



Ministry of Health and Family Welfare
Government of India

State Action Plan on Climate Change and Human Health Bihar



National Centre
for Disease Control
Government of India



National Programme
on Climate Change
and Human Health

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Part I: Climate Change and Its Health Impacts in Bihar

Chapter 1: Introduction

“The earth, the air, the land, and the water are not being inheritance from our forefathers but on loan from our children. So, we must hand it over to them at least as it was handed over to us. There is a sufficiency in the world for man’s need but not for man’s greed” -Mohandas Karamchand Gandhi

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 in several ways, but the most commonly experienced are increased frequency and intensity of heat waves leading to a 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 exacerbates cardio-respiratory and allergic diseases and certain cancers. Besides these, there is an increase in the transmission and spread of infectious diseases, changes in the distribution of water-borne, food-borne, and vector-borne diseases as well as the frequency of exposure to disasters and malnutrition.

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

India is a signatory to the “Male’ Declaration”, which recognizes the need for strengthening the health sector to make it climate resilient. According to Male’ Declaration, it is desired that the healthcare facilities should be made climate-resilient, with emphasis on encouraging them to withstand any climatic event, and continuity of essential services such as water, sanitation, waste management, and electricity during such events. Further, the health department is to undertake measures to initiate the greening of the health sector by adopting environment-friendly technologies and using energy-efficient services.

In this regard, the initiatives undertaken by the Government of India include the identification of the Ministry of Environment, Forest & Climate Change (MOEF&CC) as the nodal ministry, the formulation of National Environmental Policy, 2006 and the formation of Prime Minister’s Council on Climate Change for matters related to Climate Change. Based on these initiatives, MoEFCC developed the National Action Plan on Climate Change and included Health as one of the missions. The health mission aims to reduce the impact of the 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, the Ministry of Health and Family Welfare (MoHFW) constituted a National Expert Group on Climate Change & Health (NEGCCH) to prepare the 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 National Mission on Health. Under NCDC, the Centre for Environmental and Occupational Health Climate Change & Health (CEOH&CCH), is implementing the National Programme of Climate Change and Human Health (NPCCHH), as a part of which the state of Bihar has prepared its Action Plan on Climate Change and Human Health (SAPCCHH).

The SAPCCHH is a long-term vision and planning document, based on this, district-specific action plans will also be prepared. The 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 Bihar.

Chapter 2: STATE PROFILE OF BIHAR

Located in the eastern part of India, the state of Bihar is entirely land-locked and shared boundaries with West Bengal, Uttar Pradesh, Jharkhand, and Nepal. It covers a total area of 94,163 sq. km. and the mean elevation is 173 feet above sea level. The Ganges flows with its tributaries, including

Figure 1: Administrative Division of Bihar



Physical Features	
Latitude	24°-20'-10"~27°-31'-15"N
Longitude	83°-19'-50"~88°-17'-40"E
Rural Area	92,257.51 sq. kms
Urban Area	1,095.49 sq. kms
Total Area	94,163.00 sq. kms
Height above Sea-Level	173 feet
Normal Rainfall	1,205 mm
Avg. Number of Rainy Days	52.5 days in a year

Gandak, Budhi Gandak, Bagmati, Koshi in the north, while Son, Chandan, and Phalgu flows in the south. The Bihar plain is divided into two unequal halves by the river Ganga, which flows through the

middle from West to East. Bihar state is 12th largest in terms of geographical size (94,163 sq. km) and 3rd largest by population, 10.38 crores as per Census 2011, in the country.

Divisions	9
Districts	38
Sub-Divisions	101
CD Blocks	534
Panchayats	8,406
Number of Revenue Villages	45,103
Number of Urban Agglomerations	14
Number of Towns	199
Police Districts	44
Civil Police Districts	40

Health Care Infrastructure	
No of Medical Colleges	9
No of District Hospitals	36
No. of Sub-divisional hospitals	45
No of Referral Hospitals	67
No of PHCs	533
No of APHCs	1399
No of Health Sub Centers	10258

Bihar has a monsoon climate with an average annual rainfall of 1200 mm. The sub-Himalayan foothills of Someshwar and Dun ranges in Champaran constitute another belt of moist deciduous forests. These also consist of scrub, grass, and reeds. Here the rainfall is above 1,600 mm and thus promotes luxuriant Sal forests in the favoured areas. The hot and dry summer gives the deciduous forests. The most important trees are *Shorea Robusta (Sal)*, *Shisham*, *Cedrela Toona*, *Khair*, and *Semal*. This type of forests also occurs in Saharasa and Purnia districts.

It has subtropical in general, with hot summers and cold winter temperature. This Geo-physical diversity

leads to flood in northern areas while drought in southern part [2,3]. Approximately, 88% people live in rural areas.

The topography of Bihar can be easily described as a fertile alluvial plain occupying the Gangetic Valley. The plain extends from the foothills of the Himalayas in the north to a few miles south of the river Ganges as it flows through the State from the west to the east. Rich farmland and lush orchards extend throughout the state. The major crops are paddy, wheat, lentils, sugarcane, and jute (hemp, related to the marijuana plant, but a source of tough fibres for gunny bags). Also, cane grows wild in the marshes of West Champaran. After the division the state in 2000, Bihar retained almost 75 percent of the population, while it is left with only 54 percent of the land, thus inducing a lot of strain on the available resources.

Bihar is highly flood prone due to its peculiar topography combined with high rainfall during monsoons and the presence of numerous rivers that criss-cross the state. The changing climate and the propensity to higher than usual precipitation can exacerbate the situation of flooding in the state.

Key Statistics - as per 2011 Census (Provisional)		
Population		10,38,04,637
Male		5,41,85,347
Female		4,96,19,290
Population (0~6 Years Group)		
	<input type="checkbox"/> In Absolute Numbers	1,85,82,229
	Male	96,15,280
	Female	89,66,949
	<input type="checkbox"/> Percentage of Total Population	17.90%
	Male	17.75%
	Female	18.07%
Literacy		
	<input type="checkbox"/> In Absolute Numbers	5,43,90,254
	Male	3,27,11,975
	Female	2,16,78,279
	<input type="checkbox"/> Percentage of Total Population	63.82%
	Male	73.39%
	Female	53.33%
Decadal Population Growth (2001-2011)		
<input type="checkbox"/> Absolute		2,08,06,128
<input type="checkbox"/> As Percentage		25.07%
Highest Decadal Growth at	Madhepura District	-30.65%
Lowest Decadal Growth at	Gopalganj District	-18.83%
<input type="checkbox"/> Civil Police Stations		813
<input type="checkbox"/> Railway Police Stations		40

Density of Population		1,106 per sq kms
oHighest Density	Sheohar:	1882 per sq kms
oLowest Density	Kaimur:	488 per sq kms
Most Populous District	Patna:	57,72,804
Least Populous District	Sheikhpura:	6,34,927
Sex Ratio	(Females/Thousand Males)	916
Highest Ratio	(Gopalganj)	1,015
Lowest Ratio	(Munger and Bhagalpur)	879
Highest Literacy Rate	Rohtas	75.59%
Lowest Literacy Rate	Purnia	52.49%
Average Population of a District		27,31,701
(Source – NIC Portal Bihar)		

“Jal, Jeevan, Haryali”, aimed at highlighting the issues related to water, life and the environment in the context of climate change”- Nitish Kumar (Bihar Chief Minister).

Climate Profile of the State

Geologically, Bihar represents the northern front of Indian sub- continent. The geographical and geological feature of Bihar includes the belt of Himalayan foothills in the northern fringe of Paschim Champaran, the vast Ganga Plains, the Vindhyan (Kaimur) Plateau extending into Rohtas region and the small Gondwana basin outliers in Banka district. Nearly two third of Bihar is under cover of the Ganga basin composed of alluvium and masks the nature of basement rocks.

The state has a tropical monsoon climate with three distinct seasons-winters, summer and rainy. The state can be divided into two climate zones; the Sub-Himalayan and the Ganga plain. The winter season exists from December to February, January being the coldest month when temperature falls below 10°C. The winter season is characterized by fog, cold wave and western disturbances. Winter rainfall is received by western disturbances in the state.

The summer season covers the period from April to June, May is the hottest month in the greater part of the area and the maximum temperature some time reaches above 45°C and causes the heat waves of the state. The monsoon season normally starts in the third week of June and lasts up to end of September and downpour accumulated seasonal rainfall of 120-150 cm throughout the state. The rainfall is also triggered by monsoon depression which formed in Bay of Bengal, entered in Bihar and produced wide spread rainfall. During monsoon season, the state experienced flood and drought in almost every year and affect the water resources and agriculture of Bihar.

The state is divided into three agro-climatic zones, which is described below:



Figure 2: Agro-climatic zones of Bihar

Agro climatic Zone	Districts	Area (,000ha)	Average rainfall	Soil and Topography	Crops
Zone - I North West Alluvial Plains	Bettiah, Motihari, Gopalganj, Siwan, Vaishali, Seohar, Muzaffarpur, Samastipur, Sitamarhi, Madhubani, Darbhanga, West & East Champaran	Net Cultivated – 2281; Gross Cultivated -- 3260	1234.7	Medium acidic, heavy textured, sandy loam to clayed, flood prone. (Large area remains under water called Chaur, Maun & Tal lands)	Rice, Wheat, Maize, Arhar; Horticultural crops including Litchi, Mango, Makhana, Water Chestnut.
Zone - II North East Alluvial Plains	Purnea, Katihar, Saharsa, Madhepura, Araria, Kishanganj, Supaul, Khagaria, Begusarai	Net Cultivated – 1147; Gross cultivated -- 1677	1382.2	Light to medium textured, slightly acidic, sandy to silty loam (large area comprise of Tal and Diara lands)	Maize, Mustard, Jute, Sugarcane; Horticultural crops include Mango, Bel, Banana, Papaya, Cucurbit, Chilly, Turmeric, Potato

Zone - III South Bihar Alluvial Plains	3(a) Bhagalpur,Sheikhpur a, Lakhisarai,Jamui, Munger, Banka,3(b) Bhabua, Rohtas,Aurangabad, Buxar,Jahanabad, Gaya,Nalanda, Nawada,Patna	Net Cultiva ted – 241; Gross cultivat ed - 3408	1102.1	Old alluvium to sandy loam.	Rice, Gram, Wheat; Horticultural crops include Mango, Guava, Banana, Bel, Jackfruit, Onion, Potato, Chillies, Marigold
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Figure 3: Flood consequence in North Bihar (Source: WMO)



Chapter 3: Climate Sensitive Issues/Diseases in the State

Climate change poses several threats to the health of the population. The health effects of climate change occur either through the direct effects (changes in temperature and precipitation and occurrence of heat waves, floods, droughts, and fires, etc) or indirect effects (ecological disruptions resulting in crop failures, shifting patterns of diseases' vectors, or displacement of populations).

There are several climate sensitive issues/diseases in Bihar which include:

1. Air Pollution Related Illnesses
2. Heat Related Illnesses
3. Vector Borne Diseases
4. Water Borne Diseases
5. Allergic Diseases
6. Zoonotic Diseases

The state is prone to Climate sensitive illnesses like water borne diseases (Acute Diarrhea), Food borne illnesses (Hepatitis, Bacillary Dysentery, Typhoid), Vector borne diseases like (Dengue, Malaria, Japanese Encephalitis etc) and Acute Respiratory Illnesses. In absolute number under presumptive surveillance, the reporting of the following disease/conditions increased over time- acute respiratory infections, fever of unknown origin and acute diarrheal diseases. Among the vaccine preventable diseases, measles and chicken pox were mostly reported. About 23 confirmed cases of Diphtheria cases were reported in 2012, which was only 2 in 2011. No confirmed Diphtheria case was captured after 2014. Lab-confirmed Dengue cases appeared to be high in 2019 ((3232).

Bihar is also among one of heat vulnerable states in India and several cases related to heat injuries have been reported in some southern districts including Gaya, Rohtas, Buxar, Aurangabad, Nawada and Nalanda districts.

Air Pollution Related Illnesses

In Bihar, vehicular emissions in urban agglomerations, domestic fuel use, open waste burning, brick kilns, agricultural activities and industries are the major sources of air pollution [13, 14]. Some of the important pollutants resulting in local pollution by exhaust emissions include Sulphur dioxide (SO₂), nitrogen oxides (NO₂), carbon monoxide (CO), hydrocarbon (HC), volatile organic compounds, toxic metals, lead particles and particulate matter (PM) including black carbon [13]. These changes in air quality can have negative impact on health and can cause allergy, cardio-respiratory, cardio-pulmonary diseases, and cancers. Bihar being a poor state which is also densely populated, rely mostly on firewood, coal, dung – cakes, etc. as a primary source of cooking. The smoke coming out from such sources cause alarming indoor pollution and adversely affects the health of women, children, and the elderly causing

several respiratory diseases[15, 16]. A report published by WHO stated that the smoke inhaled by women from unclean fuel is equivalent to burning 400 cigarettes in an hour[17]. To combat this exposure, the Pradhan Mantri Ujjwala Yojana was launched in Bihar with the aim to protect the health of women and children by providing them with clean cooking fuel so that they don't have to compromise their health in smoky kitchens with firewood.

The Bihar State Pollution Control Board [18] identified three non-attainment districts in the state—Patna, Muzaffarpur and Gaya. The air pollutants of concern are PM₁₀, PM_{2.5} and NO₂. Higher-levels of such pollutants are usually observed during the months of November to February. The air quality at Patna is regularly monitored through six continuous ambient air quality monitoring station (CAAQMS) reporting on PM₁₀, PM_{2.5} and NO₂. Similarly, there are three such CAAQMS in Gaya and Muzaffarpur for monitoring air quality. In addition, information regarding Air Quality Index is available on SAMEER app developed by the Central Pollution Control Board and e-Paryavaran app by the Bihar State Pollution Control Board. However, for better monitoring of air quality and calculation of emission load, about 35 additional CAAQMS are proposed to be installed across 23 districts by the higher-level Government officials [18].

Air Quality Index (AQI):

Air Quality Index is a tool for effective measurements of atmospheric air quality representation of various pollutants into a single number or index value, nomenclature and colour.

Air Quality Index (AQI) Category	
Good	0-50
Satisfactory	51-100
Moderately Poor	101-200
Poor	200-300
Very Poor	300- 400
Severe	401-500

AQI: Comparison across three districts in Bihar between 2017 and 2022 (Aug, 4)

Patna

No. of days	2017	2018	2019	2020	2021	2022 (Aug, 4)
Satisfactory	170	178	168	271	223	120
Poor	174	187	157	95	141	96

Gaya

No. of days	2017	2018	2019	2020	2021	2022 (Aug, 4)
Satisfactory	150	188	206	310	326	195
Poor	76	164	99	36	35	17

Muzaffarpur

No. of days	2017	2018	2019	2020	2021	2022 (Aug, 4)
Satisfactory	224	200	110	228	222	124
Poor	140	158	131	121	132	90

Source: Bihar State Pollution Control Board [19]

Acute Respiratory Infection (ARI) or Pneumonia

Respiratory diseases such as pneumonia under presumptive surveillance has been on a steady rise with 54927 cases in 2010, 70076 cases in 2011, 104556 cases in 2012 followed by a marginal decline in 2013. It constituted 1% of the total reported cases in 2016 and <1% in 2017.

Acute Respiratory Infection (ARI) or Influenza like Illness

The number of Influenza like illness captured under the Integrated Disease Surveillance Program (IDSP) have substantially increased accounting to 1157977 cases in 2017 while it was 837456 in 2010, 1590227 in 2011, 3512752 in 2012. ARI cases constituted 38% of the total reported cases in 2013 and 35% of the total cases reported in 2016 while it was 36% in 2017.

ARI burden in Bihar

Table showing the Year Wise Cases of Acute Respiratory Illnesses attributed to Air Pollution in 38 districts of Bihar with reference to change in recent years.

