स्वास्थ्य एवं
परिवार कल्याण मंत्रालय
MINISTRY OF
**HEALTH AND
FAMILY WELFARE**

सत्यमेव जयते

MANIPUR

STATE ACTION PLAN ON CLIMATE CHANGE AND HUMAN HEALTH







National Centre for
Disease Control
Government of India

National Programme
on Climate Change
and Human Health

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2022-27

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Executive Summary

Climate change is happening. There is no escaping the health consequences of climate variability. The challenge before our society now is to create one that is climate resilient. A climate-resilient society is one that has assessed its vulnerability to climate change and has defined priority mitigation and adaptation measures. With this vision in mind, the Department of Health & Family Welfare has come up with an action plan to create climate-resilient health systems. The goal of a climate-resilient health system is to have mechanisms in place that not only withstand the onslaughts of climate variability but also sustain human health amid uncertainties.

In a series of UN reports, thousands of scientists and government reviewers agreed that limiting global temperature rise to no more than 1.5°C would help us avoid the worst climate impacts and maintain a liveable climate. As a result of continuous emissions of greenhouse gases, the earth is now 1.1 °C warmer than it was in the late 1800s. The last decade (2011-2020) was the warmest on record. The consequences of climate change now include intense droughts, water scarcity, severe fires, rising sea levels, flooding, melting polar ice, and catastrophic storms and severe heat waves.

Adaptation plans will be required everywhere but must be prioritized now for the most vulnerable population with fewer resources to cope with climate hazards. Adapting to climate consequences protect people, homes, businesses, livelihood, infrastructure, and natural ecosystem.

Climate change is increasingly being identified as the single biggest health threat facing humanity. Climate impacts through air pollution, climate-sensitive diseases, extreme weather events, displacement, pressure on mental health, and increased hunger and poor nutrition in places where people cannot grow or find sufficient food. Every year, environmental factors affect the lives of around 13 million people.

Therefore, every district, state, and nation needs to develop an action plan to combat the consequence of climate change by identifying appropriate adaptive and mitigation measures. Any approach to climate change-related action has to be organic and dynamic. State Action Plans shall be as per the needs of the state and be reviewed and modified from time to time.

This action plan draws heavily from the World Health Organization Operational Framework for building climate resilient health systems (WHO 2016) and the Ministry of Health & Family Welfare, the Government of India's draft National Action Plan on Climate Change & Human Health (MOHFW 2018). The important climate-sensitive illnesses in Manipur are Water & Food borne diseases (Diarrhoea & Typhoid), Vector- borne and zoonotic diseases (Malaria, Dengue, Japanese Encephalitis), Air Borne, Cardio Pulmonary & Respiratory Allergic Diseases (Chronic Obstructive Pulmonary Disease, Asthma, Lung cancer & Heart Disease) and heat-related illnesses such as skin rashes, heat exhaustion, heat syncope etc. and disaster (floods, cyclones, drought) related illnesses like food borne and water-borne diseases.

PART I

Climate Change and its Health Impacts

CHAPTER 1

Introduction

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

Climate change may negatively affect human health in several ways, but the most commonly experienced ones include increased frequency and intensity of heat waves leading to a rise in heat-related illnesses and deaths, increased precipitation, floods, droughts, and desertification. 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, and increased risk of disasters and malnutrition.

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

India is a signatory to the "Malé Declaration" which calls for the strengthening of the health sector to make it climate resilient. According to the "Male Declaration", it is desired that health care facilities should be made climate resilient, particularly to encourage that these can withstand any climatic event and that essential services such as water, sanitation, waste management, and electricity are functional during such events. Further, for achieving climate resilience, the health department has to undertake measures to initiate the greening of the health sector by adopting environment-friendly technologies and using energy-efficient services.

Initiatives undertaken by the Government of India in this regard include the identification of the Ministry of Environment, Forest & Climate Change (MOEF & CC) as the nodal ministry for climate change, the formulation of National Environmental Policy 2006, and the formulation of Prime Minister's Council on Climate Change for matters related to Climate Change.

Ministry of Environment Forest and Climate Change (MoEFCC), has developed the National Action Plan on Climate Change with eight missions. Later on, four new missions (including Health Mission) were identified. The *Health Mission* aims to reduce climate- sensitive illnesses through integration with other missions under

the National Action Plan for Climate Change (NAPCC) as well as through programs 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 National Action Plan on Climate Change and Human Health (NAPCCHH) and recommend strategies for mitigation, capacity building, adaptation, etc. for the health sector to respond to the climate emergency.

