilities**

<b>Responsibilities</b>	
<b>SNO</b>	<ul style="list-style-type: none"> <li>• Disseminate early warnings to district level</li> <li>• Finalization of IEC material and dissemination Plan</li> <li>• Formalize intersectoral coordination for disaster planning, management and response with SDMA/IMD and other response departments</li> <li>• Organize training of district level officers</li> <li>• Facilitate assessment and implement of climate resilient measures in health facilities</li> <li>• Review implementation of IEC, training and surveillance activities at all levels</li> <li>• Evaluate and update relevant section of SAPCCHH with support from State Task Force</li> <li>• Create organizational support and strengthen Environmental Health cell to implement NPCCHH vision, Goal and Objectives</li> <li>• Organize sensitization workshops for other stakeholders and line departments</li> <li>• Collaborate with academic institute/s for support in updating SAPCCHH, Surveillance activity monitoring, training of health care professionals, vulnerability assessment and applied research</li> <li>• Submit reports of activities on EWE and health under NPCCHH</li> </ul>
<b>DNO</b>	<ul style="list-style-type: none"> <li>• Disseminate early warning to block and health facility level</li> <li>• Ensure IEC dissemination to community level and facilitate community level IEC activities</li> <li>• Organize training for block health officers and MO</li> <li>• Formalize intersectoral coordination for disaster planning, management and response with SDMA/IMD and other response departments</li> <li>• Liaison with other departments for combined IEC campaigns, coordinated response and information sharing of health indicators for targeted action</li> <li>• Identification and communication of Evacuation routes &amp; relief camps</li> <li>• Support planning and management of health care services in relief camps</li> <li>• Provide necessary IEC on health and sanitation in relief camps</li> <li>• training for block health officers, medical officers, with relevant training manuals</li> <li>• Conduct sensitization of vulnerable groups: police officers, outdoor works, women, children etc</li> <li>• Organize IEC campaigns at district level on observance of important environment-health days</li> <li>• Facilitate disaster vulnerability assessments in health facilities and maintain records of such assessment and health facility damage due to EWE</li> <li>• Update DAPCCHH with support from District Task Force</li> <li>• Submit reports of activities on EWE and health under NPCCHH</li> </ul>

<b>Block health officer</b>	<ul style="list-style-type: none"> <li>• Conduct community level IEC activities</li> <li>• Ensure training of medical officers</li> <li>• Organize PRI sensitization workshop and training for vulnerable groups</li> <li>• Facilitate disaster vulnerability assessments in health facilities and maintain records of such assessment and health facility damage due to EWE</li> </ul>
<b>Medical officer</b>	<ul style="list-style-type: none"> <li>• Conduct health facility-based IEC activities</li> <li>• Support community level IEC activities</li> <li>• Preparation of Disaster Management Plans and hospital safety plan</li> <li>• Assessment of health facility in context of climate change-extreme weather events</li> <li>• Identifying structural changes/retrofitting measures at the facility level to equip the healthcare facility</li> <li>• Ensuring routine monitoring and maintenance of support functions (Water quality, waste management)</li> <li>• Health facility preparedness for seasonal events</li> </ul>
<b>Panchayati Raj Institutions</b>	<ul style="list-style-type: none"> <li>• Conduct community level IEC activities</li> <li>• Community involvement in planning and demonstration of measure taken before-during-after an EWE</li> </ul>

**Part III**

**Chapter 11 - Budget**

**BUDGET**

The next table presents and overview of the proposed activities and the respective budget to be implemented under the climate change and human health programme between 2022-2027 in Chhattisgarh State. The detailed activities and the corresponding budgetary amount are enlisted in the table below-

SL.NO	ACTIVITIES	INDICATOR	BUDGET (in lakhs) for 5 years					TARGET for five years 22-27				
			22 to 23	23 to 24	24 to 25	25 to 26	26 to 27	22 to 23	23 to 24	24 to 25	25 to 26	26 to 27
<b>PROGRAMME MANAGEMENT</b>												
01	Taskforce meeting to draft health sector plan for heat and air pollution	<ul style="list-style-type: none"> <li>% State Task Force Quarterly Meetings conducted in a year</li> <li>% Districts conducted quarterly District Task Force Meetings in a year</li> </ul>	28	28	28	28	28	50%	100%	100%	100%	100%
01	Sensitization workshop/meeting of the state programme Officers and District level Health Officers.		1	1	1	1	1	100%	100%	100%	100%	100%
<b>GENERAL AWARENESS</b>												
03.	Development of IEC material, campaigns, Innovative IEC/ BCC Strategies	<ul style="list-style-type: none"> <li>% of implemented IEC on all climate sensitive</li> </ul>	15 0.65	15 0.74	15 0.85	15 0.97	15 1	100%	100%	100%	100%	100%

		issues						11					
<b>CAPACITY BUILDING</b>													
04.	Orientation/ Training /capacity Building of healthcare staffs	<ul style="list-style-type: none"> <li>% of Medical Officers/DNO/SN trained in Districts</li> </ul>	12	12	12	12	12	100%	100%	100%	100%	100%	
		<ul style="list-style-type: none"> <li>% of targeted sensitization trainings planned for vulnerable population in district (PRI Training)</li> </ul>	120	120	120	120	120	50% of district having trained 10% of pop	80% of district having trained 30% of pop	80% of district having trained 50% of pop	100% of district having trained 80% of pop	100% of district having trained 100% of pop	
<b>STRENGTHENING OF THE HEALTH SYSTEM</b>													
05.	Adoption of Green/ Environment Friendly Measures in Health facilities	<i>Energy Audit:</i> <ul style="list-style-type: none"> <li>% of healthcare facilities per district per year that have conducted energy audit.</li> </ul>	18.90	18.90	18.90	18.90	18.90	20% of district covering 20% of health care facilities	35% of district covering 35% of health care facilities	50% of district covering 50% of health care facilities	75% of district covering 75% of health care facilities	100% of district covering 100% of health care facilities	
		<i>LED lighting:</i> <ul style="list-style-type: none"> <li>% of healthcare facilities per year that installed solar panel</li> </ul>	Untied funds	Untied funds				Most of the Health facilities in state have LED lighting installed under kayakalp scheme.					



		<p><i>Solar Panel:</i></p> <ul style="list-style-type: none"> <li>% of healthc are faciliti es per district per year that installe d solar panel</li> </ul>										
		<p><i>Rain water harvesting:</i></p> <ul style="list-style-type: none"> <li>% of healthc are faciliti es per district per year that installe d rain water harvest ing system</li> </ul>			20	20	20		20% of CHC and 10 % of PHC to be covered for rain water harvesti ng	20% of CHC and 10 % of PHC of remaini ng facilitie s to be covered for rain water harvesti ng	20% of CHC and 10 % of PHC of remaini ng facilitie s to be covered for rain water harvesti ng	20% of CHC and 10 % of PHC of remaini ng facilitie s to be covered for rain water harvesti ng

## 11.2 Budget as planned for FY 2022-23 and FY 2023-24

### Community interventions

#### Training of PRI :-

Two days of training will be conducted for the next batch of 2,000 Panchayats PRIs in 2022-23, 2023-24. The training module developed by the State Health Resource Centre will be used for it. The next batch of panchayats will be selected on a priority basis from the districts where the air pollution level is at an alarming level. The proposed budget for the activity is as follow

#### Training of PRI

Activity	Budget Proposed for F.Y 2022-23	Budget Proposed for F.Y 2023-24	Total (in lakhs)
Training of PRIs	120	120	240

The proposed budget for the activity for F.Y 2022-24 is Rs. 240 lakhs Only

## Training :

### Training of Medical Officers, Health Workers, and Programme officers.

Training of 300 health personal on climate change and human health will be conducted in 2021-22. The 300health staff will include Medical Officers, Health Workers, and program Officers from the high priority districts. The high priority districts are categorized based on the intensity of the pollution in the districts. the high priority districts in the state are Raipur, Durg, Bhilai, Korba, JanjgirChampa, Bilaspur,Raigarh,,BalodaBazar, etc. The proposed budget for the activity is as below.