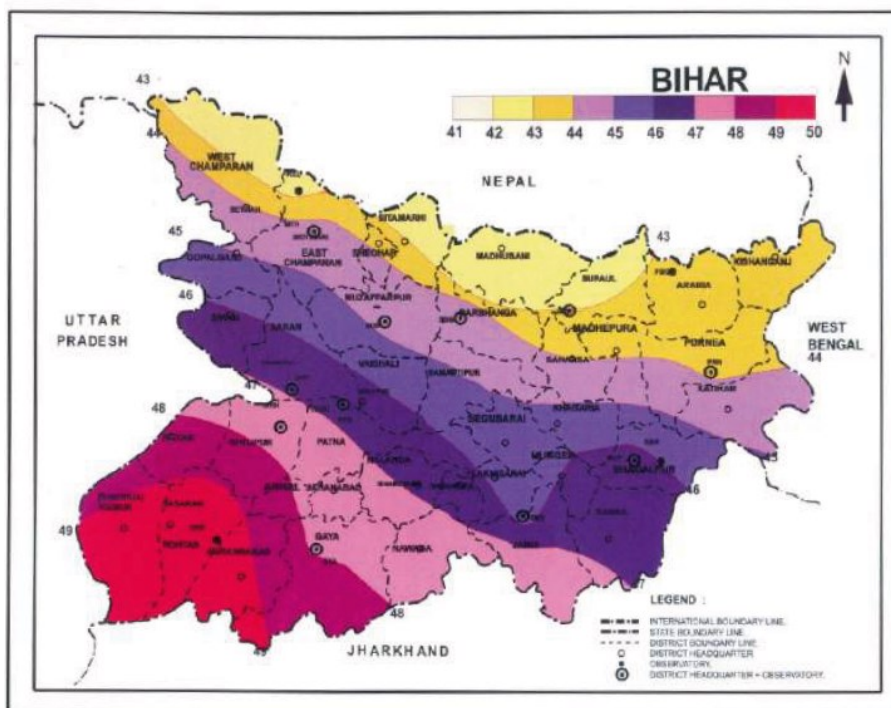
Sl.No	District	Year Wise Cases of Acute Respiratory Illnesses									
		Year									
		2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
1	Araria	2489	9719	3750	5090	3974	4015	7343	5738	26264	10121
2	Aurangabad	15123	28027	22215	19248	17858	12841	7320	4751	4610	3035
3	Arwal	1255	8163	16504	26415	22376	26781	8772	4049	5405	6797
4	Banka	894	20636	10771	54974	49757	56212	37493	40584	1476	12
5	Begusarai	5321	17483	85059	199289	173939	102644	73422	49610	49997	34789
6	Bhabhua	0	10487	20427	54126	40250	34613	19793	21369	17762	10468
7	Bhagalpur	4352	5159	13907	22574	29330	13682	44808	27834	16877	9650
8	Bhojpur	14684	24384	52675	83863	110159	94461	59280	39450	53398	71938
9	Buxar	2070	18390	44369	75976	47405	58930	37912	49313	33790	25434
10	Darbhanga	599	6463	37719	68278	83244	54919	17970	32183	38714	41537
11	Gopalganj	0	18942	88251	85197	83900	84035	68603	64841	60185	36008
12	Gaya	9969	76715	84619	82041	76314	74498	45310	24643	0	0
13	Jahanabad	8515	20934	45844	37700	48755	44622	31287	36690	39369	52753
14	Jamui	5796	31973	56969	79078	94158	82648	66456	77468	87020	101225
15	Khagaria	2320	15705	32719	43566	51877	84752	61504	95133	83524	71406
16	Kishanganj	2906	18612	45411	36707	34758	9558	7109	7017	11093	20087

17	Katihar	4615	26879	53500	57054	53979	37482	32278	30196	25260	20725
18	Lakhisarai	6611	27422	33895	26988	32214	18622	10344	6655	1779	588
19	Madhubani	23438	44591	108877	123651	112352	86092	54482	49322	40955	40895
20	Madhepura	5377	0	15089	29827	25572	11621	3329	1121	4619	2900
21	Munger	21426	42412	52894	46985	41266	31364	23786	39503	38928	52154
22	Muzaffarpur	22372	37025	41679	32040	57824	54750	39050	44295	38804	18678
23	Nawada	1828	2853	34973	43696	29466	18913	10654	8962	6364	5895
24	Nalanda	0	27906	53229	50398	39870	25322	17791	14067	20822	15702
25	West Champaran	1380	12545	30273	61843	69496	53315	32225	32243	30872	24325
26	Patna	13774	55214	59402	65423	67591	46897	30550	20555	20949	8725
27	East Champaran	238	8111	1759	11557	24987	10913	0	1541	0	0
28	Purnia	7994	30370	11895	30496	45455	56914	39367	54063	62241	60638
29	Rohtas	510	22585	73748	65441	77197	74360	65227	42218	48540	35810
30	Saharsa	10697	36219	73601	84232	104521	75819	77704	59737	45173	14280
31	Shekhpura	6013	35445	50428	43974	39307	34730	15627	4328	2696	2079
32	Sheohar	783	640	0	4567	5896	10465	8400	5529	3935	4450
33	Sitamarhi	1171	7664	53655	74820	62313	48628	42392	35758	38865	15168
34	Samastipur	683	10389	99617	108709	86406	74991	78041	71614	75621	78890
35	Saran	1702	19133	5294	25422	32035	24613	21857	8871	12704	7869
36	Supaul	1146	7842	10290	11400	7353	6276	4758	6675	3804	8937
37	Siwan	10162	44117	61636	72167	75275	79016	78201	80079	91522	0
38	Vaishali	3989	1911	40054	61596	77844	101046	100953	116045	84481	98290
TOTAL		222252	833065	1626997	2106408	2136273	1821360	1381398	1314050	1262881	10967 39

Heat Related Illnesses

Indian sub-continent is experiencing rapid warming, particularly since the 1980s. As per IMD's (2019) analysis, the annual mean temperature during the 1901-2018 period showed an increasing trend of 0.6°C/100 years.

Bihar has been traditionally highly vulnerable to heatwaves and by extension, heat related illnesses.



Source: India Meteorological Department, Patna Office, Bihar

Figure 4: Highest temperature ever recorded in Bihar

As is clear from the Figure (Figure 4), most areas in the state have recorded maximum temperature exceeding 40 degree Celsius, with some places along the southeast recording temperatures in the late 40s.

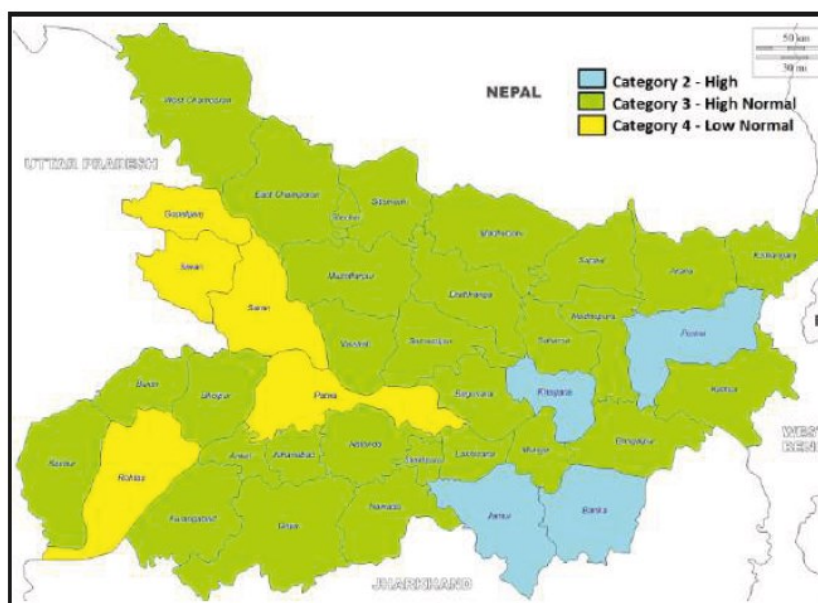
Vulnerability to Heatwaves

Based on the Heat Vulnerability Index (HVI) prepared by a consortium of organisations led by IIPH-Gandhinagar, 29 districts fall under the “high normal” category, four in the high category and five in the low normal

Sl No	District	Heat Vulnerability
1	Purnia	High
2	Banka	High
3	Jamui	High
4	Khagaria	High
5	Pashchim Champaran	High Normal

6	Madhubani	High Normal
7	Darbhanga	High Normal
8	Nawada	High Normal
9	Kaimur (Bhabua)	High Normal
10	Sitamarhi	High Normal
11	Madhepura	High Normal
12	Aurangabad	High Normal
13	Jehanabad	High Normal
14	Gaya	High Normal
15	Munger	High Normal
16	Purba Champaran	High Normal
17	Bhagalpur	High Normal
18	Kishanganj	High Normal
19	Katihar	High Normal
20	Vaishali	High Normal
21	Begusarai	High Normal
22	Samastipur	High Normal
23	Sheikhpura	High Normal
24	Bhojpur	High Normal
25	Buxar	High Normal
26	Sheohar	High Normal
27	Araria	High Normal
28	Supaul	High Normal
29	Muzaffarpur	High Normal
30	Arwal	High Normal
31	Saharsa	High Normal
32	Lakhisarai	High Normal
33	Nalanda	High Normal
34	Rohtas	Low Normal
35	Gopalganj	Low Normal
36	Siwan	Low Normal
37	Saran	Low Normal
38	Patna	Low Normal

Source: Heat Vulnerability Index-IIPHG



Source: India Meteorological Department, Patna Office, Bihar

Figure 5: Districts in Bihar categorised as per the Heat Vulnerability Index

Vector Borne Diseases

All the VBDs are climate sensitive as the pathogens have to complete a part of their development in particular species of the insect vector that transmit them. The temperature, rainfall and relative humidity (RH) affect the development of vectors.

Priority Diseases in Bihar

Table showing Laboratory confirmed cases of key vector borne disease over the years (2009-2019) as per annual, monthly and weekly reports of IDSP, Bihar

Cases of Priority disease over the years as per IDSP annual, monthly and weekly reports, Bihar											
Disease	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Chikungunya	0	0	80	10	4	2	3	378	186	21	238
Malaria Pv	311	566	1567	2373	2505	1258	1610	1618	1286	620	937
Malaria Pf	1025	528	1079	1029	888	524	781	596	423	252	196
Kala-azar	21318	23084	25009	16056	9929	7615	6905	4773	4127	NA	NA
Japanese Encephalitis	1	0	159	63	37	15	30	55	39	12	3
Dengue	16	1125	46	350	2206	284	1296	1201	640	807	3232

Extreme Weather Events

Bihar due to varied geography is very vulnerable to different types of natural hazards. Available evidence shows that there is high probability of increase in the frequency and intensity of climate related natural hazards due to climate change and hence increase in potential threat due to climate change related natural disasters in India, and Bihar is no exception to this. It is highly vulnerable to hydro-meteorological natural disasters, with North Bihar in general being highly flood-prone, and South Bihar being highly drought prone. In the (relative) absence of state level climate models and/or vulnerability studies, as well low community awareness, Bihar is potentially more sensitive and vulnerable to the climate change and its impacts.

Earthquakes:

Being located in the high seismic zone perched on the boundary of the tectonic plate joining the Himalayan tectonic plate near the Bihar-Nepal Border and having six sub-surface fault lines penetrating through its Gangetic planes in four directions, Bihar is vulnerable to the worst kind of disaster caused by earthquake of near maximum intensity.

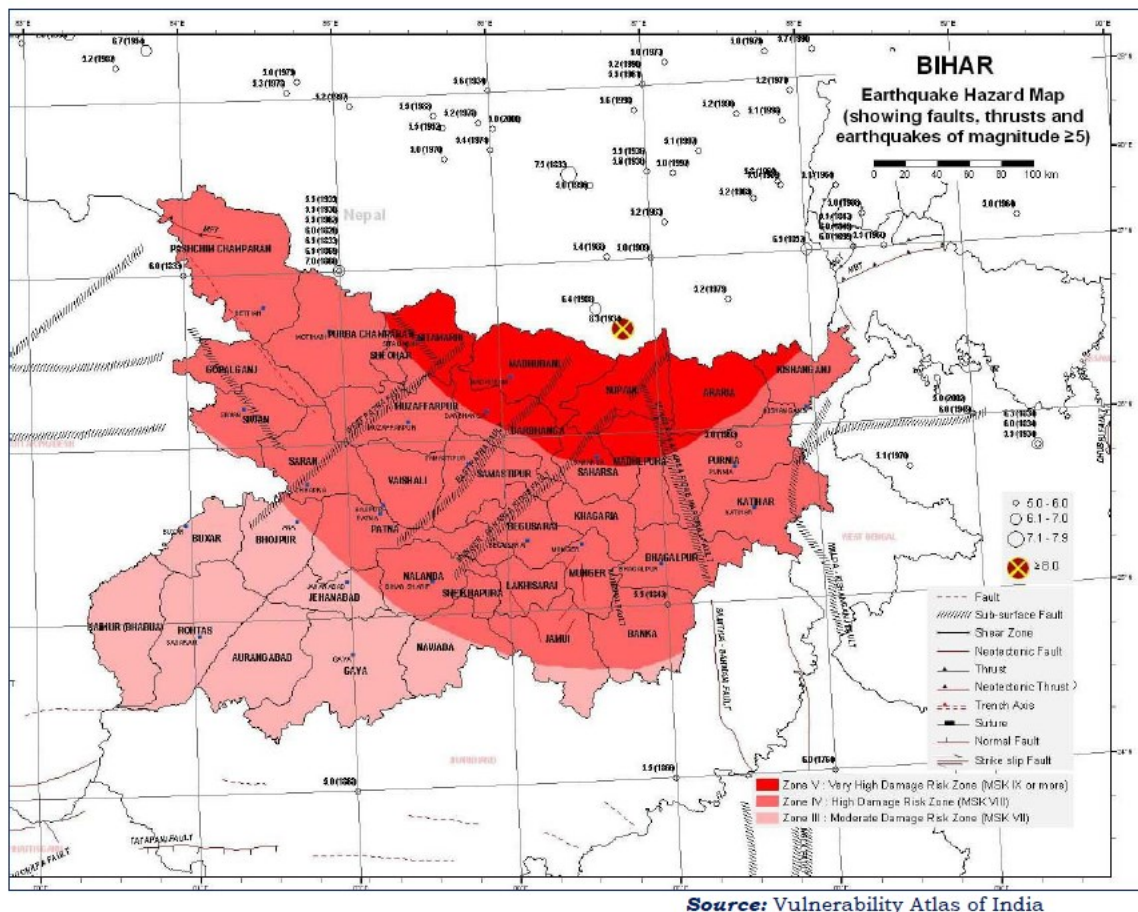


Figure 6: Earthquake prone areas of Bihar

Drought:

A state so rich in water bodies, ironically also suffers from severe droughts. Bihar often faces drought situation of different scales/levels that intrinsically lead to famine-like situations. Climatically, the state of Bihar lies on the cross-roads of the wet eastern coastal regions and the relatively dry continental region of the western plains. Being on the threshold of transition zone there happens regional variations in rainfall distribution as well as rainfall variability. Although, the average rainfall in Bihar is 1120 mm, but considerable variations occur with 2000 mm in the extreme eastern and northern part and less than 1000mm in the western and south-western part of the state. As a result 33% of the State receives less than 750 mm rainfall, making the southern part of Bihar vulnerable to drought. Even the 35% of north-eastern part of Bihar that receives around 1120 mm rainfall suffers drought once in four to five years due to scanty rains.