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

CHAPTER 2

Climate Vulnerability

Manipur is a state in the North-Eastern part of India lying at latitude 23°83' N – 25° 68'N latitude and 93°03' E – 94° 78'E longitude. It is bounded by Nagaland in the north, Assam in the west, and Mizoram in the south and shares an international boundary with Myanmar on the eastern side. Manipur has a total area of 22,347 sq. Km. Geographically, the hill area covers around 86.78% and the valley area covers only 10% (2238 sq. km) of the area. The average elevation of the valley is about 790 m above sea level. The state has 16 districts, out of which 5 are valley districts namely, Imphal East, Imphal West, Bishnupur, Thoubal, and Kakching. Manipur has a population of 2.86 million as per the 2011 census. The state is rich in natural resources and is renowned for its greenery. It is largely an agrarian state with almost 71% of the population living in rural areas. The major crops are rice, maize, and different types of millet.

Maximum average temperature ranges from 34°C with a minimum temperature of 16°C with a wind speed of 8 km/hour. The precipitation rate is 110.9 mm, humidity of 77.6%, and average annual rainfall is between 935 to 2636 mm. South-western parts of the state ie. Jiribam, Churachandpur, Thoubal, Imphal-East, Imphal-West, and some parts of Chandel and Tamenglong have experienced an increase in both maximum and minimum temperature of ≥1.75°C and ≤1.5°C respectively in the last 100 years.[1] Manipur is vulnerable to landslides, earthquakes, flash floods, rise in colder days, warm summer months, and unusual patterns in the occurrence of vector-borne diseases, water-borne diseases, etc. as an impact of climate change.

In accordance with the State Action Plan, the identified key areas of concern for addressing the crisis are as follows:

Water Resources Lakes/Water Bodies

Manipur is one of the rain-fed regions of the country and receives an appreciable amount of precipitation throughout the year with peak rainfall during monsoon. However, because of the hilly topography, water does not get to recharge over a long period of time. The valley areas witnessed flash floods damaging available agricultural lands and habitats. Acute shortage of safe drinking water has been a prominent problem faced by the people during the past few decades due to heavy siltation during monsoon season and the disappearance of perennial streams and natural springs. Pollution of water sources poses risks to health and the ecosystem. The lakes namely Lamphelpat, Takyelpat, Akampat, Porompat, Khonghampat, and Sangaipat which were once large fresh water lakes are now filled up and elevated.

[1] Source: Directorate of Environment, Govt. of Manipur, National Data Center, IMD, Pune and ICAR, Lamphel

Agriculture

The agricultural practices in Manipur can be broadly categorized into two distinct types viz., settled farming practiced in the plains, valleys, foothills, terraced slopes, etc., and shifting cultivation practiced on the hill slopes leading to forest degradation. As the climatic conditions change, so do the spatial distribution of agro-ecological zones, habitats, and distribution patterns of plant diseases, and pests entailing a significant impact on agricultural and food production which is speculated by the year 2050. As per a study by the IISc Bangalore, "Rice yield is projected to decrease in seven out of nine districts of Manipur viz Chandel and Thoubal by 3% and between 0.4 to 0.1% in Imphal (East &West), Senapati, Ukhrul, and Tamenglong by the year 2050".

Forests, Ecosystem, and Biodiversity

Forests of Manipur are rich in biological and genetic diversity with about 2192 species of plants and at least 100 species of mammals and over 400 species of avi-fauna. Manipur is the home of Recervus eldi eldi, Hoolock gibbon, Slow loris, Serow, and Sunbear are rare endangered denizens of the forests. This rich flora and fauna of the state forest might be at risk under the long-term projection of climate variability on temporal and spatial scales or deforestation due to natural or anthropogenic pressure. The forest ecosystem might be vulnerable on account of the altitudinal and latitudinal shift of the species of the forest ecosystem on account of the increased occurrence of forest fire, invasive deforestation, and frequent landslide. An increase in population and decreasing land productivity and relatively higher dependency on natural resources such as forests are also major constraints of Manipur.

Transport

Land and air route are the main modes of transportation in Manipur. The lack of connectivity with the interior of the hill districts has made the population very much vulnerable and reduced their preparedness against disaster. Public and private transport systems passing through the narrow lanes, the market place and densely populated areas are prone to accidents and loss of life. Manipur is experiencing a rise in the number of diesel vehicles, and old public vehicles, including two and three-wheelers which are contributing to greenhouse gas emissions at an alarming rate.

Urbanization and Growth in Population

More than 90% of the total land area of Manipur belongs to the hilly region. Overcrowded valley area due to unplanned urbanization, population migration from rural and hilly regions has led to the growth of congested and haphazard settlements mainly in Imphal city, with no separate residential, industrial areas and office complexes. In such urban habitation, a large number of people are deprived of basic amenities such as housing, water supply, solid waste disposal, proper sanitation, and sewerage system. Climate change not only has adverse impacts on the urban settlement with the level of vulnerability depending upon the population density and urban infrastructure but urbanization per se impacts the climate.