#### Training of MO, Health workers, and POs.

Activity	Budget Proposed for F.Y 2022-23	Budget Proposed for F.Y 2023-24	Total (in lakhs)
<b>Training of MO, Health workers, and POs.</b>	12	12	24

The proposed budget for the activity is Rs. 24 lakhs Only for F.Y 2022-24

#### IEC/BCC : FMR Code – 11.4.7

IEC/ BCC on Climate change and human health.

Community awareness of climate change and human health is very important. Yet, many steps have been taken at the national, international, and state level, the concern information has not reached the community level. Therefore, the active participation of the community in climate change is very limited. Therefore, to make this climate change issue of day to day life concern of the people, it may require to spread its knowledge to the doorstep of the people. This information will help to develop the opinion of people about the short term and longterm effects on their life and their participation. Therefore, it very important to have the IEC and BCC activities in the state particularly focusing the climate change.IEC activities will be carried with collaboration with SHRC ( Climate Change Cell). IEC activities will include Flex printing , Video Documentary making, puppet shows etc. The proposed budget for the activity is as follows.

#### IEC/BCC

Activity	Budget Proposed for F.Y 2022-23	Budget Proposed for F.Y 2023-24	Total (in lakhs)
<b>IEC/BCC</b>	15	15	30

The proposed budget for the activity is Rs. 30 lakhs for F.Y 2022-24

**Task force Meeting to draft health sector plan for Heat and Air Pollution :- FMR Code-16.1.2.1.23**

At State level task force including different departments to be formed under chairmanship of principle secretary health , and meeting to be organized quarterly . similarly under the chairmanship of Hon. health minister of state governing body should be constituted for which one to two meeting can be organized at state level.

Activity	Budget Proposed for F.Y 2022-23	Budget Proposed for F.Y 2023-24	Total (in lakhs)
<b>Task Force Meeting &amp; GB Meeting</b>	1	1	2

The proposed budget for the activity is Rs. 2 lakhs for F.Y 2022-24

**Sensitization workshop/ Meeting of the State Program Officers and District level Health Officers : FMR Code – 16.1.2.1.24**

Similarly like state level at district level task force including different departments to be formed under chairmanship of District collector to be formed and meeting to be organized time to time.

Activity	Budget Proposed for F.Y 2022-23	Budget Proposed for F.Y 2023-24	Total (in lakhs)
<b>Workshop / Meeting at District level</b>	28	28	56

The proposed budget for the activity is Rs. 56 lakhs for F.Y 2022-24

**Other including Operating Cost (OOC) :-**

1. Energy Audit in Health Care facility :- Budget Proposed for energy audit of health care facility @ Rs. 10,000 for PHC , Rs. 30,000 for CHC , Rs. 1,00,000 for DH . In F.Y 2022-24 about 10 % PHC i.e 79 , 15 % of CHC i.e 23 and 25 % of DH i.e 5 is selected each year to conduct energy audit of health care facilities. Budget proposed for F.Y 2022-23 is Rs. 19.80 Lakhs and for F.Y 2023-24 Budget proposed is Rs. 19.80 Lakhs. Total Budget Proposed for two years is Rs. 39.6 lakhs .
2. Budget proposed @ Rs. 10 lakhs for F.Y 2022-23 & @Rs. 10 Lakhs for F.Y 2023-24 technical cell operation at SHRC. The technical cell support head and budget is required to work on and develop content on Climate Change and Human Health in general and state specific requirements. The content is developed through various activities of field, interaction at various platforms, assessments, short studies, survey to provide hands on recommendations and suggestions to strengthen the health system. Total Budget proposed @ Rs. 20 lakhs for F.Y 2022-24

## Total Proposed Budget:

Total budget proposed in 2022-23 for NPCCHH program by Chhattisgarh State is Rs. 205.5 lakhs and 2023-24 budget proposed Rs. 205.5 lakhs , Total Budget proposed Rs. 411 lakhs for two years

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## ANNEXURES

### Annexure A : Key Priorities of Chhattisgarh Action Plan

<i>Climate Change and Health Risks (Existing Health Burden)</i>	<i>Impacts of Climate Change</i>	<i>Vulnerable Districts</i>	<i>Plan of Action</i>	<i>Budget</i>
Respiratory Illnesses (Air Pollution)	Acute Respiratory Illnesses (ARI)/ Related Allergies	Raipur, Korba, Raigarh, Balodabazar, Janjgir-Champa, Bilaspur, Durg-Bhillai,	a) Capacity Building of the health professionals on climate change and air pollution-related illnesses is planned with the centre of excellence PGI Chandigarh. b) Associating ARI surveillance and health advisories. c) IEC has been developed and disseminated.	
Heat-Related Morbidity and Mortality	Heat Strokes / CKD: Kidneys are particularly vulnerable to damage from high heat.	Bilaspur, Rajnandgaon , Raipur, Durg, Pendra Road , Ambikapur, Jagdalpur, Raigarh, Janjgir -Champa, Gariyaband, Dantewada	a) On the issue of Heat Stress, the state in collaboration with IDSP has been disseminating heat alerts. The Directorate of Health and Family Welfare and District Collectors have also been regularly issuing Health Alerts based on heat predictions in the State. b) Efforts are being made to raise awareness among the citizens on the issue of heat stress and health impacts with simple messaging of Dos and Don'ts. c) IEC has been developed and disseminated. d) Treatment through dialysis have been made available ....	
Vector-Borne Disease	Malaria/Dengue/ Filariasis	Ambikapur/ Surguja, Bilaspur, Dhamtari, 18 Durg, Janjgir, Jashpur Nagar, Mahasamund, Raigarh, Raipur.	a) Disease management - Early case Detection and Prompt Treatment (EDPT) b) Insecticide resistance - Vector Control – Chemical and Biological Control. c) Involvement of NGOs /private sector/community	
Water-Borne Disease	Acute Diarrheal Disease/ Typhoid	Kawardha, Janjgir, Balodabazar, Balod, Rajnandgaon, Mahasamund, Kanker and Durg	- Sensitizing and involving the community for detection of Anopheles breeding places and their elimination - NGO schemes involving them in program strategies - Collaboration with the private sector. d) Quality assurance on laboratory	

			<p>diagnosis</p> <p>e) Long-lasting insecticide-treated nets</p> <p>f) Improve quality and efficiency of services at primary, secondary and tertiary levels</p> <p>g) Environmental management</p> <ul style="list-style-type: none"> <li>- Source reduction i.e. filling of the breeding places</li> <li>- Proper covering of stored water</li> <li>- Channelization of breeding source</li> </ul> <p>h) Monitoring and evaluation</p> <ul style="list-style-type: none"> <li>- Monthly Computerized Management Information System (CMIS)</li> <li>- Field visits by state-by-State National Program Officers</li> <li>- Field visits by Malaria Research Centers and other ICMR Institutes - Feedback to states on field observations for correction actions.</li> </ul> <p>i) Inter-sectoral collaboration</p> <p><a href="https://nvbdcp.gov.in/index4.php?lang=1&amp;level=0&amp;linkid=503&amp;lid=3780">https://nvbdcp.gov.in/index4.php?lang=1&amp;level=0&amp;linkid=503&amp;lid=3780</a></p> <p><b>Refreshers pieces of training from time to time is planned</b></p>	
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**Emerging Health Burden under Climate Change and Human Health**