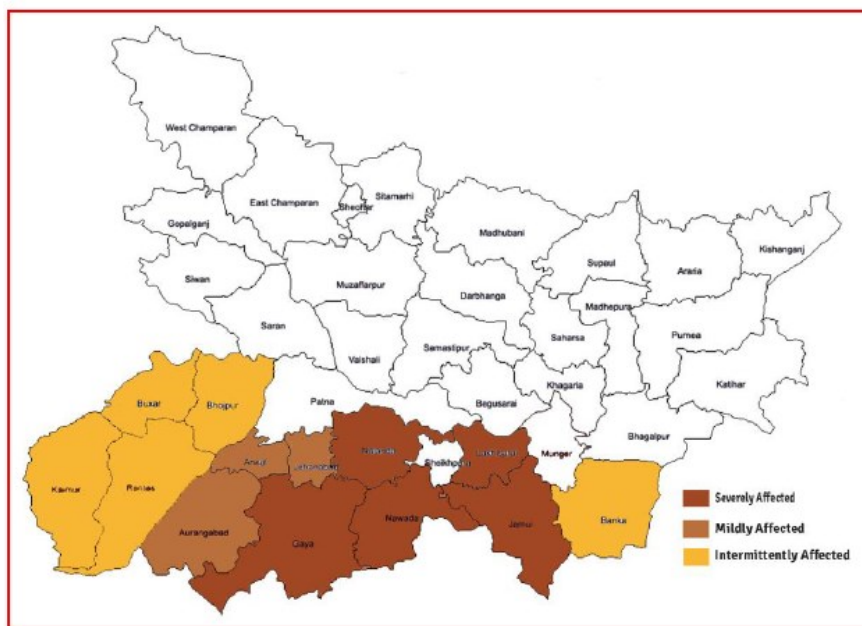
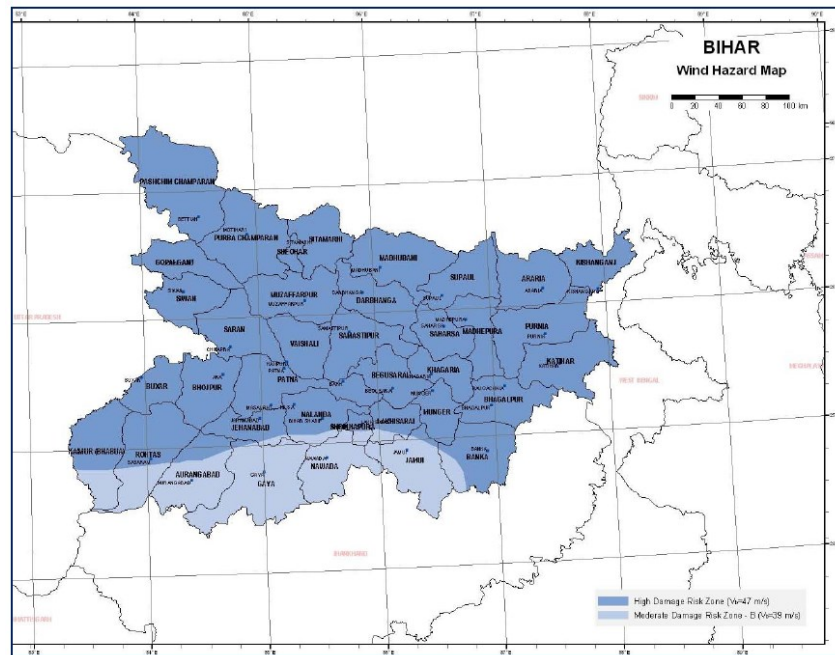


Figure 7: Drought Prone Areas of Bihar (Source: SDMA)

Cyclone:

86% of the total area of Bihar falls in high damage risk zone of cyclone of 47 m/s velocity which means that a population of 8,92,71,990 consisting of 4,26,72,589 women, 1,59,80,720 children of 0—6yrs. of age and 2,96,38,300 SC/ST and minorities living either in 40,64,253 mud houses or in 74,10,477 brick walled houses or in 59,37,526 houses of other materials out of which 68,60,143 are thatched with lightweight materials; 59,72,988 with heavy weight materials and 47,21,166 have flat roofs.



Source: Vulnerability Atlas of India

Figure 8: High Speed Wind/Gale /Hail Storm Prone Areas

Floods:

The area worst affected by floods in the state is 56% of its total geographical area covering 28 out of 38 districts. But the nature and causes of floods vary from one geo-cultural zone to another although the end result is the same: inundation, siltation and erosion.

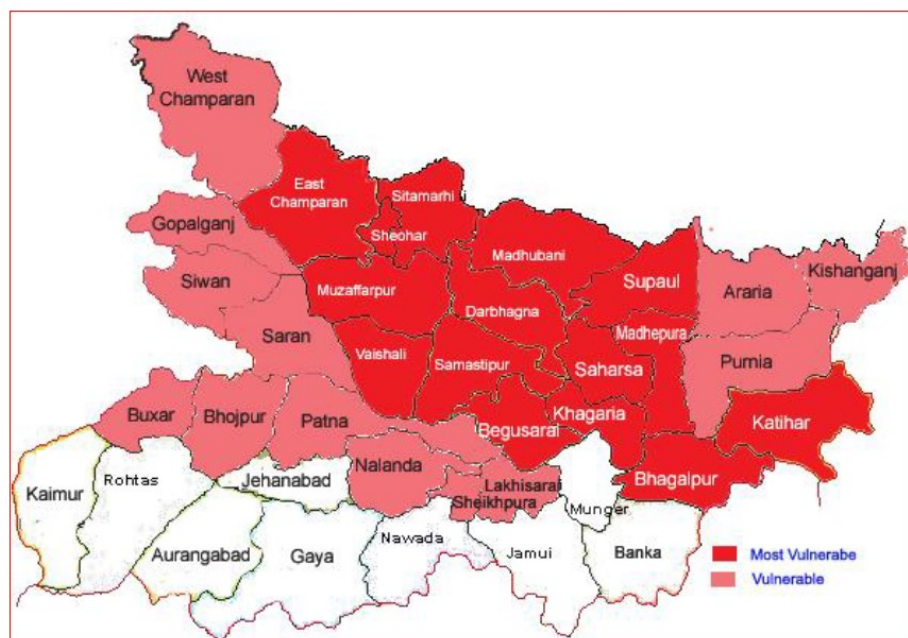


Figure 9: Flood prone areas of Bihar (Source: SDMA, Bihar)

District Wise Climate Vulnerability Index:

Eight districts from Bihar feature in the top most climate vulnerable districts in the country according to the Climate Vulnerability Index prepared by CEEW¹

SI No	District	Climate Vulnerability	National Rank
1	Madhepura	Flood & Drought	3
2	Banka	Flood & Cyclone	4
3	Sitamarhi	Flood & Drought	4
4	Paschim Champaran	Flood	6
5	Darbhanga	Flood, Drought & Cyclone	7
6	Khagaria	Flood	8
7	Araria	Flood	9
10	Lakhimpur	Flood	10

¹ <https://www.ceew.in/publications/mapping-climate-change-vulnerability-index-of-india-a-district-level-assessment>

Chapter 4: NAPCCHH: Vision, Goal & Objectives

Vision:

To strengthen health of Bihar people against climate sensitive illness, especially among the vulnerable like children, women, and marginalized population.

Goal:

To reduce morbidity, mortality, and injuries attributable to climate change and extreme weathers

Broad Objective

To build capacity of health care services against adverse impact of climate change on human health

Specific Objectives

Objective 1:

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

Objective 2:

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

Objective 3:

To perform situational analysis to strengthen preparedness and response at district/block levels to cope with adverse health impacts of climate change related disasters.

Objective 4:

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

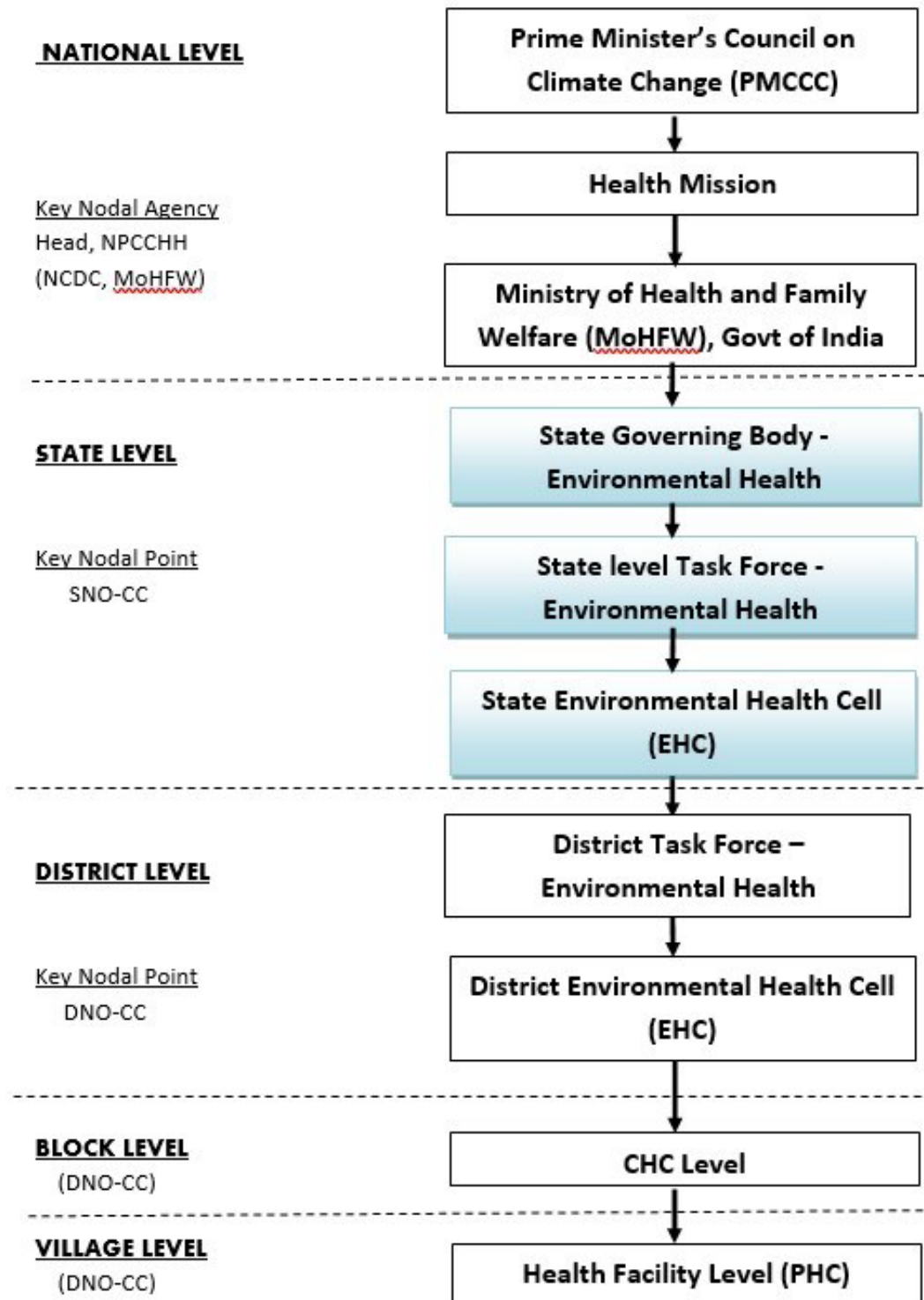
Objective 5:

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

Objective 6:

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

NPCCHH: Organisational Framework



The responsibility for implementation of the State Action Plan for Climate Change and Human Health (SAPCCHH) will be under the chairmanship of the Honourable State Health Minister.

The proposed State Level Structure of the Governing body will be:

1. Honorable State Health Minister (Health)
2. Mission Director-National Health Mission
3. Director Public Health
4. Director Health Services, Medical Education
5. Department of Environment & Health
6. State Public Health Laboratory
7. Animal Husbandry
8. Principal Medical Colleges
9. State Program Managers for communicable diseases

State Level –Governing Body for implementing NPCCHH

Members	Designation
Additional Chief Secretary (Health)	Vice Chairman
Director Health Services	Member Secretary
Executive 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 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

State Level Task Force

This task force shall be working under the guidance of Additional Chief 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. It shall be working through Directorate of Health Services (DHS) of the state, which will be the implementing agency for SAPCCHH.

State Level Task Force Committee Bihar:

Members	Designation
Additional Chief Secretary -Department of Health	Chairman
Executive Director-National Health Mission	Vice Chairman
Director Health Services	Member Secretary
Secretary -Department of Environment, Forests & Climate Change	Member
Additional Chief Secretary -Department of Disaster	Member
Additional Chief Secretary -Department of Education	Member
Secretary -Department of Agriculture	Member
Additional Chief Secretary -Department of Minor Water Resource	Member

Additional Chief Secretary -Department of Water Resource	Member
MGNREGA Commissioner CEO Jeevika -Department of Rural Development	Member
Additional Chief Secretary -Department of Panchayati Raj	Member
Secretary -Department of Transport	Member
Principle Secretary -Department of Animal Husbandry	Member
Principal Secretary -Department of Public Health Engineering	Member
Additional Chief Secretary -Department of Road Construction	Member
Additional Chief Secretary -Department of Urban Development & Housing	Member
Additional Chief Secretary -Department of Planning	Member
Vice Chairman, Disaster Management Division	Member
Secretary -Department of Social Welfare	Member
Secretary -Department of Information & Public Relation	Member
Director, Meteorological department of State/UT	Member
Secretary -Department of Building Construction	Member
Principal Secretary -Department of Energy	Member
Additional Chief Secretary -Department of Art, Culture & Youth	Member
Secretary cum Legal Remembrancer -Department of Law	Member
Chairman, State Pollution Control Board	Member
Regional Director -Health &Family Welfare (GoI)	Member
Addl Director, Medical Education, Health Dept,	Member
State Nodal Officer-Climate Change & Human Health	Member
Director, RMRI, ICMR Institute	Member
State Surveillance Officer, State Health Society	Member
Head, NCDC Branch of the state	Member
Environment Engineer/Scientist, Department of Environment	Member
State Epidemiologist, State Health Society	Member
All SPO, SPM, NHM/NUHM, State Health Society	Member
State Consultant, Environment Health, Vital Strategies	Member
Team Lead, PATH	Member

Roles and Responsibilities of the State Task Force

- Developing a framework for building an organizational structure for conducting/reviewing state-level program activities
- Designing, planning 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.
- Need assessment for health care professionals (like training, capacity building) and organize training, workshop, and meetings.
- Maintain State and District level data on epidemiological profile for climate sensitive illnesses, required logistic support & budget.
- Ensure convergence with NHM activities and other related programs in the State/ District
- Monitor program, review meetings, Field observations by supervisory visits.
- Timely issue of warning/ alerts to health professionals and related stakeholders as well as public through awareness campaign or using social media
- 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.)
- To conduct quality research on climate change and its impact on human health.

Proposed State Level Structure of Environmental Health Cell (EHC):

State Environmental Cell	Name
State Nodal Officer-NPCCHH	Dr. Ranjeet Kumar (9801254934)
State Surveillance Officer, State IDSP cell	
State Epidemiologist, IDSP Cell	Dr. Ragini Mishra (9471007301)
Consultant-Environmental Health	--
State Data Manager & Analyst, IDSP cell	
Data entry Operator, IDSP cell	

Executive Members of EHC

State Nodal Officer-Climate Change	Designation
State Program Manager–NHM/NUHM	Member
SPO/NCD	Member

SPO NVBDCP	Member
SPO Immunization/Family Welfare/Maternal Health /Child Health /RKSK/Mental Health	Member
State Surveillance Officer	Member
Head, State Nutrition Bureau	Member
Consultant, SHSRC	Member
Additional Director, IEC/State Mass Media	Member
State Epidemiologist, IDSP	Member
State Veterinary Consultant	Member
State Microbiologist, IDSP	Member

District Level

A District Level Task Force will be constituted by the District Nodal Officer- Climate Change in consultation with the SNO-CC.

At District level, District Medical/ Health Officer (Additional Chief Medical Officer) will oversee the implementation regarding climate related programs. The Medical Officer will be the nodal officer for all the activities.

The proposed District Level Structure is as follows:

- District Magistrate
- Medical Officer
- District Epidemiologist
- Data Entry Operator

Proposed Structure of District Level Task Force-Environmental Health

District Environmental Cell	Designation
District Magistrate	Chairman
Civil Surgeon (CS), District Nodal Officer–Climate Change	Nodal Officer
District Additional Chief Medical Officer (ACMO)	<i>Member Secretary</i>
District Epidemiologist, IDSP cell	Member
District Program Manager- NHM	Member
District Head, 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 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.

Structure at District Environment Health Cell

District Nodal Officer- Climate Change	Chairman
District Veterinary officer	Member
District RCH officer/FW Officer	Member
District Epidemiologist	Member
District Microbiologist (Medical College & Hospital)	Member
District Immunization Officer	Member
District Training Officer	Member
Data Manager/Data entry operator	Supporting staff

As per the NAPCCHH Guidelines, the details of Nodal Officer and experts in Governing Body, Task Force, The State EHC, District EHC, CHC level cell, Health Facility Level – like designation details are provided in the SAPCCHH.