Non-Communicable diseases	hypertension, diabetes, obesity, Gastritis	Disease mapping	Integral and coordinated approach with IDSP/Mental Health and other associated departments. Capacity building of different cadre health professionals
Mental Health	Anxiety, Stress		
Zoonotic Diseases	Scrub Typhus/Snake Bites/Rabies	Bastar/Rajnandgao/ Bilaspur/Korba/Janj gir-Champa/Raigarh /Surguja/ Jashpur/Balrampur/ Surajpur	Detection and Diagnosis (Testing's Kits for scrub typhus)/ Capacity Building of health professionals is planned with the center of Excellence on CCHH PGI Chandigarh
Burnt/Shocks/disabilities due to Lightening	Burns and deaths dues to Lightening	<b>High Occurrence:</b> Korba/Raigarh/ Mahasamund / Bastar	

**Cardiovascular diseases**

**There is a relationship between cardiovascular mortality and max temperatures which are positive and strong for temperatures more than 26 °C (r=0.83, P<0.01) such that, a 1 °C increase in maximum temperature is associated with a 4.27% (95%CI: 0.91, 7.00) increase in cardiovascular disease mortality. Climate Change and Simulation of Cardiovascular Disease Mortality: A Case Study of Mashhad, Iran**

**Mohammad BAAGHIDEH and Fatemeh MAYVANEH,**

**<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5395536/#:~:text=There%20is%20a%20relationship%20between,increase%20in%20cardiovascular%20disease%20mortality.>**

**Malnutrition**

**and consequent disorders, like retarded child growth and development have been identified as one of the health**

threats by the Working Group-II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. Climate change results in food insecurity, namely, food availability, food accessibility, food utilization, and food system stability. Drought diminishes crop yield, dietary diversity, supply chain disruption, increases market prices, and reduces animal and aquatic products are being experienced. These factors reduce overall food consumption, and may therefore lead to macro as well as micronutrient deficiencies.

<b>Impact of climatic Disasters on health</b>			
<b>Heavy Rainfall</b>	Vector-Borne Disease	Raipur/Gariyabandh / Dhamtari/ Balodabazar/ Durg /Balod / Bemetara /Rajnandgao / Janjgir-Champa / Korba/ Surajpur/ Jagdalpur/Narayanpur/ Sukma/ Bijapur/ Dantewada/ Kanker	
<b>Drought</b>	Water-Borne Disease	The districts whose tehsils have been declared drought-hit (as in 2017) are Rajnandgaon (9 tehsils), Bilaspur (8), Kanker (7), Balodabajara (6), Raigarh (6), Dantewada (5), Koriya (5), Bemetara (5), Mahasamund (5), Dhmatari (4), Raipur (4), Balod (4), Kabeerdham (4) and Janjgir-Champa (4), Kondagaon (4), Bijapur (4), Mungeli (3), Gariyaband (3), Durg (3), Narayanpur (2), Korba (1).	
<b>Occupational Health Hazards</b>			
<b>Occupational Health Risk (COPD/Cancer/Silicosis)</b>	Pulmonary Lung Diseases	Korba/Raigarh/Raipur/Balodabazar/Durg-Bhillai/Bilaspur/Janjgir Champa	Identifying the respiratory health-related issues in the early stages to reduce mortality and strengthen the compensations procedures for the treatment.
<b>Climate Resilient Health Infrastructure</b>			
<p>Assessed around 1000 health facilities listed in government records as solarised. Solar plants were found to be functional and in use in 86% of the solarised public health facilities. Identified around a hundred specific facilities for improvements. The mechanism for addressing repairs was functioning well and smaller centres were found to utilize solar energy well.</p> <p>Smaller centers were found to utilize solar energy well. CREDA is also working on pilots of cool roofs, rainwater harvesting, solar-powered water heaters, and water pumps for hospitals and health centers and implementing them at the district level.</p>			



**We plan**

1. **To conduct an energy audit and climate vulnerability assessment of health centers.**
2. **Reduce Carbon Emissions in the Health care system by addressing biowaste management.**

**Annexure B**

**Long Term Matrix of Adaptation Plan of Chhattisgarh SAPCCHH**

S.N.	Key Action	Short term (2022-2024)	Midterm (Till 2028)	Long Term (Till 2030)
<b>1</b>	<b>To strengthen the capacity of the health system for climate change and Human health</b>			
	Strengthening of the health care system in the context of climate change in coordination with different departments of the state with the sup	<p>Establish ‘Environment Health Cell’ (EHC) at Health deptt.</p> <p>Depute State Nodal Officer –Climate change (SNO-CC) as the focal point</p> <p>Notify Task Force with multiple stakeholders and review existing Indian Public Health Standards and appropriate suggestions</p> <p>State to form climate-sensitive health Programme Implementation Plan (PIP)</p>	<p>Implement/ adapt/ modify the Monitoring, Supervision, and Evaluation tool for climate-sensitive diseases</p> <p>Coordinate with other agencies (municipalities, PRIs) for efficient and effective implementation of proposed activities at the state and below level.</p> <p>Phased Implementation of the recommendations of Task Force.</p>	<p>Share appropriate technology like reduction in carbon footprint at healthcare facilities</p> <p>Continue Phased Implementation of recommendations of Task Force.</p> <p>Notification of - SNO, State level EHC, State level Task Force, State level Governing Body</p> <p>Notification of District Nodal Officers identified, District Environmental Health Cell, District Task Force formed.”</p> <p>State Action Plan for Climate Change and Human Health (SAPCCHH) was developed, approved by the State Governing Body, and launched by the state.</p> <p>District-specific Heat Action plan developed by the respective District Task Force. ( State-specific heat action plan will be a chapter of SAPCCHH and the respective district-specific</p>

					<p>plan will be consolidated within the SAPCCHH)</p> <p>PIP submitted to state NHM</p> <p>Consultant Recruited in the state EHC</p>
	Capacity building	<p>-Identify agency/ institute/ Organizations/ Centers of Excellence for developing guidelines, capacity building, supporting implementation, monitoring, and supervision.</p> <p>Training of the health care professionals at various levels of the health system</p> <p>Enlist (customized as per states' vulnerabilities)</p> <p>Technical committees/ working groups to support the focal point,</p> <ul style="list-style-type: none"> <li>- skilled staff,</li> <li>- logistics,</li> <li>- iv) funds</li> </ul>	<p>As per the priority list, State to prepare a guideline/ action plan and upload the same on its website for ready reference.</p> <p>-Develop training modules, organize training</p> <p>Conduct meetings / Workshops/ Training on CC&amp;HH for health care personnel</p> <p>Sensitize and orient private health care providers</p>	<p>Extend and expand training to reach health care staff to the village level.</p> <p>Conduct workshops/ structured training in new treatment/ management technologies at the regional or local level</p> <p>- Disseminate reports and good practices;</p>	<p>Names of related institutes and NGOs identified per state-specific climate-sensitive illnesses in the state and district.</p> <p>No of SNOs/ DNO's trained at National/State level pieces of training, Workshop, and ToT.</p> <p>Details of funds mobilized and utilized from other sources (Govt/NGOs)</p>
2	<b>To strengthen health preparedness and response by performing situational analysis at State and district levels</b>				
	Develop/ strengthen the monitoring and surveillance systems for climate-sensitive diseases in coordination with IDSP	<p>Develop/strengthen surveillance for each district on Climate Sensitive Diseases (CSD)</p> <p>Train all concerned personnel on surveillance system (data collection, collation, and analysis)</p> <p>Integrate relevant non-health data into the</p>	<p>Build an interdisciplinary platform i.e. link health databases with real-time monitoring of weather, climate, geospatial, and exposure data so as to accurately forecast health illness/ events for heat/ARI/Zoonotic</p>	<p>Update monitoring and surveillance system as per new evidence</p> <p>Evaluate inter-disciplinary platform and upgrade as per evolving technologies.</p> <p>Identify gaps for</p>	<p>No of polluted cities were identified for ARI surveillance in the state and no of Sentinel Surveillance Hospitals were Identified from polluted cities</p> <p>No of polluted cities where ARI</p>