Roles and Responsibility of key members of State Task Force

Sr. No	Task force Member	Role and Responsibility for Climate Change in state
1	SNO-CC	<p>i. Representative from the state Integrated Disease Surveillance Program (IDSP) will be acting as the state nodal officer for climate change.</p> <p>SNO will supervise the overall activities related to climate change at the state and district levels which included development/finalization of IEC materials & its dissemination to all districts, planning for capacity building & training, fund mobilization, organizing meetings/seminars/workshops and liaising with other related departments for multisector collaboration</p> <p>ii. Another one or two consultants is proposed to be recruited for coordinating and supporting the activities that will be carried out by the SNO</p> <ul style="list-style-type: none"> • Co-ordinate with Directorate of Medical Education to • To collect and compile data of patients with respect to climate change including Air Pollution • To assist research on Air pollution impact on Health initiated by central/state govt ministry, ICMR or any other agencies
2	Principal/Director from any research Institute/Apex Institutes/Medical Colleges	To create evidence of Climate Change on Human Health by undertaking various studies, research for the same
3	Director, Meteorological department	<ul style="list-style-type: none"> • To provide timely data of temperature, rainfall, windspeed or any other relevant meteorological factors having relation with increase or decrease of air pollution for particular city/district • To give inputs for reducing air pollution in relation to meteorological factors or any other impact
4	Chairman, State Pollution Control Board	<ul style="list-style-type: none"> • To provide Air Quality Data for the cities identified under the Sentinel Surveillance for assessing impact of Air Pollution. • To undertake measures to reduce the Air pollution and improve quality of air. • To monitor the progress of activities undertaken for reduction of Air Pollution.
5	Chairman, State Disaster Management Authority	<ul style="list-style-type: none"> • To monitor the situation of the climate change in different Districts of states.
6	State Surveillance team under IDSP	<ul style="list-style-type: none"> • To plan, implement and monitor regular data collection on specific indicators related to climate change and conduct analysis to understand the trend • To prepare and disseminate IEC on regular basis to raise awareness among the targeted population • To plan, strategize and provide training on climate change and human health

Role and responsibilities of District and Block Health Officers under NPCCHH

District Nodal Officer (DNO)	<p>District Epidemiologist under IDSP cell will be acting as the district nodal person</p> <ul style="list-style-type: none"> a. To constitute a district-level task force engaging members from various departments—District Malaria officer/Vector-borne Disease, District Disaster management authority, Department of Agriculture, Department of Water and Sanitation, Department of Animal Husbandry, Department of Rural Development, Department of Education, Department Public Health Work, District Pollution Control Board & Social Welfare b. To develop a District Action plan for Climate Change and Human Health with support from the district-level task force c. To ensure quarterly meeting by the District task force in order to track the progress and bottlenecks of implementation; Also, to draft, revise and update the district action plan d. To conduct IEC campaigns and sensitization workshop at least once quarterly e. To provide facility level training at the block PHC/CHC/SHC/DH of the key officials f. To conduct vulnerability assessment and risk mapping of commonly occurring climate sensitive illnesses g. To monitor, supervise and maintain the database for climate sensitive illnesses
Block Health Officers	<p>Medical-officer in charge (MOIC) will be overall in-charge for climate change in each block</p> <ul style="list-style-type: none"> a. To support DNO in all above-mentioned activities and planning for conducting such initiatives b. To ensure distribution and access to IEC materials in the block under his/her jurisdiction, micro-planning for training of target audience within a stipulated timeframe c. Creating block-level WhatsApp groups involving all key persons for overall supervision of actions, sharing IEC materials, dates for official meetings, workshops/trainings

Initiatives taken by the state and proposed strategies towards impact of climate change on health

To reduce preventable morbidity and mortality related to climate change, the Bihar Government developed a State Action Plan on Climate Change and Human Health (SAPCCHH) aligned to the National Action Plan for Climate Change and Human Health with special focus on vulnerable population including women, children and elderly people. The state has established a State Task Force as a part of SAPCCHH and the first meeting was held under the chairmanship of Principal Secretary Health in 2019.

The state has planned the following activities/strategies to be implemented in order to make health facilities more resilient to climate change (climate-related shocks and stresses) in the next 5-year (2022-2027)

To raise awareness and understanding the adverse effects of climate change on health among public in general with special focus on vulnerable population including women, children and elderly

To create awareness among policy makers and other stakeholders on climate change and human health

To enhance state preparedness and response by strengthening the healthcare system and capacity building of health care providers through regular training, orientation, and handholding up to district level and below.

To integrate and develop synergy with other related departments.

To conduct quality research to support evidence-based policy decision on climate change and human health.

The state has also identified 10 components to make healthcare system more resilient to climate change such as:

- Leadership and governance
- Health workforce
- Vulnerability, capacity and adaptation assessment
- Integrated risk monitoring and early warning
- Health and climate research
- Climate-resilient and sustainable technologies and infrastructure.
- Management of environmental health determinants
- Climate-informed health programs
- Emergency preparedness and management
- Climate and health finance

In addition, the state initiated a prospective surveillance on acute respiratory illnesses (ARI) seeking care in four tertiary care hospitals in the capital city, Patna during 2018-2020. All probable cases related to respiratory illnesses were captured reporting to either emergency or out-patient department of Medicine, Pediatrics, Chest medicines on a daily basis using an offline online synchronized application. Each case was also linked with AQI in collaboration with the state pollution control board with the objectives of identifying cases related to air pollution This initiative got badly affected by COVID pandemic and data collection process stopped in mid-2020.

Few studies related to climate change and human health have been conducted in the state to generate evidence for policy decisions in recent past

Part 2: Health Adaptation Plans for Climate Sensitive Illnesses

I. Health Action Plan on Air Pollution Related Diseases

Activities related to Information, Education and Communications (IEC) for creation awareness and sensitization for Air Pollution and its impact on health

- ✓ Translation of IEC content provided by the NCDC/NPCCHH to culturally appropriate local language regarding the awareness messages on impact of air pollution and health and development of IEC on climate sensitive issues related locally to the state and district by the state IEC cell, invitation to tender and plan to receive to the printed materials
- ✓ Target population will be vulnerable groups including elderly population, under-five children, pregnant women and people with other comorbidities including respiratory illnesses, cardiac problems etc. and outdoor workers
- ✓ Target places will be three non-attainment districts in the state—Patna, Muzzafarpur and Gaya.

Dissemination Plan for IEC activities on Air Pollution, NAPCCHH, Bihar

IEC type	Material	Dissemination timeline	Dissemination mechanism
Advisory	As developed by NCDC, MoHFW	By February	Emails/WhatsApp from State Nodal to District Nodal for further instructions to block health facilities
Early Warnings	AQI level & Health Hazards	By February	Health Departments, other Govt. offices, District Hospitals, public places & official websites, applications Newspaper Social Media
Posters	12 posters on Air Pollution & Human Health in English & 3 posters in Hindi as suggested by NPCCHHIEC https://ncdc.gov.in/WriteReadData/1892s/12404500311654851896.pdf	By March	Printing for state-level dissemination at major public places, Health Facilities Email to DNO for printing for district-level dissemination in health facilities, schools & other important public places
Wall painting	Above mentioned IEC materials	By March	Selected schools, health facilities & important public places
Hoardings	Above mentioned IEC materials	By March	To be displayed at selected places following discussions with Patna Municipal Corporation

Audio-Visual	3 audio jingles in Hindi & 2 video messages in both English & Hindi as suggested by NPCCHHIEC	By March	To be played twice a day between November and March when the air pollution is maximum
Digital display	4 GIFs as developed by NPCCHHIEC	By March	Major hospitals in non-attainment districts & public places
Social media	Selected materials as mentioned above	By March	Official WhatsApp groups

Preparatory work for IEC dissemination

Activities	Department & Nodal person
Hindi translation of IEC materials if required Designing and formatting of any new Hindi material Printing	State IEC cell/State IDSP unit Dr. Ranjeet Kumar

Observance of important environment health days for air pollution and health related

Day	Activities
August 9, Bihar Prithvi Diwas	To protect environment by planting saplings on this day by more engagement of general people

Capacity Building Activities

A. Training materials

Training modules, guidelines, handbook etc. available at NCDC website under NPCCHH guidelines

- Health Adaptation Plan for Disease due to Air pollution
- Health Sector Preparedness for Air Pollution
- Handbook for Health Professionals on Air Pollution and its impact on Health
- Women Training Manual
- Children Training Manual
- Traffic Police Training Manual
- Municipal Worker Training Manual

B. Training Institutes

State-level: State Institute of Health & Family Welfare.

District- level: District Headquarter

Annual training plan for Air Pollution and Health under NPCCHH, Bihar

Training program for	Trainer	Topics	Timeline
District level (DNO-CC)	State-level trainers, SNO-	Air pollution & it's impact on Health Prevention & control of Air pollution	March-April, 2023

	CC, Consultant	District-level preparedness & surveillance	
Health facility level (Medical officers/Block Health Managers)	District level trainers, DNO-CC	Air pollution & it's impact on Health District-level preparedness & surveillance Specific roles & responsibilities of Medical officers in surveillance	March-April, 2023 Refresher training/Review quarterly
Frontline workers (ANM, ASHA, JEEVIKA)	State & District level trainers	Air pollution & it's impact on Health Surveillance & reporting of probable cases	March-April, 2023 Refresher training/Review quarterly
Panchayati Raj Institutions	District level trainers	Air pollution & it's impact on Health	March-April, 2023

C. Strengthening Health Sector Preparedness through surveillance.

Plan has been designed as per the NCDC guidelines (NPCCHH: Health Adaptation Plan for Disease due to Air Pollution)

The surveillance for probable respiratory cases in health facilities in areas with high air pollution will be conducted in three non-attainment districts of the state: Patna, Muzaffarpur and Gaya

The sentinel sites in these districts have been identified for the surveillance:

Sentinel Sites	Districts	Nodal person in the hospital
1. Patna Medical College & Hospital	Patna	HOD, Department of Chest/General Medicine/Paediatrics/Emergency Medicine
2. AIIMS, Patna		HOD, Department of Chest/General Medicine/Paediatrics/Emergency Medicine
3. IGIMS, Patna		HOD, Department of Chest/General Medicine/Paediatrics/Emergency Medicine
4. Nalanda Medical College & Hospital		HOD, Department of Chest/General Medicine/Paediatrics/Emergency Medicine
1. Anugrah Narayan Magadh Medical & Hospital	Gaya	HOD, Department of Chest/General Medicine/Paediatrics/Emergency Medicine
1. Sri Krishna Medical College	Muzaffarpur	HOD, Department of Chest/General Medicine/Paediatrics/Emergency Medicine

Surveillance training:

Training regarding surveillance of acute & chronic respiratory cases and documentation will be provided to key officials in each identified sentinel site by the state team. In each sentinel site, the principal or superintendent of the hospital will build a medical team having at least

one representative from important departments where respiratory cases are expected to report. This medical team will act as ToT for conducting such surveillance activities related to impact of air pollution on human health in the respective medical institute.

Monitoring of surveillance activity

- Daily reporting will be monitored by the medical team in each institute
- Monthly review by the Medical Superintendent
- Quarterly review by the DNO, CC & SNO, CC

Action plan on Impact of Air pollution on Human Health will be developed by the DSO-CC in consultation with the SNO-CC. Review of the health action plan will be conducted by the State Task Force every year to evaluate the effectiveness of the proposed actions, target achieved and the progress.

Role and Responsibilities of key persons

SNO-CC	<ul style="list-style-type: none"> • Finalization of IEC materials on air pollution & strategic communication plan • To develop a framework for IEC activities including training sessions, interactive workshops, seminars, conferences at state and district levels • To ensure daily reporting in prescribed formats from various sentinel sites • To conduct review meetings with the official team of each sentinel sites to discuss the progress, implementation challenges and way forward • To organize meetings with Bihar State Pollution Control Board and other relevant stakeholders (Department of Environment, Municipal Corporation etc) • To develop dashboard for better monitoring of data and real-time feedback • To update the progress and implementation challenges to the NCDC team for further guidance
DNO-CC	<ul style="list-style-type: none"> • To distribute IEC materials to targeted health facilities, schools, important public places • To conduct training workshops/interactive sessions at the district level under guidance of the State Task Force and SNO-CC • To ensure daily reporting from specific sentinel sites and to perform data quality check • To provide real-time feedback and follow-up • To analyse data and submit monthly report to the state team for necessary actions • To organize meetings with the relevant stakeholders to generate awareness on impact of air pollution on human health • To develop district action plan on Air pollution and human health in coordination with SNO-CC
Medical team	<ul style="list-style-type: none"> • To provide training to identified key officials in respective sentinel sites • To ensure daily reporting and data quality check • To holding monthly meetings with the district and state teams to update about the progress, challenges, if any and way forward
Medical officers/Medical students	<ul style="list-style-type: none"> • To ensure data collection and quality check • To flag implementation issue, if any

II: Health Action Plan on Heat-Related Illnesses

According to the National Center for Disease Control, Bihar is considered to be one of the 23 heat vulnerable states in India since 2019. The number of suspected or confirmed heatstroke cases in the state have increased over years.

Activities related to Information, Education and Communications (IEC) for creation awareness and sensitization for Heat related illnesses

- ✓ Translation of IEC content provided by the NCDC/NPCCHH to culturally appropriate local language regarding the awareness messages on impact of extreme heat on health and development of IEC on climate sensitive issues related locally to the state and district by the state IEC cell, invitation to tender and plan to receive to the printed materials
- ✓ Target population will be vulnerable groups including elderly population, under-five children, pregnant women and people with other comorbidities including respiratory illnesses, cardiac problems etc. and outdoor workers
- ✓ Target places will be heat vulnerable districts in the southern part of the state— Gaya, Nawada, Aurangabad, Kaimur, Rohtas

Types of Heat Related Illnesses

Clinical Entity	Age Range	Setting	Cardinal Symptoms	Cardinal / Important Signs	Pertinent Negative Findings
Heat rash/prickly heat/Miliaria	All, but frequently children	Hot environment; +/- insulating clothing or swaddling (wrap in tight clothes)	ITCHY RASH with SMALL RED BUMPS at pores in the skin. As seen in the setting of heat exposure; bumps can sometimes be filled with clear or white fluid	DIFFUSED RED COLOUR SKIN OR VESICULAR RASH, itching of the skin without visible eruption	NOT FOCALLY DISTRIBUTED like a contact dermatitis
Heat cramps	All	Hot environment, TYPICALLY WITH EXERTION, +/- insulating clothing	PAINFUL SPASMS of large and frequently used muscle groups	Uncomfortable appearance, may have DIFFICULTY FULLY EXTENDING AFFECTED LIMBS/ JOINTS	No contaminated wounds/tetanus exposure; no seizure activity
Heat exhaustion	All	Hot environment; +/- exertion; +/- insulating clothing or swaddling (wrap	Feeling overheated, light headedness, EXHAUSTED AND WEAK, unsteady, feeling of	SWEATY/diaphoretic; flushed skin; hot skin; NORMAL CORE TEMPERATURE; +/- dazed, +/-	No coincidental signs and symptoms of infection; no focal weakness; no difficulty in swallowing food or

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

Dissemination Plan for IEC activities on Heatwaves and Health, NPCCHH, Bihar

IEC type	Material	Dissemination timeline	Dissemination mechanism
Advisory	As developed by NCDC, MoHFW, https://ncdc.gov.in/index1.php?lang=1&level=3&sublinkid=1089&lid=848	By March	Emails/WhatsApp from State Nodal to District Nodal for further instructions to block health facilities
Early Warnings	Forecast & weather conditions, IMD website	By March-July	Health Departments, other Govt. offices, District Hospitals, public places & official websites, applications Newspaper Social Media
Posters	6 posters on Heat & Human Health in English & Hindi as suggested by NPCCHHIEC https://ncdc.gov.in/WriteReadData/1892s/12404500311	By February-March	Printing for state-level dissemination at major public places, Health Facilities Email to DNO for printing for district-level

	654851896.pdf		dissemination in health facilities, schools & other important public places
Wall painting	Above mentioned IEC materials	By February-March	Selected schools, health facilities & important public places
Hoardings	Above mentioned IEC materials	By March	To be displayed at selected places following discussions with Patna Municipal Corporation
Audio-Visual	3 audio jingles in Hindi & 2 video messages in both English & Hindi as suggested by NPCCHHIEC	By March	To be played twice a day between March and June
Digital display	Available GIFs as developed by NPCCHHIEC	By March-July	Major hospitals & important public places
Social media	Selected materials as mentioned above	By February-July	Official WhatsApp groups

Preparatory work for IEC dissemination

Activities	Department & Nodal person
Hindi translation of IEC materials if required Designing and formatting of any new Hindi material Printing	State IEC cell/State IDSP unit

Observance of important environment health days for heat waves and health related

There is no specific day to observe heat related impact on health. However, the following days may be observed to generate awareness on impact of climate change on human health

Day	Activities
World Forest Day (March 21) World Water Day (March 22) World Health Day (April 7) Earth Day (April 22) World Environment Day (June 5) World Day to Combat Desertification and Drought (June 17)	Awareness generation through IEC campaigns, local cultural events, sports, tree plantation drive, etc.

Capacity Building Activities

A. Training materials

Training modules, guidelines, handbook etc. available at NCDC website under NPCCHH guidelines

- Health Adaptation Plan for Disease due to Heat waves
- Health Sector Preparedness for Heat waves
- Handbook for Health Professionals on Heat waves and its impact on Health
- Women Training Manual
- Children Training Manual
- Traffic Police Training Manual
- Municipal Worker Training Manual

B. Training Institutes

State-level: State Institutes of Health & Family Welfare.

District-level: District Head Quarter.

Annual training plan for Heat and Health under NPCCHH, Bihar

Training program for	Trainer	Topics	Timeline
District level (DNO-CC)	State-level trainers, SNO-CC, Consultant	Heat waves & it's impact on Health Prevention & control of Heat waves District-level preparedness & surveillance	February
Health facility level (Medical officers/Block Health Managers)	District level trainers, DNO-CC	Heat Waves& it's impact on Health District-level preparedness & surveillance Specific roles & responsibilities of Medical officers in surveillance	February Refresher training/Review quarterly
Frontline workers (ANM, ASHA, JEEVIKA)	State & District level trainers	Heat waves& it's impact on Health Surveillance & reporting of probable cases	February-March, 2023 Refresher training/Review quarterly
Panchayati Raj Institutions	District level trainers	Heat waves& it's impact on Health	February-April, 2023

C. Strengthening Health Sector Preparedness through surveillance

- Plan has been designed as per the NCDC guidelines (NPCCHH: National Heat-related Illness Surveillance)
- As per the National action plan on Heat related illnesses, the following will be developed
 - ✓ Case definitions
 - ✓ Reporting formats in health facility
 - ✓ Death investigation form
- Selection of reporting units: All designated health facilities in a district will be engaged for reporting heat related cases from March to July

D. Health Sector preparedness

- **Surveillance training:**

Training regarding surveillance of acute & chronic heat related cases and documentation will be provided to key officials in each identified sentinel site by the state team. In each sentinel site, the principal or superintendent of the hospital will build a medical team. This medical team will act as ToT for conducting such surveillance activities related to impact of heat waves on human health in the respective medical institutes.

- **Monitoring of surveillance activity**

- ✓ Daily reporting will be monitored by the medical team in each institute.

- ✓ Monthly review by the Medical Superintendent

- ✓ Quarterly review by the DNO, CC & SNO, CC

Action plan on Impact of Heat Waves on Human Health will be developed by the DSO-CC in consultation with the SNO-CC. Review of the health action plan will be conducted by the State Task Force every year to evaluate the effectiveness of the proposed actions, target achieved and the progress.

(available on NPCCHH website)

City-Specific Heat-Health Action Plans should include:

1. Early warning system and inter-agency emergency response plan:

- a. Analysis of historic city level all-cause mortality with observed temperatures to establish health impact-based warning and response trigger (IMD, SDMA)

- b. Daily dissemination of forecast and observed temperature during summer to public and government agencies (IMD)

- c. Identification of roles and responsibilities of coordinating agencies with activity matrix and action checklists (Refer: Ahmedabad Heat Action Plan12)

2. Public awareness

- a. Communicating risk to vulnerable population groups.

3. Capacity building of medical professionals

- a. On identification, management and reporting of HRI cases and deaths.

4. Promoting short and long-term adaptation and mitigation measures

- a. Access to potable water, shaded area, cooling spaces

- b. Plantation, cool roof

Role and Responsibilities of key persons

SNO-CC	<ul style="list-style-type: none"> • Finalization of IEC materials on heat waves& strategic communication plan • To develop a framework for IEC activities including training sessions, interactive workshops, seminars, conferences at state and district levels • To ensure daily reporting in prescribed formats from various sentinel sites • To conduct review meetings with the official team of each sentinel sites to discuss the progress, implementation challenges and way forward • To organize meetings with Bihar State Environment Cell and other relevant stakeholders (Department of Environment, Municipal Corporation etc) • To develop dashboard for better monitoring of data and real-time feedback • To update the progress and implementation challenges to the NCDC team for further guidance
DNO-CC	<ul style="list-style-type: none"> • To distribute IEC materials to targeted health facilities, schools, important public places • To conduct training workshops/interactive sessions at the district level under guidance of the State Task Force and SNO-CC • To ensure daily reporting from specific sentinel sites and to perform data quality check • To provide real-time feedback and follow-up • To analyse data and submit monthly report to the state team for necessary actions • To organize meetings with the relevant stakeholders to generate awareness on impact of air pollution on human health • To develop district action plan on Heat Waves and human health in coordination with SNO-CC
Medical team	<ul style="list-style-type: none"> • To provide training to identified key officials in respective sentinel sites • To ensure daily reporting and data quality check • To holding monthly meetings with the district and state teams to update about the progress, challenges, if any and way forward
Medical officers/Medical students	<ul style="list-style-type: none"> • To ensure data collection and quality check • To flag implementation issue, if any

III: Health Action Plan Vector Borne Diseases (VBD) in context of climate change

Bihar, a state in Eastern India, is prone to several vector-borne diseases such as Malaria, Japanese Encephalitis (JE), Kala-azar (Visceral Leishmaniasis), Dengue and Chikungunya.

Vector Borne Diseases		2021	2022	Annual change rate
Malaria	Cases	29733	24123	-18.87%
	Death	38	11	-71.05%
Dengue/DHF	Cases	633	9374	1380.88%
	Death	2	7	250.00%
Japanese Encephalitis (JE)	Cases	38	20	-47.37%
	Death	7	5	-28.57%
Acute Encephalitis Syndrome (AES)	Cases	157	25	-84.08%
	Death	28	5	-82.14%
Kala-azar	Cases	893	547	-38.75%
	Death	20	26	30.00%
Chikungunya	Cases	40	56	40.00%
	Death	0	0	0.00%

NVBDCP platform

The situation analysis could be performed to assess the disease, vectors, and its determinants at the state and district levels. In addition, empirical research will be conducted periodically to identify hotspot areas within the state and districts. At risk zones and vulnerable populations will be identified based

- Epidemiological assessment
- Vector assessment
- Geographic stratification based on endemicity of disease
- Risk factors

Control measures–

Mainly control measures for VBD are biological, chemical, environmental and mechanical. Among these

measures, it appears that Long Lasting Insecticide treated Nets (LLIN) and Indoor Residual Spray (IRS) are the most effective control measures recommended at the community level. These activities will be planned and implemented in identified at risk-zones. Additionally, in urban areas or places where breeding sites are fixed few and findable (FFF), Larval source management (LSM) and source reduction measure also will be carried out with Larvicides.

Activities related to Information, Education and Communications (IEC) for creation awareness and sensitization for diseases transmitted by arthropod vectors in the community

- Translation of IEC content provided by the NVBDCP to culturally appropriate local language regarding the awareness messages on impact of vector borne diseases and control measure to contain vectors by and eliminate source of infection.
- The state IEC cell will invite tenders and plan to receive to the printed materials.
- Target population will be vulnerable groups those are living in endemic and hot spot zones
- Areas to be identified based on situational analysis.
- Vulnerable group (Primarily children, pregnant woman, older adult, immune compromised, outdoor workers / Vendors)

Dissemination Plan for IEC activities on Air Pollution, NPCCHH, Bihar

IEC type	Material	Timeline	Dissemination Mechanism
Poster	Posters on VBD and climate change (English/Hindi) Posters made by NVBDCP Bihar	After extreme weather events i.e. floods, cyclone, and other natural disaster like- earthquake in collaboration with NVBDCP	In collaboration with NVBDCP
Wall Painting	Using available material	Painting will be done seasonally as needed	In school and selected colleges In health facilities
Hoardings	Posters in regional languages (Hindi, Maithili, English)	June July as needed	To be planned with hotspot municipalities and Districts
Audio - Visual	3 Video messages (Hindi, English and Bhojpuri) 3 Audio Jingles (Hindi, Bhojpuri and Maithili)	June-July as per extreme weather condition or before rainy season starts.	Plan according to PIP guidelines and in condition with NVBDCP
Digital display	Available GIF Above mentioned video messages	June-July as per extreme weather condition or before rainy season starts.	Display in health facilities Public digital display boards in major cities and high transit chowraha
Social Media	All above material + relevant activity updates	June July, seasonally, as needed in case of extreme weather events	Facebook and twitter handle of state NPCCHH, NHM WhatsApp groups (state DNO, Health facilities group)

Preparatory work for IEC dissemination

Activities	Department & Nodal person
<ul style="list-style-type: none"> Hindi and regional language translation of IEC materials if required Designing and formatting of any new Hindi material Printing 	State IEC cell/State IDSP unit Dr. Ranjeet Kumar

Observance of important environment-health days

Observance of following days may be recommended for awareness on climate change and vector-borne diseases.

Day	Activities
<ul style="list-style-type: none"> World malaria day (April 25) World mosquito day (August 20) World Environmental Health Day (September 26) 	<ul style="list-style-type: none"> IEC Campaigns Audio-video spots broadcasting Targeted awareness sessions: urban slums, schools, women, children Street plays and local cultural activities, Rallies Sports events Competition: poster, poem/essay, quiz In collaboration with NVBDCP

Capacity Building Activities

A. Training materials

Training modules: (available bit.ly/NPCCHHguidelines shortly)

- State-District level training modules
- Medical officer training
- Para medical officers & Health care workers
- Community level training: vulnerable population group such as women/ children/ elderly/ different type occupations

Other training resources: NPCCHH channel <https://bit.ly/NPCCHHyT>

- Training on climate change and its impact on VBD burden

Annual training plan for vector-borne diseases in context of climate change, NPCCHH, Bihar

Training program for	Trainer	Topics	Timeline
District level (DNO-CC)	State-level trainers, SNO-CC, Consultant	<ul style="list-style-type: none"> General information about VBD: Causative organisms, mode of transmission, name of vectors, life cycle, host factors and control measures Role of climate change in VBD burden and 	July or after extreme weather events/natural disasters

		<p>prevention measures</p> <ul style="list-style-type: none"> •Tracking trend of VBD and linking it with rainfall, humidity and temperature change •Risk of VBD after any natural disaster like flood, earthquake etc. surveillance & its mitigation strategies •Importance of real-time reporting of suspected cases on digital platform like Integrated Health Information Platform (IHIP) •Methods of VBD surveillance, monitoring and feedback 	
Health facility level (Medical officers/Block Health Managers)	District level trainers, DNO-CC	<p>Role of climate change impact in VBD burden, prevention measures</p> <p>Strengthen surveillance reporting</p> <p>Post-disaster VBD surveillance, prevention, management in community and at relief camps</p>	
Community Health care workers (BCM, ASHA, ANM etc)	State & District level trainers	<ul style="list-style-type: none"> •Role of climate change impact in VBD burden, prevention measures •Post-disaster VBD surveillance, prevention, management in community and at relief camps 	
Panchayati Raj Institutions	District level trainers	<p>Climate change and VBD burden, prevention measures</p> <p>Awareness generation regarding real time reporting of probable cases using digital platform to designated health facilities and community health workers.</p> <p>Community engagement and awareness.</p>	<p>June - August</p> <p>During rainy season</p> <p>Additionally in disaster like natural events</p>

Strengthening Health Sector Preparedness through surveillance

To plan how to link weather parameters with VBD surveillance under NVBDC at District level and also how to

- Monitor VBD with weather parameters
- Initiate surveillance based on prediction models related to breeding places, increase in number of vectors and their behaviors and to pick up emerging foci with support from the State Program Officers (SPO) and District Malaria Officers (DMO)

To enhance knowledge about VBD prevention and control measures

- Planning of indoor residual spray a month before peak of VBD cases based on historical data

- Management of new foci of transmission in the same way as other endemic areas.
- Epidemic preparedness especially after extreme weather events or natural disasters

Roles and responsibilities (Govt & non-Govt) in implementation of VBD activities in context of climate change under NPCCHH, Bihar

Department/Agency	Area of Collaboration	Specifics
1. NVBDCP, Bihar	Overall guidance and policy formulation	Guide and the state governments in resurgence and containment of any VBD
2. State Nodal Officer, Climate Change	To support the state govt. in control of VBDs particularly in climate sensitive states	Oversee vector control measures Oversee health sector preparedness Oversee VBD surveillance, control in post disaster situations in community and relief camps Train DNO, DMO Sensitization workshops to increase awareness on climate change and its impact on VBD
3. India Meteorological Department	To provide meteorological data as and when required	To help the state govt. in collaboration with any research institute, in analysis of relationship between climatic factors and a particular VBD so as to forewarn the impending outbreaks.
4. NGO at state and district level for reach to community	Health education at community level	Conduct workshops for IEC activities for different level of staff in the identified areas in consultation with the state govts.
5. State Programme officers	Overall planning and execution of surveillance and intervention measure to control VBDs	Supervise and guide the DMOs in control of VBDs
6. State Entomologist	To provide guidance in vector control.	Generate data on fortnightly fluctuations in density of vector species to guide the state government in choosing appropriate time of IRS activities. To generate data on susceptibility status of disease vectors for using appropriate insecticides for IRS/ larvicide for vector control
7. Chief Medical Officer/ District malaria officer/ Disease surveillance Officer	Execution of task assigned by the SPO	Supervise and guide surveillance and intervention measures for control of VBDs in the districts.

8. Media	To be vigilant for report of any upsurge/ Outbreak of any VBD.	Impart health education to masses through print and audiovisuals means
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Revision of Health Action Plan on VBD in State Action Plan on Climate Change and Human Health (SAPCCHH):

The section should be revised every year in collaboration with NVBDCP based on updated surveillance data, its analysis with weather parameter, prevention and control activities, targets achieved, and predicted climate variability with support from multi-sectoral task force.

Surveillance training:

Training regarding surveillance of VBDs cases and documentation will be done in Integrated Health Information Platform (IHIP -IDSP) and a Rapid Response Team will investigate and respond to the outbreaks in the district and state. This surveillance will be carried out with collaboration with IDSP and NVBDCP **Monitoring of surveillance activity**

- Daily reporting will be monitored by the DNO-CC at district level and SNO-CC state level
- Monthly review by the District Surveillance Units
- Quarterly review by the DNO, CC & SNO, CC

IV: Health Action Plan on Extreme Weather Events and its Health Impacts

Bihar state is prone to extreme weather conditions which include earthquake, floods, lightning, thunderstorm, droughts, heatwave, cold wave and dust storm.