	<p>health surveillance system</p> <p>Initiate Sentinel &amp; real-time surveillance for illnesses due to Air Pollution, Heat etc</p>	<p>diseases/ Vector-borne/Waterborne diseases</p> <p>Develop/ modify mechanisms and indicators to monitor the trend of CSDs.</p> <p>Conduct Joint Review Missions / Central Internal Evaluations and feedback mechanisms.</p>	<p>research</p>	<p>surveillance has been initiated as per SOP</p> <p>No of hospitals identified with 'Special Cold Room' (SCR) for management of heat-related illnesses</p> <p>Coordination with SDMA regarding death due to heat-related illnesses.</p> <p>Coordination with respective IMD offices for climate data for analysis of climate-sensitive illnesses</p> <p>Coordination with the respective State Pollution Control Board for getting AQI data.</p> <p>No. of Biennial Training Workshops of concerned personnel on surveillance systems (data collection, collation and analysis)</p>
<p>Develop mechanisms for EWS/ alerts and responses at state, district, and below district level in coordination with Other state government departments</p>	<p>Constitute a multi-stakeholder working group for the development of an early warning system for each CSD</p> <p>Design and integrate public health response plan with Meteorology Dept, NDMA, EMR</p>	<p>-Review the monitoring and surveillance system of CSDs</p> <p>-Develop thresholds/ prediction models for health events or CSDs.</p> <p>-States to develop a</p>	<p>Evaluation and modifications for the appropriateness of the plans' for</p> <p>Thresholds of action</p> <p>Interventions to maximize response</p>	<p>Establishment of a Working group by EHC for the development of a mechanism for EWS/ alerts for climate-sensitive illnesses</p> <p>-Steps were taken by EHC to develop</p>

			communication plan and dissemination systems to warn people and communities	effectiveness for the relevant community or region.	mechanisms to integrate public health response plan with related stakeholders (SPCB, NDMA, IMD, etc. )
<b>3</b>	<b>To strengthen the climate-resilient and energy-efficient health infrastructure</b>				
	-Develop climate-resilient health and energy-efficient health infrastructure	Vulnerability needs assessment in the entire state of Chhattisgarh	Identify the climate-vulnerable districts and prepare the health infrastructure to be climate resilient  Old facilities to be made adaptive.  New facilities to be climate resilient  Guidance document for state-specific climate-resilient health infrastructure	Policy changes in the health facility infrastructure	No of climate-vulnerable health facilities Type of climatic vulnerabilities affecting the health system and delivery of health care facilities No of Changes to the old facilities Climate-resilient infrastructure with new health facilities
	Integrate, adopt and implement environment-friendly measures suggested in other missions on climate change in coordination with other state departments	Increase plantation in and around the building to make it 'Green'  Incorporate measures in building design for making it climate resilient  Use technologies that reduce harmful chemicals emission & carbon foot-print  Use of energy-efficient equipment and services	Expand measures to make the healthcare sector 'Green'.  Replicate the successful 'model of building design' for new healthcare facilities  Explore and support technologies, equipment and services which are energy efficient and reduce harmful chemicals emission & carbon foot-print	Assess and document the reduction of climate risk in climate-resilient building design for replication in other states and UTs	No plants planted in the various health care facilities-PHC, CHC, SHC, DH annually  No Green Hospital models were Initiated, Constructed, and Renovated at Primary, - Secondary and Tertiary levels.  No of prototype hospital buildings prepared which are resilient to Disasters (Floods, Cyclones, earthquake, Tsunami)

					- No of health facilities where solar panels installed, LEDs installed, rain water harvesting done
<b>4</b>	<b>To strengthen research capacity to fill the evidence gap on climate change's impact on human health.</b>				
	Strengthening of healthcare services based on research on climate variables and impact on human health in coordination with NCDC	<p>Create a database of professionals, researchers, and institutions engaged in studies of the impact of weather and climate on health</p> <p>Create a platform for 'data-repository' of various researches on climate and health effects</p> <p>Scenario-building (initiation of study, data sources, mechanism used, apportionment of risk factor, methodology, assumptions, model used, confidence interval) for establishing a relation of climate variables and health impacts.</p> <p>Identify best practices in the implementation of measures to combat the effect of climate change</p>	<p>Development of models mathematical or other types for early warning alerts for CSDs.</p> <p>Develop/adapt techniques for modeling or use other research advances by transitioning them into operational products and decision support tools</p> <p>Reassess health data esp. CSDs using modeling techniques</p> <p>Inform Policy-makers about the 'scenario' of health-related statistics was ith focus on CSDs.</p> <p>Conduct seminars, workshops, and conferences on best practices of measures to combat the effect of climate change on human health.</p>	<p>Develop and validate models, and enhance research on the effectiveness of CSDs management.</p> <p>Evaluate and improve the effectiveness of the modeling technique.</p> <p>Evidence-based information to Policy-makers</p> <p>Conduct seminars, workshops, and conferences on best practices of measures to combat the effect of climate change on human health.</p>	<p>List of professionals, researchers, and institutions engaged in studies of the impact of weather and climate on health at the state and district level. Creation of 'data-repository' of various researches on climate and health effects at state and district levels.</p> <p>List of 'best practices in the implementation of measures to combat the effect of climate change</p> <p>Number of seminars in a year on CSDs and</p> <p>related aspects including 'best practices at the state and district levels.</p>
<b>5</b>	<b>To develop partnerships and create synchrony/ synergy with other missions and ensure that health is adequately represented in the climate change agenda in the country</b>				
	Develop a joint action plan with other deptt./ organizations In view of their	<p>Identify or assess aspects/ areas underserved in the management of CSDs</p> <p>Develop affordable</p>	Broaden Stakeholders' network and partnership and reassess service areas to be served	Reassess tools for risk reduction and Environmental Health Impact assessment.	State-specific Affordable and acceptable tools developed for risk reduction and

	<p>capabilities and complementarities in coordination with other state government departments/ National and state level</p>	<p>and acceptable tools for risk reduction and Environmental Health Impact Assessment</p> <p>Establish <i>Corporate Social Responsibility / Accountability</i> in terms of finances for implementing measures for prevention/ reduction/ treatment of CSDs</p>	<p>for climate-related health risk reduction and Environmental Health Impact Assessment.</p> <p>Evaluate Corporate Social Responsibility (CSR) under laws for Health Strategies, Policies, and measures for the promotion of health</p> <p>- Meeting/ Consultation with the local governing body for a reassessment of roles and services and appropriate resource allocation and for limiting duplication of actions</p>	<p>Share best management practices that are affordable and acceptable in social/ traditional contexts locally</p> <p>Evidence-based support to decision-makers for addressing gaps in climate-resilient healthcare services</p>	<p>Environmental Health Impact Assessment by the State Task Force.</p> <p>No Corporate Houses involved with the state to invest in mitigation/ adaptation of climate-sensitive illnesses through CSR Funds eg. Printing and dissemination of IEC, conduct training and workshops, greening of hospitals, help in research etc.</p> <p>- No medical colleges (Private and Govt.) involved with the State EHC</p>
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## ANNEXURE C

### Training Material: Do's and Don't for Climatic situations

<b>Lightning Safety</b>	
<b>Do's</b>	<b>Don't</b>
<b>Stay off corded phones, computers and other electrical equipment that put you in direct contact with electricity.</b>	Don't lie on the ground to avoid lightning. If lightning strikes nearby you should keep as little of your body to come in contact with the ground current.
<b>Do stay away from Windows and doors and stay off porches</b>	Don't lie on concrete floors and do not lean against concrete walls
<b>Do avoid the open area. You should avoid being the tallest object in the area</b>	Don't bath, wash clothes and utensils in ponds, rivers, hand pumps, tube wells, plumbing including sinks, bath and water taps. Water is an excellent conductor of electricity.
<b>Do spread out if with the group of people this decreases the chance of multiple casualties</b>	Don't swim or participate in watersports (Fishing) during thunderstorms. Head inside until it is safe
<b>Do pay attention to the weather. If able, head in doors when lightning seems imminent</b>	Don't stand under or near isolated tall trees. Towers or utility poles lightning will strike taller objects in an area.
<b>Do stay in a safe location for 30 minutes past the last rumble of thunder you can hear</b>	Don't ignore thunder if you can hear it you are in danger. Lightning often strikes as far as 10 miles away from a storm's heavy rainfall.