Districts/administrative divisions which are vulnerable/prone to extreme weather conditions are:

- Earthquake : Madhubani and Supaul
- Flood : Out of 38 districts 28 districts get flooded mostly from North Bihar (Kosi division)
- Lightning and Thunderstorm: Gaya, Jamui, Nawada, Aurangabad, Banka, Arwal and Sheikhpura
- Drought: Munger, Nawada, Rohtas, Bhojpur, Aurangabad and Gaya
- Heat wave: Aurangabad, Buxar, Gaya, Nawada, Jamui, Banka and Patna
- Cold wave: Magadh, Tirhut, Kosi and Patna divisions

Most hydro-met (Flood, cyclone & drought) vulnerable districts of Bihar as per the vulnerability index score:

District	Exposed to extreme weather events	Vulnerability index score
Madhepura	Flood & drought	0.935
Sitamarhi	Flood & drought	0.934
Banka	Flood & Cyclone	0.934
PashchimChamparan	Flood	0.925
Darbhanga	Flood, drought & cyclone	0.917
Khagaria	Flood	0.910
Araria	Flood	0.907

List of hotspot districts, their vulnerability indices and ranks (Source: CEEW):

Rank	District	Event	Exposure	Sensitivity	Adaptive Capacity	Vulnerability Index	Vulnerability
3	Madhepura	Flood & Drought	0.860	0.750	0.290	0.935	Very High
4	Sitamarhi	Flood & Drought	0.970	0.710	0.310	0.934	Very High
4	Banka	Flood & Cyclone	0.610	0.770	0.320	0.934	Very High
6	PashchimChamparan	Flood	0.810	0.950	0.330	0.925	Very High
7	Darbhanga	Flood, Drought & Cyclone	0.925	0.810	0.350	0.917	Very High
8	Khagaria	Flood	0.780	0.990	0.310	0.910	Very High
9	Araria	Flood	0.700	0.980	0.300	0.907	Very High
21	Purnia	Flood	0.590	0.970	0.290	0.751	Very High
43	Samastipur	Flood & Drought	1.000	0.540	0.340	0.668	Very High
55	Sheohar	Flood, Drought & Cyclone	0.575	0.860	0.370	0.573	High
64	Patna	Flood & Drought	0.890	0.570	0.390	0.547	High
75	Kishanganj	Flood	0.870	0.680	0.290	0.522	High
78	Saharsa	Flood, Drought & Cyclone	0.400	0.850	0.290	0.502	High

79	Muzaffarpur	Flood & Drought	0.740	0.580	0.360	0.501	High
80	Vaishali	Flood & Drought	0.630	0.680	0.360	0.500	High
87	Aurangabad	Flood & Drought	0.740	0.810	0.520	0.485	High
89	Gopalganj	Flood	0.470	0.850	0.320	0.482	High
90	Rohtas	Drought & Cyclone	0.545	0.740	0.370	0.480	High
100	Bhagalpur	Flood, Drought & Cyclone	0.400	0.880	0.340	0.444	High
118	Munger	Flood & Drought	0.450	0.720	0.350	0.389	Moderate
119	Saran(chhapra)	Flood & Drought	0.450	0.690	0.340	0.384	Moderate
152	Katihar	Flood & Drought	0.450	0.500	0.300	0.315	Moderate
166	Begusarai	Flood, Drought & Cyclone	0.250	0.840	0.330	0.273	Moderate
202	Nalanda	Flood & Drought	0.280	0.540	0.330	0.193	Low
216	Siwan	Flood & Drought	0.160	0.810	0.340	0.160	Low
216	Bhojpur	Flood, Drought & Cyclone	0.150	0.870	0.350	0.160	Low
238	PurbiChampan	Flood & Cyclone	0.110	0.750	0.490	0.107	Low
245	Gaya	Drought	0.410	0.140	0.360	0.091	Low
264	Buxar	Flood, Drought & Cyclone	0.025	0.900	0.340	0.028	Low
270	Lakhisarai	Flood & Drought	0.040	0.110	0.320	0.006	Low
272	Supaul	Flood	0.000	0.830	0.300	0.000	Very Low
272	Jamui	Drought	0.000	0.270	0.320	0.000	Very Low
272	Jehanabad	Drought	0.000	0.320	0.330	0.000	Very Low
272	Nawada	Drought	0.000	0.330	0.320	0.000	Very Low
272	Arwal	Drought & Cyclone	0.000	0.820	0.320	0.000	Very Low
272	Sheikhpura	Flood, Drought & Cyclone	0.000	0.700	0.310	0.000	Very Low

Activities related to Information, Education and Communications (IEC) for creation awareness and sensitization for Extreme weather events

- ✓ Translation of IEC content provided by the NCDC/NPCCHH to culturally appropriate local language regarding the awareness messages on impact of extreme weather event and health and development of IEC on climate sensitive issues related locally to the state and district by the state IEC cell, invitation to tender and plan to receive to the printed materials
- ✓ Vulnerable population living in districts/divisions mentioned above
- ✓ Target population will be vulnerable groups including elderly population, under-five children, pregnant women and people with other comorbidities including respiratory illnesses, cardiac problems etc. and outdoor workers

Dissemination Plan for IEC activities on Extreme weather events and their health impacts, NPCCHH, Bihar

IEC type	Material	Dissemination timeline	Dissemination mechanism
Advisory	bit.ly/NPCCHHPrg	Seasonal	Emails/WhatsApp from State Nodal to District Nodal for further instructions to block health facilities

Early Warnings	Bulletins/ advisory by IMD (storm, cyclone), CWC (flood) sent by NPCCHH	Seasonal	Health Departments, other Govt. offices, District Hospitals, public places & official websites, applications Newspaper Social Media
Posters	6 posters on various EWE and health impacts (English, Hindi) bit.ly/NPCCHHIEC	Seasonal, as needed	Printing for state-level dissemination at major public places, Health Facilities Email to DNO for printing for district-level dissemination in health facilities, schools & other important public places
Wall painting	Using available material	Painted in July-September	Selected schools, health facilities & important public places
Hoardings	Above mentioned IEC materials	Seasonal, as needed	To be displayed at selected places following discussions with Municipal Corporation
Audio-Visual	5 Video messages (Hindi, English) bit.ly/NPCCHHIEC	Seasonal, as needed	Played seasonally and around relevant extreme weather events
Digital display	4 GIFs as developed by NPCCHHIEC	Seasonal, As needed	Major hospitals in vulnerable districts & popular public places
Social media	Selected materials as mentioned above	Seasonal, As needed	Facebook and Twitter handle of state NPCCHH, NHM Official WhatsApp groups

Preparatory work for IEC dissemination

Activities	Department & Nodal person
<ul style="list-style-type: none"> Hindi translation of IEC materials if required Designing and formatting of any new Hindi material Printing 	State IEC cell/State IDSP unit Dr. Ranjeet Kumar

Observance of important environment health days for Extreme weather events and health related

Day	Activities
October 13, International Day for Disaster Reduction	<ul style="list-style-type: none"> To educate people around the world on how they can lower the risks faced by natural disasters hence reducing the monetary loss and human lives Promoting awareness and enhancing knowledge and skills of all stakeholders and general people Mock drill and disaster response exerci

Capacity Building Activities

A. Training materials

Training modules, guidelines, handbook etc. available at NCDC website under NPCCHH guidelines (<https://bit.ly/NPCCHHyt>)

B. Training Institutes

State-level: NA

District- level: District Head Quarter.

Annual training plan for Extreme weather events and Health under NPCCHH, Bihar

Training program for	Trainer	Topics	Timeline
District level (DNO-CC)	State-level trainers, SNO-CC, Consultant	<ul style="list-style-type: none">Climate change and impact of extreme weather eventsFormation of disaster management committees and Emergency Operating CenterAssessment for Health facility vulnerability, resilient measuresDisaster preparedness & response in coordination with state/district disaster management authorityPost-disaster health impact assessment and response	February
Health facility level (Medical officers/Block Health Managers)	District level trainers, DNO-CC	<ul style="list-style-type: none">Disaster vulnerability assessment of health facilitiesDisaster management and planningClimate resiliency measures (structural/functional)Preparedness for EWE of health facilitiesPost-disaster inspection and damage estimation	February
Frontline workers (ANM, ASHA, JEEVIKA)	State & District level trainers	<ul style="list-style-type: none">Health effects and weather changes of extreme weather eventsDisaster events mapping and response	February-March
Panchayati Raj Institutions	District level trainers	<ul style="list-style-type: none">Health effects and weather changes of extreme weather eventsDisaster mapping and response with community level participation	February-April

C. Strengthening Health Sector Preparedness through surveillance.

Plan has been designed as per the NCDC guidelines (NPCCHH: Health Adaptation Plan for regarding early warning and surveillance activity due to Extreme weather events)

Surveillance training:

Training regarding surveillance of water-borne and vector-borne diseases and documentation will be provided to key stakeholders and Government functionaries in each identified high-risk area by the state/district teams. In case of any impending outbreak, Rapid Response Team and Disaster Relief Task force will be sent for verification and further surveillance for necessary actions.

Monitoring of surveillance activity

- To review real-time *weather* data to generate warnings for specific changes
- Analyze recurrent conditions and work out possible mitigation measures keeping in view climate change trends and appropriate strategies for adaptation measures.
- SNO-CC and the Task Force should explore collaborative mechanism (e.g. memoranda of understanding) for regular sharing data and for coordinating efforts to manage health risks
- Concurrent review by the DNO, CC & SNO, CC as per the situation and need
- Monitoring and learning from resilient development planning and implementation
- Strengthen surveillance and monitoring for the high-risk population and identify / assess need in routine as well as in emergency situation (Emergency preparedness plans).
- Ensure health related Real-time Surveillance and Monitoring System in case of extreme event

Action plan on Impact of EWE on Human Health will be developed by the DNO-CC in consultation with the SNO-CC. Review of the health action plan will be conducted by the State Task Force every year to evaluate the effectiveness of the proposed actions, target achieved and the progress

Role and Responsibilities of key persons

SNO-CC	<ul style="list-style-type: none"> • Finalization of IEC materials on EWE & strategic communication plan • To develop a framework for IEC activities including training sessions, interactive workshops, seminars, conferences at state and district levels • Map vulnerable population based on demography, land cover, water bodies, potential exposure, available resources health insurance coverage, and burden of chronic illnesses in the community. • Issue health advisory to healthcare personnel based on IMD seasonal prediction or warning • Build capacity of health care personnel to detect and treat illnesses associated with extreme weather events. • Facilitate implement and assessment of climate resilient measures in health functionaries • Evaluate and update relevant section of SAPCCHH with coordination with National governing body MoH&FW • Provide organizational support and strengthen Environmental Health cell to implement NPCCHH vision, Goal and Objectives • Explore collaborative mechanism (e.g. memorandum of understanding) for regular sharing data and for coordinating efforts to manage health risks • To update the progress and implementation challenges to the NCDC team for further guidance • Submit activities reports on Extreme weather events and health under NPCCHH
DNO-CC	<ul style="list-style-type: none"> • To distribute IEC materials to targeted health facilities, schools, important public places • To conduct training workshops/interactive sessions at the district level under guidance of the State Task Force and SNO-CC • To provide real-time feedback and follow-up • To organize meetings with the relevant stakeholders to generate awareness on EWE and their impacts • To develop district action plan on EWE in coordination with SNO-CC • Provide IEC materials on EWE & strategic communication plan • Submit activities reports on Extreme weather events and health under NPCCHH
Medical team	<ul style="list-style-type: none"> • Conduct Community and Health facility-based IEC activities • To prepare hospital safety and Disaster Management plans • Facilitate disaster vulnerability assessments in health facilities and provide records of such assessment and health facility damage due to EWE • To ensure daily reporting and data quality check • To holding meetings with the district and state teams to update about the progress, challenges, if any and way forward
Panchayati Raj Institutions	<ul style="list-style-type: none"> • Community participation in the planning and performance of pre-during-post EWE interventions • Conduct IEC activities at community level • Organize PRI sensitization training for vulnerable groups

V: Green and Climate Resilient Health Care Infra-structure

Bihar ended up as the bottom six performers in NITI Aayog's first State Energy and Climate Index (SECI) for performance in various dimensions of energy efficiency and climate resilience. The state's overall score was 38.3, which is 2.3 points lower than the national score of 40.6. Also Bihar has got lowest score (9.8) in clean energy initiatives which include clean cooking fuel supply. It has got 0.9 in renewable energy penetration and 3.9 in CNG vehicle penetration. Patna, Rohtas, Gaya, and Begusarai are partly covered with green network.

Capacity building

Guidelines on Green and Climate Resilient Healthcare Facilities (available on NPCCHH website)

Guidelines on Solar Powering Healthcare Facilities (available on NPCCHH website)

Training modules: (available on NPCCHH website shortly)

- State-District level training modules
- Medical officer
- Health workers
- Community level training: vulnerable population group

Other training resources: NPCCHH channel <https://bit.ly/NPCCHHyt>

Annual training plan for Green energy installation and climate resilient health care facilities under NPCCHH, Bihar

Training program for	Trainer	Topics	Timeline
District level DNO-CC, trainers	State Level Trainers SNO-CC consultant	Role GCRHCF in terms of climate impact Assessment required for implementation Coordination with supporting agencies	August-September
Health facility level (MO of DH/CHC/PHC)	District level trainers DNO-CC	Role GCRHCF in terms of climate impact Assessment required for implementation Coordination with supporting agencies	September
Community Health care workers (MPH, ASHA, ANM etc)	District level Trainers , MO	GCRHCF in terms of climate impact and coping strategy.	Twice in a year
Panchayati Raj Institutions	District level trainers, MO, Health care workers	GCRHCF in terms of climate impact Necessary support community engagement for implementation.	Half yearly

Strengthening Health Sector Preparedness

i. Implementation of Climate Resilient measures at health facilities

a) New HCF should be built in compliance with Green & Climate Resilient Infrastructural features as of updated on Indian Public Health Standard guidelines.

b) Existing HCF are recommended to undergo retrofitting to implement structural climate-resilient (i.e. to withstand disasters and provide continuous, quality care to the affected population postdisaster) measures as per IPHS guidelines. Health facilities' vulnerability to prevalent climate change impact should be assessed to determine retrofitting the measures. For the retrofitting locally sourced and sustainable building designs and construction technologies should be considered to reduce energy requirements, carbon footprint, and cost-effectiveness.

c) Extreme weather event specific measures (Refer: Guidelines on Green (Environmentally Sustainable) and Climate Resilient Health Care Facilities¹³, <https://bit.ly/NPCCHHIP>)

- Flood resilient measures
- Temperature control measure

ii. Implementation of Green (Environmentally-friendly and sustainable) considered in FY 2023-24 are as following

- a. Energy Auditing of the Healthcare Facilities for Energy Efficiency level in the HCFs
- b. Replacement of existing (non-LED) lighting with LED in Healthcare Facilities
- c. Installation of Solar Panels in Healthcare Facilities
- d. Install Rainwater Harvesting System in Healthcare Facilities

iii. Implementation plan for Green Measures in Healthcare facilities activity plan for 2022-23

Measure	Unit	Justification	Pre-requisite
Replacing Non-LED with LED lighting in			
CHC			
PHC			
Total	38	First implement at all District Hospital	
Installing solar panels			Following assessment should be done at health facility level with support from DNOand nodal technical agency identified by state. Energy audit Water audit Disaster vulnerability
HC			
PHC			
Total	38	First implement at all District Hospital	
Installing rainwater harvesting system			
CHC			
PHC			
Total	38	First implement at all District Hospital	

iv. Plan of implementation of green measures in healthcare facilities 2022-2027, NPCCHH, Bihar

Green measures in healthcare facilities	Units					
	2023-24	2024-25	2025-26	2026-27	2027-28	Total

Replace existing Non-LED with LED in CHC	38					
Replace existing Lighting Non-LED with LED in PHC	43	50	100	150	200	543
Installing Solar panels at CHC	38					
Installing solar panels in PHC	43	50	100	150	200	543
Installing rain water harvesting system at CHC	38					
Installing rainwater harvesting system in PHC	43	50	100	150	200	543

- v. Monitoring and evaluation of activities should be done in-line with targets set in PIP.
Refer PIP Guidelines: <https://bit.ly/NPCCHHPIP>

Roles and responsibilities of key persons

	Responsibilities
SNO	<ul style="list-style-type: none"> Disseminate early warnings to district level • Finalization of IEC material and dissemination Plan • Organize training sessions for district level officers and trainers • Identify health facilities for priority implementation based on disaster and health facility vulnerability • Identify relevant state and district level nodal agencies and collaborate with them for assessment of health facilities for implementation of measures • Facilitate and monitor necessary assessments at health facility level • Facilitate implementation of structural and functional measures at health facility level • Submit report of activities on heat-health under NPCCHH • Advocate for reduction in source of greenhouse gas emissions
DNO	<ul style="list-style-type: none"> • Conduct training for block health officers, medical officers, with relevant training manuals • Support conduction for following assessment at health facility level Energy audit, Water audit, Disaster, Vulnerability assessment • Support following functional measures at health facility level <ul style="list-style-type: none"> - Water committee - Sustainable procurement committee - Operational measures to make health facility functioning during disasters or power cut • Coordinate with other agencies for assessment and implementation of identified structural and functional measures • Update DAPCCHH with support from District Task Force • Submit report of activities on heat-health under NPCCHH

Block Health officer	<ul style="list-style-type: none"> • Ensure training of medical officers • Organize PRI sensitization workshop • Coordinate with other agencies for assessment and implementation of identified structural and functional measures
Medical officer	<p>Conduct health facility assessment Energy audit, Water audit, Disaster, Vulnerability assessment</p> <ul style="list-style-type: none"> • Lead following functional measures <ul style="list-style-type: none"> - Water committee - Sustainable procurement committee - Operational measures to make health facility functioning during disasters or power cut • Support community level IEC activities • Identify local funding opportunities: e.g. CSR initiative, NGO funding
Panchayati Raj Institution	<ul style="list-style-type: none"> • Support retrofitting and new health facilities with local funding source and community participation

Part 3: Budget

The proposed budget (in lakhs) for implementation of NPCCHH activities in Bihar for 2023-2024:

Activities	2022-23	2023-24	
1. Capacity building including training	1.50	6.96	Fund approved for MO Training & ASHA Facilitator training
2. Other operating costs (OOC)	2.00	14.89	Fund approved for all operational activities including all major environmental day's celebration
3. IEC materials & printing	2.00	11.7	Fund approved for development & display of banners, hoardings at all Health Facilities and for IEC Video, Audio etc.
4. Surveillance, Review & Research activities	2.00	2.00	Fund approved for joint surveillance with other Departments
Total	8.00	35.55	

Monitoring evaluation checklist (Annexure: Quarterly Progress Report Format, NPCCHH)

References

State Profile. Government of Bihar. Available at:

<https://state.bihar.gov.in/main/CitizenHome.html>

Buha State Profile. Government of India. Ministry of Micro, Small and Medium Enterprise.