## Snake Bite

<b>Do's</b>	<b>Don't</b>
Let the victim of a snake bite lie in a semi-reclined position with the bite wound below the level of the heart. This prevents the venom from spreading to other parts of the body until medical help arrives.	Try to suck out the venom it is extremely important to retain traces of venom for use with Venom identification kits
Do tie a bandage 2 to 4 inches above the bite wound to slow the spread of venom in the body. If the bite area turns cold or numb, the bandage is too tight. Loosen it. Use a splint to immobilise the wounded limb. Remove the bandage in a medical facility as the release of pressure will cause a rapid flow of venom through the bloodstream	Do not in size or cut the bite or reply hi torquent cutting aur incising the bite hotel high torque winds are ineffective and can be fatal if released
DO seek medical help immediately as the Venom can cause serious damage to health or even death within a few hours	Do not allow the victim to walk or move their Limbs use a splint for linked to minimise all Limb movement what the patient on a stretcher or bring transportation to the patient
	Don't apply ice on the snake bite as the ice may block blood circulation.
	Don't suck the blood out with your mouth (germs in the mouth may cause infection in the bite wound) and you may be also exposing yourself to the venom.
	Don't attempt to cut the wound.
	Don't attempt to guess whether the snake was venomous or not, based on its physical characteristics.

### Heavy Rainfall

<b><u>Do</u></b>	<b><u>Don't</u></b>
<b>Do listen to the weather forecast India Meteorological Department (IMD)</b>	Don't Go in the water logging area.
<b>Do drive slow or stop as visibility reduces</b>	Don't drive/walk on flooded bridges, there are high chances of flash floods/ bridges suddenly collapsing.
<b>Do stay away from electric poles/transformers/ and wires.</b>	
<b>Beware of and watch for structural damages, such as falling walls and ceilings. Piercing small holes in sagging ceilings can strategically drain them and prevent collapses.</b>	



<b>Floods</b>	
<b>Do's</b>	<b>Don'ts</b>
<b>Turn off gas valves fed to appliances, water valves and the electricity on the main fuse box. Be aware that surges of electricity during gas leaks can cause violent ignitions.</b>	Don't eat or drink anything exposed to the likely contaminated floodwaters.
<b>Unplug all electrical items and store them away from floodwaters.</b>	Don't use potentially contaminated water for washing or food preparations.
<b>Move all inhabitants and pets at a higher level or any to safe locations, ideally in pet carriers.</b>	Watch out for and don't approach downed power lines.
<b>To prevent sewage backups, put sandbags in the toilet and obstructions on drain holes. Both floating and sinking littered debris and refuse can both complicate rescue efforts and plug outgoing flows.</b>	Don't drive through floodwaters. If stuck, exit the vehicle and move to higher ground.
<b>Look out for snakes, which often go inside flooded homes.</b>	Don't be careless in a flooded area at night when it's much harder to see standing and flowing water. Two feet of moving water is deep enough to sweep away a vehicle and six inches can sweep away an adult.
<b>Try to keep the ration/ documents in the attic.</b>	Don't leave doors and windows unlocked when leaving your property due to high incidences of looting.
<b>Strong ropes and a well equipped First Aid Kit can greatly enhance rescue efforts.</b>	
<b>Rushing waters, risks of electrocution, gas explosions, drowning, and the threats of pests, pestilence, water damages, mold damages and looting all accompany floods. Being tactful can avert or minimize the physical threats and the damages.</b>	

<b>Drought</b>	
<b>Do's</b>	<b>Don'ts</b>
<b>Monitoring of rainfall during the South West Monsoon period, on a regular basis.</b>	Do not waste water, especially drinking water, as it is precious
<b>listen to the advisories advisories by Indian Meteorological department and State Disaster Management Authority to farmers for taking up drought resistant crops &amp; crops requiring less water</b>	
<b>Judicious use of available water.</b>	
<b>Issue of advisories to farmers for taking up drought resistant crops &amp; crops requiring less water.</b>	
<b>Have kitchen gardens (Badi), Water harvesting.</b>	

<b>Heat Wave</b>	
<b>Do</b>	<b>Don't</b>
<b>Stay and work in the shade. Do agricultural work in early hours of morning and evenings when heat is less and take frequent breaks.</b>	Don't drink ice-cold drinks; they can cause stomach cramping.
<b>Move slowly.</b>	Don't leave any living being in a closed car
<b>Wear a wide-brimmed hat.</b>	Don't take salt tablets unless the doctor says so.
<b>Check on elderly neighbors or relatives.</b>	Don't assume you are immune to heat outside just because you work in a hot environment like a bakery or pizza parlor. The damage can accumulate through the day.
<b>Stay Hydrated and also keep giving water to pets and animals from time to time.</b>	Don't skimp on water.
<b>Tune into weather broadcasts for the latest heat advisory or alert — and heed it!</b>	
<b>Wet a paper towel or hankie and drape it on your face when you come inside. Other "hot spots" to place a cool compress for quick cooling include the back of your neck, underarms, and groin area.</b>	
<b>Staying safe in high temperatures is relatively simple: Don't take chances when Mother Nature is turning up the heat.</b>	

<b>Air Pollution</b>	
<b>Do's</b>	<b>Don'ts</b>
<b>Stay indoor as much as possible. Monitor the pollution level in the newspaper daily, especially people with Asthma and COPD.</b>	Don't do outdoor activities, physical exercise in peak hours of pollution.  4. Avoid going to areas with heavy smoke or dust
<b>Wear a mask whenever you go out. and, wear the right masks with respirators.</b>	Do not burn garbage, plastics and other discarded items.
<b>Place air purifying plants like Tulsi, spider plant, aloe vera in homes and offices to increase indoor air quality.</b>	Don't burn Dry neem leaves to chase the mosquitoes; it creates suffocation.
<b>Stay hydrated. Drink more water to flush out toxins and harmful particles from the body.</b>	Don't go to bigger roads with more traffic.
<b>Start carpooling, public transport to reduce the number of vehicles plying on roads.</b>	Don't go to areas with heavy smoke or dust
<b>Follow a diet rich in antioxidants, nutrients to detoxify and improve immunity as air pollutants affect the lungs.</b>	
<b>Avoid smoking.</b>	
<b>Keep a proper check on pollution of your vehicles.</b>	

Air Borne Disease	
Do's	Don'ts
Cover your mouth and nose when sneezing or coughing	Don't go to crowded places unless very necessary .
Wash hands frequently with soap and water.	Don't touch your eyes and face areas oftenly.

Water Pollution	
Do's	Don'ts
Do collect the water sample for testing regularly from time to time.	Don't litter around the water bodies.
<u>Properly dispose of chemical cleaners, oils, and non-biodegradable items to keep them from ending up down the drain or water bodies.</u>	Don't throw garbage, especially plastic garbage in water bodies, drains etc.
Do water harvesting	Don't apply pesticides and herbicides in gardens and yards.
Do learn about water acts	Don't allow the runoff from roads, farmyards, hard standings and ring feeder areas used by stock to discharge directly to a watercourse.
	Don't allow livestock to have access to watercourses. Instead, provide water at drinking troughs wherever possible.
	Don't allow the rainwater from poultry buildings that are ventilated to the roof to discharge directly to a watercourse.