Available at: http://dcmsme.gov.in/old/dips/state_wise_profile_16-17/Bihar%20-%20State%20Profile.pdf

Haris, A.A., V. Chhabra, and S. J. J. o. A. Biswas, *Rainfall and temperature trends at three representative agroecological zones of Bihar*. 2010. 12(1):p.37-39.

Zakwan M, Khan I, Ara Z, Rahim Z, Sharief S. Trend analysis of rainfall in Bihar. *Water Resources Management (WRM)* 2019; 2019:79-85.

Zakwan M, Ara Z. Statistical analysis of rainfall in Bihar. *Sustainable Water Resources Management*. 2019; 5:1781-9.

State Action Plan on Climate Change, Government of Bihar, 2015

Haris, A.A., S. Biswas, and V. Chhabra, *Climate change impacts on productivity of rice (Oryza sativa) in Bihar*. 2010.

Kumar, A. and A. K. J. I. J. o. R. i. S. S. Singh, *Flood-induced Migration and its socio-economic impact on women-A Case Study of Kosi Flood in North-Bihar*. 2018. 8(9):p.486-501.

Saina, C.K., D.K. Murgor, and F.A. J. E. C. S. Murgor, *Climate change and food security*. 2013:p.235-257.

Kumar, S. *The*

News Paper. Fighting Flood and Drought, Millions in Bihar Lose Livelihoods. <https://thewire.in/environment/bihar-flood-drought-crop-loss.26/AUG/2019>.

Dutta, P.K., *The News Paper. India Today. Why Bihar flood is a warning sign for Nitish Kumar*. <https://www.indiatoday.in/news-analysis/story/as-flood-drowns-drought-hit-bihar-it-s-a-warning-for-nitish-kumar-1604750-2019-09-30>.

Bihar: Disease Burden Profile, 1990 to

2016. http://www.healthdata.org/sites/default/files/files/BiharDisease_Burden_Profile%5B1%5D.pdf.

Bihar State Action Plan on Climate Change. Building Resilience through Development.

Government of Bihar. 2015. Available at: <https://moef.gov.in/wp-content/uploads/2017/08/Bihar-State-Action-Plan-on-Climate-Change-2.pdf>.

Comprehensive Clean air action plan for the city of Patna. Shakti Sustainable Energy Foundation.

2019. Available at: https://shaktifoundation.in/wp-content/uploads/2019/12/PCAAP_Report_Final-3-1.pdf.

Kim, D., et al., Air pollutants and early origins of respiratory diseases. *Chronic diseases and translational medicine*, 2018. 4(2): p. 75-94.

The news paper. The telegraph online. Stubble becomes burning issue in Patna. <https://www.telegraphindia.com/bihar/stubble-becomes-burning-issue-in-patna/cid/1678215>.

The news paper. down to earth. India's burning issue of crop burning takes a new turn. <https://www.downtoearth.org.in/coverage/agriculture/river-of-fire-57924>.

Action Plan for Control of Air Pollution in Non-attainment city of Bihar. Technical Report. Bihar State Pollution Control Board. Available at: http://bspcb.bihar.gov.in/report_information.html.

AQI status of Non-attainment Cities. Bihar State Pollution Control Board. Aug, 2022. Available at: http://bspcb.bihar.gov.in/comparative_aqi_status_of_patna.html.

ANNEXURES

Annexure-1-District Nodal Officer-NPCCHH

Sl. No .	District	Name	Contact Number	Email-ID
1	Araria	Dr. Vidhan Chandra Singh	9470003030	civilsurgeonararia@gmail.com
2	Arwal	Dr. Rai Kamleshwar Nath Sahai	9470003045	csarwal2@gmail.com
3	Aurangabad	Dr. Ravi Bhushan Prasad	9470003061	csaurangabad.bihar@gmail.com
4	Banka	Dr. Ravidra Narayan	9470003073	cs-banka-bih@nic.in
5	Begusarai	Dr. Pramod Kumar Singh	9470003084	csbegusarai@gmail.com
6	Bhagalpur	Dr. Anjana Kumari	9470003118	csofficebgp1@gmail.com
7	Bhojpur	Dr. Suresh Prasad Singh	9470003146	civilsurgeonbhojpur.new@gmail.com ilsurgeonbhojpur@gmail.com
8	Buxar	Dr. Suresh Chandra Sinha	9470003163	cs-buxar-bih@nic.in csbuxar123@gmail.com
9	Darbhanga	Dr. Anil Kumar	9470003245	civilsurgeondarbhanga@gmail.com
10	East Champaran	Dr. Anjani Kumar	9470003180	cseastchamparan@gmail.com
11	Gaya	Dr. Ranjan Kumar Singh	9470003278	csofficegaya@gmail.com
12	Gopalganj	Dr. Birendra Prasad	9470003322	gopalganjdh3@gmail.com
13	Jamui	Dr. Kumar Mahendra Pratap	9470003337	csjamui222820@gmail.com
14	Jehanabad	Dr. Sarda Khatoon Usmani	9470003329	csofficejpd@gmail.com
15	Kaimur	Dr. Meena Kumari	9470003354	cskaimur@gmail.com cs.kaimur@gmail.com
16	Katihar	Dr. Jai Prakash Singh I/c	9470003366	cscumcmoktr@gmail.com
17	Khagaria	Dr. Amitabh Kumar Sinha	9470003391	cs.khagaria@rediffmail.com
18	Kishanganj	Dr. Kaushal Kishor Prasad	9470003399	cskishanganj99@gmail.com
19	Lakhisarai	Dr. Vinod Prasad Sinha	9470003417 9709425471	cslakhisarai@gmail.com
20	Madhepura	Dr. Mithilesh Thakur	9470003419	csmadhepura1@gmail.com
21	Madhubani	Dr. Naresh Kumar Bhimsare	9470003434	csofficemadhubani@gmail.com
22	Munger	Dr. Pran Mohan Sahay	9470003466	civilsurgeonmunger1@yahoo.com
23	Muzaffarpur	Dr. Umesh Chandra Sharma	9470003500	csmuz@rediffmail.com cs-muzaffarpur-bih@nic.in
24	Nalanda	Dr. Abinash Kumar Singh	9470003507	civilsurgeonnalanda@gmail.com
25	Nawada	Dr. Ram Kumar Prasad	9470003536	csnawada@gmail.com
26	Patna	Dr. Shravan Kumar	9470003600	cspatna2015@gmail.com
27	Purnea	Dr. Abhay Prakash Chaudhary	9470003627	csurgeon@rediffmail.com
28	Rohtas	Dr. K.N.Tiwari	9470003640	dr.sudhir.1955@gmail.com csrohatas@gmail.com
29	Saharsa	Dr. Kumar Mukul	9470003675	cmosaharsa@gmail.com
30	Samastipur	Dr. S.K. Chaudhary	9470003701	csofficesamastipur@gmail.com
31	Saran	Dr. Sagar Dulal Sinha	9470003720	dhssaran@gmail.com
32	Sheikhpura	Dr. Ashok Kumar Sinha	9470003730	sheikhpura.cs@gmail.com
33	Sheohar	Dr. Shailendra Kumar Jha	9470003740	cssheohar@gmail.com
34	Sitamarhi	Dr. Suresh Chand Lal	9470003747	cscumcmositamarthi02@gmail.com cscumcmositamarthi01@gmail.com

35	Siwan	Dr. Anil Kumar Bhatt	9470003788	cssiwan@gmail.com
36	Supaul	Dr. Mihir Verma	9470003790	cssupaul@gmail.com
37	Vaishali	Dr. Shyam Nandan Prasad	9470003807	civilsurgeonvaishali@gmail.com
38	West Champaran	Dr. Sri Kant Dubey	9470003201	csbettiah@gmail.com

Annexure-2 Notification of Governing Body



राज्य स्वास्थ्य समिति, बिहार



Sanjay Kumar, I.A.S
Principal Secretary Health
-Cum-
Chief Executive Officer

ORDER

In-order to address the threats of illnesses, diseases and health events associated with climate change, Climate Change and Human Health Programme has been launched by Ministry of Health and Family Welfare (MOHFW), Government of India. Vide MOH&FW letter Z-12020/34/2019-PH, dated 12 April, 2019, it was informed that "Proposal for Inclusion of Climate Change and Human Health Related Activities in National Health Mission (NHM)" has been approved. A State Task Force has been constituted to draft the State Action Plan on Climate Change and Human Health vide SHSB Letter No: 8644, dated 11/3/2019.

An organizational structure is essential for successful implementation of the Programme. In view of the same, State Level Governing Body is being constituted that shall take policy level decisions related to Climate Change and Health. The composition of Governing Body shall be as under:

- **Honourable Health Minister, Bihar- Chairman**
- **Principal Secretary, Health Department, Govt. of Bihar: Vice Chairman**
- **Principal Secretary, Environment, Forest and Climate Change Department Govt. of Bihar: Member**
- **Principal Secretary, Water Resource Department, Govt. of Bihar: Member**
- **Principal Secretary, Agriculture Department, Govt. of Bihar: Member**
- **Principal Secretary, Finance Department, Govt. of Bihar: Member**
- **Principal Secretary, Urban Development Department, Govt. of Bihar: Member**
- **Principal Secretary, Energy Department, Govt. of Bihar: Member**
- **Principal Secretary, PHED, Govt. of Bihar: Member**
- **Principal Secretary, Animal Husbandry Department, Govt. of Bihar: Member**
- **Principal Secretary, Mining & Geology Department, Govt. of Bihar: Member**
- **Principal Secretary, Planning & Development Department, Govt. of Bihar: Member**
- **Principal Secretary, Disaster Management Department, Govt. of Bihar: Member**
- **Principal Secretary, Tourism Department, Govt. of Bihar: Member**
- **Principal Secretary, Transport Department, Govt. of Bihar: Member**
- **Executive Director, SHSB: Member**
- **Director-in-Chief, Disease Control, Health Department, Govt. of Bihar: Member Secretary**
- **Regional Director, Bihar & Jharkhand, Regional Health Office, Patna, Bihar: Member**
- **Nodal Officer, Climate Change & Health-Member**
- **Co-Nodal Officer, Climate Change and Health-Member**

This order shall be made effective with immediate effect.

S/d
(Sanjay Kumar)



Memo No: SHSB/GA/2443/2017.....2406....., Date.....06.07.19....
Copy to:

1. Joint Secretary, MoH&FW, Govt. of India for kind information

परिवार कल्याण भवन, रोखपुरा, पटना- 800 014,
दूरभाष : 0612-2290328, फैक्स : 0612-2290322, वेबसाइट : www.statehealthsocietybihar.org



Annexure 3- Notification of State Task Force

**राज्य स्वास्थ्य समिति, बिहार**
An ISO 9001:2008 Certified Agency

Manoj Kumar, I.A.S
Executive Director

SHSB/Gen Admin/IDSP/2443/2017/8644

To,

Dr Ashok Ghosh, Chairman, BSPCB, Govt. of Bihar
Dr Pradip Das, Director, RMRIMS, Patna
Dr Ram Singh, Joint Director, NCDC, Patna
Dr Kailash Prasad, Senior Regional Director, RHO, Patna
Dr DK Gupta, Add. Director-Cum-Nodal Officer, Climate Change & Human Health, Health Dept., Govt. of Bihar
Dr Ragini Mishra, State Surveillance Officer-Cum-Co-Nodal officer, Climate Change & Human Health, SHSB, Patna
Dr Ram Kumar, Assoc. Prof. & HOD, Environmental Science Dept., CUSB, Patna
Dr P.P. Sarthi, Assoc. Prof., Environmental Science Dept., CUSB, Patna
Dr SN Jaiswal, Board Analyst, Bihar State Pollution Control Board, Patna
KK Roy, Asst Director (Tec), Directorate of Technical Development, Industries Dept., Govt. of Bihar
Avinash Kumar, OSD, Disaster Management Dept., Govt. of Bihar
SS Chaudhary, PPCF-Cum-MD, Bihar Forestry Development Co Ltd, Environment & Forest Dept., Govt. of Bihar
Er. Pawan Kumar Karn, Prof. Env & Water Drainings, WALMI, Water Resources Dept, Govt. of Bihar
Dr Pramod Kumar Mishra, State Coordinator, BAMETI, Patna, Agriculture Dept., Govt. of Bihar
Binodanand Jha, Addl. Sec-Cum-Dy Director, (BUDA), Urban Development & Housing Dept., Govt. of Bihar
Anuj Kumar, Depy. Secretary, Energy Department, Govt. of Bihar
Ajeev Vats Raj, Depy. Secretary, Transport Dept., Govt. of Bihar
Sanjeev Mittal, Dy. Budget Controller-Cum-Dy. Secretary, Finance Dept, Govt. of Bihar
Dr Krishna Kant Kumar, Dy. Director, Animal Husbandry (HQ), Animal & Fisheries Resource Dept., Govt. of Bihar
Biswajit Chakrovarty, Scientist 'G', national Institute of Hydrology, IMD, Patna
Pankaj Kumar, Team leader, DFID, CCIP, Bihar
Satyajit Ghosh, Water Aid, Patna
Dr SSS Reddy, Health Specialist, UNICEF, Patna
Dr Gitanjali Kumari, Technical Expert, Disaster Management, ADPC, Patna
Dr Vishesh Kumar, Regional Team Leader, WHO, Bihar
Dr Abinash Mohanty, Director, CEEC, ADRI, Patna
Dr Sanchita Mahapatra, Epidemiologist, ADRI, Patna


Patna, Date- 11/03/2019

Sub: Regarding attending meeting of the State Task Force on Climate Change & Human Health on 25.03.2019 at Conference Hall, Health Department, Govt. of Bihar from 3:30 PM onwards

Sir/Madam,

You are aware that climate change affects the human health in significant but varied manner. The impact of climate change on human health may be direct like exposure to the extreme temperatures, intense precipitation, floods and droughts or indirect like attack of the vector borne diseases due to humid/moist environment or due to expended time window of optimum temperature for growth/regeneration of mosquitoes, frequent attacks of asthma due to pollution and temperature conditions. In addition, climate also affects the quality and accessibility of safe water and food, which causes the reduced immunity and increased susceptibility to the water borne and other diseases.