Vector Borne Diseases	
Do's	Don'ts
Remove water from coolers and other small containers at least once in a week	Do not wear clothes that expose arms and legs
Use aerosol during day time to prevent the bites of mosquitoes	Don't allow children to play in shorts and half sleeved clothes
Use mosquito nets or mosquito repellents while sleeping during day time	

<b>Water Borne Diseases</b>	
<b>Do's</b>	<b>Don'ts</b>
<b>Wash hands with soap after using the toilet and before eating.</b>	Keep your home and surroundings clean to prevent flies and other insects from breeding.
<b>Consume freshly cooked food. Protect food and water from flies. cover the food items with a lid.</b>	Don't eat uncooked and open or exposed street food.
<b>Avoid stale foods, while raw fruits and vegetables should be washed thoroughly before eating.</b>	
<b>Drink Purified Water. Boil water and allow it to cool with a lid on it.</b>	

<b>Soil / Land Pollution</b>	
<b>Do's</b>	<b>Don'ts</b>
<b>All cropped land over the following winter must, where soil conditions after harvest allow, have either: crop cover, grass cover, stubble cover, ploughed surface or a roughly cultivated surface. Fine seedbeds must only be created very close to sowing.</b>	Don't use pesticides, veterinary medicines or chemicals unless there is an identified need.
<b>Prevent Erosion. plant more trees and shrubs.</b>	Don't throw plastic and non biodegradable waste in open.
<b>Do reduce dirty water around the farm and improve nutrient use.</b>	
<b>Do carry out a land risk assessment for slurry and manure; manage your water margins.</b>	

## ANNEXURE D

### Health Adaptation plan for Water borne Diseases

#### 1. Water Borne Diseases

Illnesses due to contaminated water and food are usually seen following flood, drought, religious or other mass gatherings.

Waterborne diseases such as typhoid, hepatitis, dysentery, and others caused from micro-organisms such as *Vibrio vulnificus* and *Vibrio cholera*, *E.Coli*, *Campylobacter*, *Salmonella*, *Cryptosporidium*, *Giardia*, *Yersinia*, *Legionella* are some climate-dependant infectious diseases. The increase in temperature is seen to be associated with increased survival and abundance of micro-organisms<sup>44,46</sup>. The decreased precipitation and drought result in decrease availability of safe-water, reuse of wastewater, contamination of water sources, transmission from vertebrate to human or human to human etc. Flooding cause contamination of water source as well as disruption of sewage disposal system, further contributors are population displacement, overcrowding, poor sanitation and hygiene, subsequent faeco-oral contamination and spread of pathogens etc .

**1.1 Acute Diarrheal Disease :** Water borne diseases are caused by the toxic contaminants, Micro organism in the water. During rainy seasons and floods the outbreak of water borne diseases occurs. Common water borne diseases in Chhattisgarh is **Acute Diarrheal Disease (ADD)**.

According to Integrated Disease Surveillance Program (IDSP) weekly reports of 2019 districts of Kawardha, Janjgir, Balodabazar, Balod, Rajnandgaon, Mahasamund, Kanker and Durg have reported outbreaks of ADD in Chhattisgarh.

#### 1.2 IEC

- a) Advertisement and promotion through IEC: Street plays , Hoards, billboards, as and other advertisement modes

#### 1.3 Capacity Building:

- b) Refresher trainings of the Medical professional training:
  - Expanded training of doctors and associate staff
  - Increased training of NGOs and Asha workers

#### 1.4 Surveillance:

- c) Monitoring of the cases in the districts through collaborated efforts with IDSP/Vector borne disease programs and district Nodal Officers of CG NPCCHH
- d) Monitoring and evaluation
  - Monthly Computerized Management Information System (CMIS)
  - Field visits by state-by-State National Program Officers
  - Field visits by Malaria Research Centers and other ICMR Institutes
  - Feedback to states on field observations for correction actions.

## ANNEXURE E- OFFICE ORDERS

### संचालनालय स्वास्थ्य सेवायें छत्तीसगढ़

विभागाध्यक्ष कार्यालय, इन्द्रवती भवन, तृतीय तल नवा रायपुर अटल नगर

क्रमांक/संचा./स्टेनो/2022/40

नवा रायपुर, दिनांक 23/03/2022

// आदेश //

संचालनालय स्वास्थ्य सेवायें छत्तीसगढ़ में पदस्थ वित्त नियंत्रक/संयुक्त संचालक/उप संचालक/राज्य कार्यक्रम अधिकारी/राज्य नोडल अधिकारी एवं अन्य अधिकारियों के मध्य निम्नानुसार कार्य आबंटन किया जाता है :-

क्रं.	नाम	पदनाम	आबंटित कार्य
1	2	3	4
1	श्री बी.आर. कावडे	वित्त नियंत्रक	लोक लेखा समिति, बजट, आडिट, पेंशन, भुगतान संबंधी समस्त नस्तरियां, एन.एच.एम. संबंधी कार्य।
2	डॉ. सुभाष मिश्रा	प्रभारी संचालक, महामारी नियंत्रण (संयुक्त संचालक)	राष्ट्रीय अंधत्व नियंत्रण कार्यक्रम, आई.डी.एस.पी, एन.डी.बी.डी.सी.पी. मानव अंग प्रत्यारोपण, से संबंधित समस्त कार्य।
3	डॉ. अल्का गुप्ता	प्रभारी संचालक (SIHFW) (संयुक्त संचालक)	मातृत्व स्वास्थ्य, आर.एम.एन.सी.एच+ए, जननी सुरक्षा योजना, जननी शिशु सुरक्षा कार्यक्रम, बीस सुत्रीय कार्यक्रम, लक्ष्य, पी.एम. एस.एम.ए., एफ.आर.यू., 24x7 पीएचसी क्रियान्वयन, एम.डी.एस. आर., से संबंधित समस्त कार्य।
4	सुश्री भारती चन्द्राकर	संयुक्त संचालक	विज्ञप्त शाखा, आर.एम.ए. शाखा, नर्सिंग शाखा, एच.आर.एम.आई. एस., सूचना का अधिकार-अपीलीय अधिकारी, महिला उत्पीड़न, स्थानीय कार्यालय।
5	श्री रविराज ठाकुर	उप संचालक	अविज्ञप्त शाखा, कार्यालय स्थापना, लीगल शाखा, पेंशन, समस्त आयोग से संबंधित समस्त कार्य, आयुष्मान भारत डिजिटल मिशन, एसडीआरएफ मद एच.आर. अनुमति एवं भर्ती संबंधित कार्य, CPGRAMS से संबंधित समस्त कार्य, HRMIS NG & Updation - चिकित्सा अधिकारी संबंधित कार्य।
6	सुश्री मनीषा नाग	संयुक्त संचालक (वित्त)	राज्य नोडल एजेंसी, आयुष्मान भारत प्रधानमंत्री जन आरोग्य योजना, डॉ.खुबचंद बघेल स्वास्थ्य सहायता योजना, मुख्यमंत्री विशेष स्वास्थ्य सहायता योजना, एड्स नियंत्रण समिति, CPS Course, बजट, लोक लेखा समिति से संबंधित कार्य, वेतन निर्धारण अनुमोदन, आडिट निरीक्षण कार्य, सामान्य भविष्य निधि, यात्रा भत्ता परीक्षण एवं वित्त, पेंशन, भुगतान, संबंधी समस्त कार्य।
7	डॉ.एस.के. पामभोई	संयुक्त संचालक (NHM)	एन.एच.एम, एन.यू.एच.एम., एच.डब्ल्यू.सी., शहरी स्वास्थ्य, विधानसभा, टेलीमेडिसीन, डायलिसिस कार्यक्रम/CKD से संबंधित संबंधित समस्त कार्य।
8	डॉ. एस.के. विज्ञवार	उप संचालक	108 संजीवनी एक्सप्रेस, 102 महतारी एक्सप्रेस, अतिरिक्त परियोजना संचालक (एड्स), रेडक्रास, ब्लड बैंक, सिकल सेल, थैलेसिमिया, सिफिलिस, एच.आई.वी., आर.टी.आई.-एस.टी.आई., पी. पी.सी.टी. कार्यक्रम, डायग्नोस्टिक सर्विसेस, मितानिन कार्यक्रम संबंधित समस्त कार्य।



9	डॉ० छाया तिवारी	उप संचालक	मातृत्व स्वास्थ्य, आर.एम.एन.सी.एच+ए, जननी सुरक्षा योजना, जननी शिशु सुरक्षा कार्यक्रम, बीस सुत्रीय कार्यक्रम, लक्ष्य, पी.एम.एस.एम.ए., एफ.आर.यू., 24X7 पीएचसी क्रियान्वयन, एम.डी.एस.आर.,
10	डॉ. राजेश शर्मा	राज्य कार्यक्रम अधिकारी	अस्पताल प्रशासन, नर्सिंग होम एक्ट, बायोमेडिकल वेस्ट मैनेजमेंट, स्वास्थ्य संस्थापना, क्वालिटी सेल, पी.पी.पी., पोस्टमार्टम, अल्टरनेटिव मेडिसीन, रोड सेफ्टी, जीवनदीप, एम.सी.सी.डी. (Medical Certification of Cause of Death), समिति से संबंधित समस्त कार्य, आयुष्मान भारत डिजिटल मिशन।
11	डॉ. अनिल परसाई	प्रभारी उपसंचालक	केन्द्रीय स्टोर शाखा, डी.डी.ओ., भवन विकास, मुख्यमंत्री घोषणा, समस्त प्राधिकरण से संबंधित समस्त कार्य।
12	डॉ. के.सी. उरांव	प्रभारी उप संचालक	विज्ञप्त शाखा, HRMIS MO/SPECIALIST, स्थानीय स्टोर शाखा, परिवहन शाखा।
13	प्रोफेसर डॉ. कमलेश जैन	राज्य कार्यक्रम अधिकारी	104 आरोग्य सेवा, 1099 मुक्तांजली, स्वच्छता एवं जल जीवन मिशन अभियान, PUBLIC HEALTH CADRE DEVELOPMENT, NPPC, NIPPCF, NPHCE, NIDDCP, NTCP, NOHP, यू.एस.पी.पी. राष्ट्रीय एवं अंतर्राष्ट्रीय सहयोगी संस्था जैसे USAID, JHPIEGO से समन्वय संबंधी कार्य एवं मानव अंग प्रत्यारोपण से संबंधित कार्य नस्ती संचालक महामारी के माध्यम से प्रस्तुत करेंगे।
14	डॉ. श्रीकांत राजिमवाले	रजिस्ट्रार मेडिकल काउंसिल/राज्य नोडल अधिकारी	मेडिकल काउंसिल, एस.एन.ए., आयुष्मान भारत, (आर.एस.बी.वाय., एम.एस.बी.वाय. से संबंधित कार्य), आयुष्मान भारत डिजिटल मिशन, AB-PMJAY, DKBSSY & MVSSY, CPS कोर्स।
15	डॉ. व्ही. आर. भगत	प्रभारी उप संचालक	शिशु स्वास्थ्य, शिशु स्वास्थ्य पोषण, शालेय स्वास्थ्य, एनआरसी, टीकाकरण कार्यक्रम, आर.बी.एस.के., आर.के.एस.के., एस.एन.सी.यू., एन.बी.एस.यू., एनबीसीसी, NIPI, एचबीवायसी, एचबीएनसी, डीईआईसी, एनीमिया मुक्त भारत कार्यक्रम से संबंधित समस्त कार्य। महिला बाल विकास विभाग से समन्वय संबंधी कार्य, मुख्यमंत्री सुपोषण अभियान।
16	डॉ. आनंद राव	राज्य नोडल अधिकारी	केंद्रीय प्रयोगशाला मलेरिया, मेडिकल बोर्ड, मेडिकल बोर्ड सर्टिफिकेट, दिव्यांगजन/समाज कल्याण संबंधी कार्य, एम.आर. शाखा, CGHS Wellness Rate (Health Scheme), एवं कर्मचारी राज्य बीमा निगम, विधानसभा शाखा – सहायक नोडल अधिकारी।
17	डॉ. नेतराम बेक	राज्य कार्यक्रम अधिकारी	102 महतारी एक्सप्रेस उपसंचालक के सहयोगी के रूप में। आरएमएमयू (RMMU) ठोस अपशिष्ट प्रबंधन, iRAD, मान. मुख्यमंत्री, मान. मंत्री, मुख्य सचिव, भारत सरकार, समय-सीमा प्रकरण, विभिन्न माध्यम, संभागायुक्त एवं अतिविशिष्ट व्यक्तियों से प्राप्त पत्रों का निराकरण, मंत्रीजी एवं सचिव स्तर पर मिटिंग से संबंधित जानकारी, जनशिकायत, जनदर्शन, पी.जी.एन., राज्य स्तरीय बैठक संबंधी कार्य, विधानसभा से संबंधित समस्त कार्य में नोडल अधिकारी के सहयोगी के रूप में, प्रोटोकॉल, सांसद आदर्श ग्राम, लोक सेवा गारंटी, वृक्षारोपण, हरियाली, हज यात्रा एवं अमरनाथ यात्रा से संबंधित समस्त कार्य। (नस्ती संयुक्त संचालक/उपसंचालक के माध्यम से प्रस्तुत करेंगे)





18	डॉ. टी.के.टोण्डर	प्रभारी उप संचालक	परिवार कल्याण कार्यक्रम संबंधित समस्त कार्य।
19	डॉ. महेन्द्र सिंह	राज्य कार्यक्रम अधिकारी	PCPNDT, Surrogacy & ART एक्ट, राज्य नोडल अधिकारी, NPCDCS, NMHP, COPD, से संबंधित समस्त कार्य, IEC राज्य सूचना शिक्षा संचार ब्यूरो एवं कम्यूनीकेशन सेल, सूचना प्रौद्योगिकी, सूचना का अधिकार, जन सूचना अधिकारी, विधानसभा, समस्त कार्य के सहयोगी के रूप में समस्त कार्य।
20	डॉ. धर्मेन्द्र गहवई	प्रभारी नोडल अधिकारी	राज्य क्षय अधिकारी (टी.बी. नियंत्रण कार्यक्रम), आई.डी.एस.पी., आपदा प्रबंधन, कोविड-19, एनसीडीसी से संबंधित कार्य, NPCCHH, National Viral Hepatitis Control Program (NVHCP) से संबंधित कार्य।
21	डॉ. जितेन्द्र कुमार	राज्य नोडल अधिकारी	लेप्रोसी कार्यक्रम (SLO), MALARIA, DENGUE से संबंधित समस्त कार्य, मुख्यमंत्री हाट बाजार क्लीनिक योजना से संबंधित नस्ती DFW को प्रस्तुत करेंगे। (संबंधित नस्ती संयुक्त संचालक/उपसंचालक के माध्यम से प्रस्तुत किया जावे)
22	डॉ. शैलेन्द्र अग्रवाल	राज्य नोडल अधिकारी	नर्सिंग शाखा, HRMIS NURSING, एच.आर.एम.आई.एस. समन्वय संबंधी कार्य, संबंधी समस्त कार्य संबंधित समस्त कार्य। लिंग जन्म पंजीकरण (Birth Registration), NPPCD, संबंधी समस्त कार्य, मातृत्व स्वास्थ्य से संबंधित समस्त कार्य एवं अस्पताल प्रशासन/बायोमेडिकल वेस्ट मैनेजमेंट से संबंधित कार्य में सहयोगी के रूप में कार्य करेंगे। (स्थापना संबंधी नस्ती संयुक्त संचालक के माध्यम से प्रस्तुत किया जावे)
23	डॉ. जी. जगन्नाथा राव	प्रभारी नोडल अधिकारी	FILARIA, JAPANESE ENCEPHALITIS, CHIKANGUNIYA, KALA AZAR, SDG, नीति आयोग, आंकाक्षी जिला से संबंधित समस्त कार्य, (संबंधित नस्ती संयुक्त संचालक/उपसंचालक के माध्यम से प्रस्तुत किया जावे)
24	श्री किशोर चतुर	प्रशासकीय अधिकारी	कार्यालय स्थापना, आवक-जावक, ऑडिट, डाक मार्किंग, विधानसभा शाखा से संबंधित समस्त कार्य।
25	श्री प्रेमशंकर वर्मा	विशेष कर्तव्यस्थ अधिकारी	ग्रामीण चिकित्सा सहायक स्थापना शाखा, छत्तीसगढ़ चिकित्सा मण्डल, त्रिवर्षीय चिकित्सा पाठ्यक्रम, संबंधी समस्त कार्य, HRMIS में अपडेशन एवं HRMIS समन्वय संबंधी कार्य।
26	डॉ. श्रीमती विनीता तिवारी	सहायक लेखा अधिकारी	महालेखाकार से संबंधित कंडिकाओं पर पालन प्रतिवेदन, वेतन निर्धारण, ऑडिट निरीक्षण, लेखा शाखा संबंधी समस्त कार्य, सामान्य भविष्य निधि (जी.पी.एफ.) में व्याप्त गड़बड़ियों में सुधार संबंधी कार्य, पेंशन प्रकरणों से संबंधित कार्य। विज्ञाप/अविज्ञाप/नर्सिंग शाखा के विभागीय जांच संबंधित प्रकरणों, नर्सिंग शाखा एवं महिला उत्पीड़न से संबंधित कार्यों में सहायक नोडल अधिकारी के रूप में।
आयुक्त/संचालक, स्वास्थ्य सेवायें एवं वित्त नियंत्रक द्वारा समय-समय पर सौंपे गए अन्य कार्य।			