STATE HEALTH SOCIETY, BIHAR
Pariwar Kalyan Bhawan, Sheikhpura, Patna- 800 014
दूरभाष: 0612-2290328, 2281232 फ़ैक्स: 2290322 Website: www.statehealthsocietybihar.org



Annexure 4- Notification of State Environment Health Cell



राज्य स्वास्थ्य समिति, बिहार



Manoj Kumar, I.A.S
Executive Director

OFFICE ORDER

In-order to address the threats of illnesses, diseases and health events associated with climate change, Climate Change and Human Health Programme has been launched by Ministry of Health and Family Welfare (MOHFW), Government of India. Vide MOH&FW letter Z-12020/34/2019-PH, dated 12 April, 2019, it was informed that "Proposal for Inclusion of Climate Change and Human Health Related Activities in NHM" has been approved. A State Task Force has been constituted to draft the State Action Plan on Climate Change and Human Health vide SHSB Letter No: 8644, dated 11/3/2019.

An organizational structure is essential for successful implementation of the Programme. In view of the same, a State level Environment Health Cell is being constituted to ensure preparation and implementation of State Action Plan on Climate Change and Human Health with following composition:

1. **Nodal Officer:** Dr Ragini Mishra, Contact No: 9471007301, Email: ssobihar@gmail.com
2. **Consultant-Environmental Health:** Navnit Kumar Dutta, State Microbiologist, Contact No: 9006006366, Email: navnitdutta@yahoo.co.in
3. **Consultant: Capacity Building/Training/HR Management:** Naveen Kumar Raman, District Microbiologist, PMCH, Patna, Contact No: 7992330681, Email: naveenraman54@yahoo.com,
4. **Data Manager:** Sarita Prasad, Contact No: 7762882211, Email: saritapd73@gmail.com
5. **Data Entry Operator:** Anil Kumar, Contact No: 8864041992, Email: cbhi.idsp@gmail.com

All works related to Climate Change and Human Health under the National Health Mission (NHM) shall be executed through the Environment Health Cell. The officials listed from Sl. No 2 to 5 shall work in above capacity till recruitment for these posts are completed. All files and works related to Climate Change and Human Health shall be rooted and implemented through the Nodal Officer of Environment Health Cell.

This order shall be made effective with immediate effect.

S/d

Memo No: SHSB/GA/2443/2017.....2405....., Date.....06/2/19..... (Manoj Kumar)

Copy to:

1. Joint Secretary, MoH&FW, Govt. of India for kind information
2. Principal Secretary Health Department, Govt. of Bihar for kind information
3. Personal Secretary to Health Minister, Govt. of Bihar for kind information
4. Principal Secretary, Environment, Forest and Climate Change Department Govt. of Bihar for kind information

(Signature)

परिवार कल्याण भवन, शेखपुरा, पटना- 800 014,
दूरभाष: 0612-2290328, फैक्स: 0612-2290322, वेबसाइट: www.statehealthsocietybihar.org



स्वास्थ्य विभाग विहार सरकार

गर्म हवाएँ (लू)

सावधानियाँ ही बचाव हैं

तेज धूप और लू के उपेड़ों का हमारे शरीर पर प्रतिकूल प्रभाव पड़ता है जो कि जानलेवा भी हो सकता है।

लक्षण:-

- बहुत तेज सरदर्द
- घबकड़ आना और सर धुमना
- गर्मी के बावजूद पसीना ना आना
- नाल, गर्म और लुझी स्क्रीन
- मांसपेशियों में कमजोरी लगना या ऐडन का अनुभव
- मातली और उल्टी
- पड़कन का तेज होना
- सोस लेने में तकलीफ
- घबराहट और बेचैनी
- दोरे आना
- बेहोशी की हालत

सुरा का उपाय:-

- जहाँ तक संभव हो सके घुस बिछोकर दोपहर में बाहर न निकलें, छाँव में रहें।
- सिमु, फुडन, घर के बाहर कार्य करने एवं जलिन बीमारी वालों को जल्दी लू लगने का भय रहता है।
- लू पानी पीने, भास न भी लगे तो भी पानी बिचें ताकि पोशाक का रंग हल्का रहे।
- भोजन करने ही घर से बाहर निकलें तथा स्नकर में अपने साथ पाने का पानी हमेशा रखें।
- जब भी घुस में बाहर जायें क्वासंभ हल्के रंग के डीने-ड्रासे एवं सुती कपड़े पहनें। घुस के घाघा का इस्तेमाल करें। गीलिया/गमछा गिरोकर तिर पर रखें और पेट पर पोछें तब ब जुता। घमच पधनकर बाहर नलें।
- घर में वेव य्वाय जैसे- सरसी, नमक-घीनी का घोल, छाउ, गी-पानी, आन का सरका आदि का निचमित सेवन करें।
- हल्का भोजन करें तथा अधिक पानी की मात्रा घालें मौसमी फल जैसे- तरबूज, सीता, गी-संतरा आदि का अधिकाधिक सेवन करें। ज्यादा प्रोटीन घालें भोजन, जो शरीर का तापमान बढ़ाते हो क्वा- माल, अंडा व लुखे में आदि का सेवन ना करें।
- अपने दैनिक भोजन में क्वा प्याज, लाल, घुली, सौक तथा लस को भी शामिल करें।
- अधिक तापमान में शारीरिक श्रम ना करें।
- बच्चों को बर वाहनों में अकेला ना छोड़ें।
- सरेरे रस रस में घर में ताजी और ठंडी हवा आने के लिए खिडकियां खुली रखें।
- स्थानीय मौसम के फुर्नमान और आगामी तापमान में परिवर्तन के बारे में सिमिन विस्सनीय सूत्रों से लगातार जानकारी घालें रखें।
- जानवरों को छाँव में रखें तथा उन्हें भी लू पानी पीने दें।

लू लगने पर क्या करें-

- लू लगे व्यक्ति को छाँव में पैर ऊँचा कर लिट दें।
- तंग कपड़ों को ढीला कर दें अथवा हटा दें।
- शरीर के तापमान को कम करने के लिए कूलर, पंखे आदि से हवा करें।
- ठंडी गीले कपड़े से शरीर को पोछें, ठंडे पानी से नहलायें।
- रोगी को ओ.आर.एस. का घोल / नींबू-पानी / साधारण पानी / नमक-घीनी का घोल पीने को दें।
- यदि व्यक्ति पानी की उल्टियाँ करें या बेहोश हो तो उसे कुठ भी घाले व पीने को ना दें।

कूलर, पंखे आदि का प्रयोग करें। पैरों को ऊँचा रखें। गर्म, घेद एवं तिर पर मौसम लवा छाउ कपड़ा रखें। शरीर को छायादार स्थान पर लिटावें एवं कपड़ा ढीला कर दें।

उपयुक्त उपाय करने पर भी अगर आपकी तबियत ठीक ना लगे या घबकड़ आए तो तुरंत नजदीकी स्वास्थ्य केन्द्र से संपर्क करें।

लू के परीख निःशुल्क एम्बुलेंस सेवा हेतु टॉल फ्री नं. 102 डायल करें।

राज्य स्वास्थ्य समिति, बिहार

स्वास्थ्य विभाग विहार सरकार

लू एवं गर्म हवाओं से यूं बचें

अत्यधिक गर्मी के दिनों में लू लगने की संभावना बनी रहती है, यह जानलेवा भी हो सकता है।

लू लगने पर क्या करें-

- लू लगे व्यक्ति को छाँव में पैर ऊँचा कर लिट दें।
- तंग कपड़ों को ढीला कर दें अथवा हटा दें।
- शरीर के तापमान को कम करने के लिए कूलर, पंखे आदि से हवा करें।
- ठंडे गीले कपड़े से शरीर को पोछें / ठंडे पानी से नहलायें।
- रोगी को ओ.आर.एस. का घोल / नींबू-पानी / साधारण पानी / नमक-घीनी का घोल पीने को दें।
- यदि व्यक्ति पानी की उल्टियाँ करें या बेहोश हो तो उसे कुठ भी खाने व पीने को ना दें।

ओ.आर.एस. का पैकेट निकटतम सरकारी स्वास्थ्य संस्थानों में निःशुल्क उपलब्ध है।

कूलर, पंखे आदि का प्रयोग करें। पैरों को ऊँचा रखें। गर्म, घेद एवं तिर पर मौसम लवा छाउ कपड़ा रखें। शरीर को छायादार स्थान पर लिटावें एवं कपड़ा ढीला कर दें।

उपयुक्त उपाय करने पर भी अगर व्यक्ति की तबियत ठीक ना लगे या चक्कर आए तो तुरंत नजदीकी स्वास्थ्य केन्द्र से संपर्क करें।

लू से बचने, घुटे, जलमेली, मलिया, नजदूर व्यक्ति अत्यधिक प्रभावित होते हैं।

जीवन्ता बिहार... रापना हो सकाए

राज्य स्वास्थ्य समिति, बिहार

104 अधिक जानकारी के लिए इल्लुमिनेशन पर डायल करें

आपगत स्थिति में निःशुल्क एम्बुलेंस हेतु डॉल फ्री नं. 102

वायु प्रदूषण

जब गैस, धूलकण, धुएँ या गंध का वायुमंडल में प्रवेश होता है तब हवा अशुद्ध हो जाती है, जिसे वायु प्रदूषण कहते हैं।

वायु प्रदूषण के स्रोत:-

प्राकृतिक स्रोत:

- ज्वालामुखी विस्फोट
- वन की आग
- जैविक क्षय
- रेडियोधर्मी सामग्री आदि

मानव निर्मित स्रोत:

- थर्मल पावर प्लांट
- औद्योगिक एवं वाहन उत्सर्जन
- जीवाश्म ईंधन का जलना
- कृषि गतिविधियाँ
- फसलों के अवशेष एवं दूँटी का जलना



वायु प्रदूषण से अत्यधिक जोखिम वाले लोग



5 वर्ष से छोटे बच्चे

श्वसन रोग मरीज



गर्भवती महिलाएं

हृदय रोग के मरीज



बुजुर्ग लोग

उच्च वायु प्रदूषण के दिनों में अत्यधिक जोखिम वाले लोग निम्न बातों का ध्यान दें-

- भीड़ वाले स्थलों से दूर रहें हो सके तो घर में ही रहें।
- साफ-सफाई का ध्यान रखें।
- घर के अंदर वायु प्रदूषण के अतिरिक्त स्रोतों जैसे: जलती हुई लकड़ी, मोमबत्तियाँ, घूपबत्ती इत्यादि से बचें।

आंखों में जलन, छाती में बेचैनी या दर्द, खांसी, चक्कर, सांस फूलने की हालात में नजदीकी स्वास्थ्य केन्द्र से संपर्क करें।

उचित फिटिंग प्रमाणित 'एन95' या 'एन99' के 'फेस मास्क' का ही उपयोग करें।



राज्य स्वास्थ्य समिति, बिहार



Quarterly Progress Report Format, NPCCHH

Name of the State	Name of the State Nodal Officer (SNO)	Quarter Period
O.M. of appointment of State Nodal Officer		Annexed (Yes / No)
Postal Address of State Nodal Officer		
Phone (O) (M)		E Mail address:
Consultant*		
No of Consultant permitted		1 or 2
No of Consultant appointed		
O.M of appointment of Consultant		Annexed (Yes / No)

Programme Activities /Deliverable			
1	Constitution of State Governing Body (SGB)		
A	If State Governing Body (SGB) constituted?	Yes/No	
B	If Yes, provide O.M. of constitution of SGB	Annexed (Yes / No)	
C	SGB meeting held in past quarter	Yes/No	
D	Minutes of last meeting held	Date of Meeting / /	Annexed (Yes / No)
2	Formation of State Multisectoral Task Force (SMTF)		
A	If State Multisectoral Task Force (SMTF) formed?	Yes/No	
B	If Yes, provide O.M. of constitution of SMTF	Annexed (Yes / No)	
C	SMTF meeting held in past quarter	Yes/No	
D	Minutes of last meeting held	Date of Meeting / /	Annexed (Yes / No)
3	Establishment of Environmental Health Cell (EHC)		
A	If State has established EHC ?	Yes/No	
B	If Yes, provide O.M. of establishment of EHC	Annexed (Yes / No)	
C	If Yes, provide list of members	Annexed (Yes / No)	
4	State Action Plan on Climate Change and Human Health (SAPCCHH)		
A	If State has submitted SAPCCHH?	Yes/No	
B	If Yes, version number of SAPCCHH	No:	Month/Year ____/____

5	Designated District Nodal Officer -Climate Change (DNO-CC)			
A	If State has identified DNO-CC in all districts?	Yes/No		
B	No of Districts in State/UT			
C	No of Districts appointed DNO-CC			
D	O.M. of appointment of DNO-CC's	Annexed (Yes / No), If Yes, No of Districts_____		
6	Formation of District Multisectoral Task Force (DMTF)			
A	If District Multisectoral Task Force (DMTF) formed?	Yes/No		
	No of Districts appointed DTF			
B	If Yes, provide O.M. of constitution of DMTF	Annexed (Yes / No), If Yes, No of Districts_____		
C	DMTF meeting held in past quarter	Yes/No, If Yes, No of Districts_____		
D	Minutes of meeting held in past quarter	Annexed (Yes / No)	If Yes, No of Districts_____	
7	Capacity Building of State & District Nodal Officers on Climate Change			
A	Have the SNO attended the TOT?	Yes/No		
B	Have the Consultant/s attended the TOT?	Yes/No		
C	Whether the training has been conducted on Climate Change and Human Health in past quarter for	DNO -CC	Yes/No	
		Medical Officer	Yes/No	
		Health Workers	Yes/No	
D	No of health care professionals trained in past quarter on Climate change and Human Health	Health care personnel	No of trained	
		DNO -CC		
		Medical Officer		
		Health Workers		
E	Training on Air pollution		Training on Heat Related Illnesses	
	Health care personnel	No of trained	Health care personnel	No of trained
	DNO -CC		DNO -CC	
	Medical Officer		Medical Officer	
	Health Workers		Health Workers	
F	Training on any other Climate issues		Health care personnel	No of trained
			DNO -CC	
			Medical Officer	
			Health Workers	
G	No of Sensitization workshop/ meeting at State level on CC&HH matters in past quarter	No :	Report Annexed (Yes / No)	

H	No of Sensitization workshop/ meeting at District level on CC&HH matters in past quarter	No :	Report Annexed (Yes / No), If Yes, No _____
I	Training of Panchayat Raj Institutions in past quarter	No of Blocks :	
		No of activities held:	Report Annexed (Yes / No), If Yes, No _____
8	IEC in past quarter		
A	At Block level in past quarter		
	Pollution	Total No	Heat
	No of audio		No of audio
	No of video		No of video
	No of social media		No of social media
	No of posters		No of posters
B	At District Level in past quarter		
	Pollution	Total No	Heat
	No of audio		No of audio
	No of video		No of video
	No of social media		No of social media
	No of posters		No of posters
C	At State level in past quarter		
	Pollution	Total No	Heat
	No of audio		No of audio
	No of video		No of video
	No of social media		No of social media
	No of posters		No of posters
9	Observation of public health days related to Climate Change in past quarter		
A	World Environment Day observed?	Yes/No /Not Applicable	
	If Yes, report submitted with details	Report Annexed Yes/No	
B	International day of Clean Air and Blue Skies observed?	Yes/No/Not Applicable	
	If Yes, report submitted with details	Report Annexed Yes/No	

C	Other events observed in past quarter	YES/No						
	If Yes, report submitted with details	Report Annexed Yes/No						
10	Printing in past quarter							
A	No of Training modules printed in past quarter							
B	IEC printed							
C	Others printed	Details.. Yes/No						
C	Articles contributed to NPCCHH Newsletter for past quarter activities	Attached.. Yes /No						
11	Budget							
A	Total budget sanctioned in ROP for Financial Year (Rs in lakhs)**							
B	Total received by SNO for expenses in FY							
C	Total budget spent till the end of past quarter (Rs in lakhs)							
D	Total budget distributed to districts (for all the districts)	District 1	OM Annexed (Yes / No)					
		District 2	OM Annexed (Yes / No)					
	At the State level							
	FMR code	Activities	Budget Received	Quarter I	Quarter II	Quarter III	Quarter IV	Total Expenditure
1	3.3.3.3	Training of PRI						
2	5.1.1.2.13	Greening						
3	9.2.4.9	Training of MO's, Health workers, Programme Officer's						
4	10.2.14	Surveillance						
5	11.4.7	IEC						
6	12.17.3	Printing						
7	16.1.2.1.23	Task force Meeting						
8	16.1.2.1.24	Review of DNO-CCHH with SNO-CCHH						
9	16.4.1.5.2	Consultant-						

		CCHH						
	Date of submission			Signature of SNO				