आयुक्त, स्वास्थ्य सेवायें द्वारा अनुमोदित।

संचालक  
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पृ. क्रमांक/संचा./स्टेनो/2022/4।

नवा रायपुर, दिनांक 23/03/2022

प्रतिलिपि :-

1. विशेष सहायक, माननीय मंत्रीजी, स्वास्थ्य एवं परिवार कल्याण विभाग, मंत्रालय, महानदी भवन, नवा रायपुर, अटल नगर, जिला रायपुर की ओर सूचनार्थ।
2. प्रमुख सचिव, छत्तीसगढ़ शासन, स्वास्थ्य एवं परिवार कल्याण विभाग, मंत्रालय, महानदी भवन, नवा रायपुर, अटल नगर, की ओर सूचनार्थ।
3. आयुक्त, स्वास्थ्य सेवायें, छ.ग. नवा रायपुर, अटल नगर, जिला रायपुर की ओर सूचनार्थ।
4. मिशन संचालक, राष्ट्रीय स्वास्थ्य मिशन नवा रायपुर, अटल नगर, जिला रायपुर की ओर सूचनार्थ।
5. संचालक, स्वास्थ्य एवं परिवार कल्याण/महामारी नियंत्रण, छ.ग. नवा रायपुर, अटल नगर, जिला रायपुर की ओर सूचनार्थ।
6. प्रबंध संचालक, छ.ग. मेडिकल सर्विसेस कॉर्पोरेशन, छ.ग. रायपुर की ओर सूचनार्थ।
7. संचालक, राज्य स्वास्थ्य एवं परिवार कल्याण प्रशिक्षण संस्थान, रायपुर छ.ग. की ओर सूचनार्थ।
8. परियोजना संचालक, छ.ग. राज्य एड्स नियंत्रण समिति रायपुर की ओर सूचनार्थ।
9. संबंधित अधिकारी ..... स्थानीय कार्यालय की ओर पालनार्थ।
10. डॉ. प्रशांत श्रीवास्तव, संभागीय संयुक्त संचालक, स्वास्थ्य सेवायें, रायपुर संभाग, रायपुर अपने वर्तमान कार्य के साथ-साथ पीसीपीएनडीटी/Surrogacy & ART एक्ट, का कार्य भी संपादित करेंगे।
11. समस्त संभागीय संयुक्त संचालक, स्वास्थ्य सेवायें/मुख्य चिकित्सा एवं स्वास्थ्य अधिकारी/सिविल सर्जन सह मुख्य अस्पताल अधीक्षक, छत्तीसगढ़ की ओर सूचनार्थ प्रेषित।

  
संचालक  
स्वास्थ्य सेवायें  
छत्तीसगढ़

**संचालनालय स्वास्थ्य सेवायें  
छत्तीसगढ़**

इंद्रावती भवन, तृतीय तल, नवा रायपुर

क्रमांक/संचा./स्टेनो/2022/42


नवा रायपुर, दिनांक :- 23/03/2022

-: आदेश :-

संचालनालय स्वास्थ्य सेवायें, छ.ग. में पदस्थ वित्त नियंत्रक/संयुक्त संचालक/उपसंचालक/राज्य कार्यक्रम अधिकारी/राज्य नोडल अधिकारी/राज्य नोडल अधिकारियों को पारस्परिक रूप से एक-दूसरे के नाम के सम्मुख दर्शाए नाम के अनुसार लिंक अधिकारी बनाया जाता है :-

क्र०	अधिकारी का नाम एवं पदनाम	अधिकारी का नाम एवं पदनाम
1	डॉ. सुभाष मिश्रा, संचालक महामारी	डॉ. अल्का गुप्ता, संचालक, SIHFW
2	सुश्री भारती चंद्राकर, संयुक्त संचालक	श्री रविराज ठाकुर, उपसंचालक
3	डॉ. एस.के.पामभोई, संयुक्त संचालक	डॉ. राजेश शर्मा, राज्य कार्यक्रम अधिकारी
4	डॉ. छाया तिवारी, उपसंचालक	डॉ. व्ही. आर. भगत, राज्य कार्यक्रम अधिकारी
5	डॉ. एस.के.बिंझवार, उपसंचालक	डॉ. श्रीकांत राजिमवाले, प्र.उपसंचालक
6	डॉ. अनिल परसाई, प्र.उपसंचालक	डॉ. एस.के.पामभोई, संयुक्त संचालक
7	डॉ. के.सी.उरांव, उपसंचालक	डॉ. शैलेन्द्र अग्रवाल, SPO
8	डॉ. कमलेश जैन, SPO	डॉ. धर्मेन्द्र गहवई, SPO
9	डॉ. डॉ. टी.के.टोण्डर, प्र. उपसंचालक	डॉ. नेतराम बेक, प्र. उपसंचालक
10	डॉ. आनंद राव, SNO	डॉ. जी. जगन्नाथा राव, SNO
11	डॉ. महेन्द्र सिंह, SPO	डॉ. जितेन्द्र कुमार, SPO

यह आदेश तत्काल प्रभाव से लागू होगा।

  
संचालक  
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पृ. क्रमांक/संचा./स्टेनो/2022/43

नवा रायपुर, दिनांक :- 23/03/2022

प्रतिलिपि :-

1. प्रमुख सचिव, छत्तीसगढ़ शासन, स्वास्थ्य एवं परिवार कल्याण विभाग, मंत्रालय, महानदी भवन, नवा रायपुर।
2. आयुक्त, स्वास्थ्य सेवायें, छत्तीसगढ़।
3. मिशन संचालक, राष्ट्रीय स्वास्थ्य मिशन, छत्तीसगढ़।
4. संचालक, परिवार कल्याण/महामारी/राज्य स्वास्थ्य एवं परिवार कल्याण संस्थान/परियोजना संचालक, छत्तीसगढ़।
5. संयुक्त/उप संचालक, समस्त स्थापना शाखा, स्थानीय कार्यालय।
6. संबंधित ..... को सूचनार्थ एवं पालनार्थ।

  
संचालक  
स्वास्थ्य सेवायें  
छत्तीसगढ़