Hydropower Generation

Multipurpose valley projects like LLI Project, Singda Dam Project, Imphal Barrage Project & Sekmai Dam Project, along with the Khuga, Thoubal, and Dolaithabi projects and two new namely Chakpi and Jiri irrigation projects which are under progress at present will sufficiently improve the water availability in the state as well as improve hydro- generation making the north-eastern grid more sustainable (low fossil fuel dependent). However, the power generation sector in the state which is crucially dependent on rainfalls is likely to be affected by the projected climate change impact.

Vulnerability assessment in rural communities: Long-term climate observation in Manipur (1954-2011) shows an increasing trend in the maximum and minimum temperature. Southern and central districts experience a decrease in precipitation whereas northern districts observe a considerable increase in precipitation. Increased relative humidity during monsoon increases the incidents of vector-borne diseases like malaria, dengue, and JE in the state.

The most effective vulnerability reduction measures for the health sector in the near future are programs that implement and improve basic public health measures, such as the provision of clean water and sanitation, secure essential healthcare including vaccination and child health services, increase capacity for disaster preparedness and response, and alleviate poverty.

CHAPTER 3

Climate Sensitive Issues/ Diseases prevalent in Manipur

In Manipur, during the last 57 years (1954-2011), the mean minimum and maximum temperature have risen from 13.9°C to 14.9°C and 26.6°C to 27.3°C respectively and the Relative Humidity has increased from 70% to 80%.[2]

The state is projected to experience an increase in surface temperature above 1.7°C by 2030. The south-western districts like Jiribam, Churachandpur, Bishnupur, Thoubal, Imphal East, Imphal West, and Chandel some parts of Tamenglong are projected to have higher temperatures. The entire State of Manipur is projected to receive increased precipitation and the districts of Ukhrul and Senapati are projected to experience extreme rainfall events of two or more days. The increase in the number of extreme rainfall (100 mm/day) is projected for the whole state.[3]

These changing patterns of climate may impact health directly or indirectly in many ways by the propagation of diseases like an increase in the number of vector-borne and water-borne diseases, a decrease in nutritional health due to loss of food security, and reducing cereal production. Flash flood during the rainy season due to unplanned urbanization and improper drainage system results in an increase in food-borne, diarrheal diseases, enteric fever, etc.

Climate Sensitive diseases prevalent in Manipur

Sl. No.	Climate sensitive	2022		2021		2020	
		Cases	Deaths	Cases	Deaths	Cases	Deaths
1.	Malaria	16	0	19	0	23	2
2.	Dengue	160*confirmed 192# probable	1	203	0	37	0
3.	JE	46	0	13	0	29	0
4.	Acute diarrhoeal diseases	**5275**	**1**	576	0	**0**	**0**
5.	Acute hepatitis	**1**	**0**	0	0	**0**	**0**
6.	Enteric fever	**1163**	**0**	84	0	**0**	**0**

Source: IDSP, Manipur) 160* - Confirmed cases by ELISA Test ; 192 – Probable cases by RDK Test.

[2] Source: IMD-Pune, ICAR-Imphal and District Weather Stations of Env. Directorate

[3] Source: Prof. Rabindranath, IIS, Bangalore

1. Vector Borne Diseases (VBD)

There is increased incidences of VBD like Malaria, JE, Dengue due to an increase in temperature, relative humidity, and change in rainfall pattern. Increased rainfall in Tamenglong (32%) and Churachandpur (22%) (2006 to 2011).

Year	Malaria		Dengue		JE	
	Cases	Deaths	Cases	Deaths	Cases	Deaths
2010	947	4	7	Nil	118	15
2011	714	1	NA	NA	9	1
2012	255	Nil	0	0	0	0
2013	120	Nil	0	0	0	0
2014	145	Nil	0	0	1	0
2015	216	Nil	0	0	6	0
2016	122	Nil	1	1	47	1
2017	80	Nil	193	1	188	11
2018	12	Nil	14	NA	57	3
2019	16	Nil	359	NA	21	1
2020	23	2	37	NA	29	4
2021	19	0	203	NA	13	2
2022	16	0	160*	1	46	6

Source: NVBDCP, Manipur) 160* - Confirmed cases by ELISA Test ; 192 – Probable cases by RDK Test # NNY- Noney district, CCP- Churachandpur district

Based on the registered cases as well as the predicted climate variability, the priority districts identified in the state to address vector-borne diseases include:

VBD	Priority districts
Malaria	Churachandpur, Tamenglong, Imphal West, Noney, Tengnoupal
Dengue	Imphal West, Imphal East, Churachandpur, Chandel, Kangpokpi, Bishnupur, Thoubal
JE	Churachandpur, Tengnoupal, Imphal East, Imphal West, Kangpokpi, Thoubal, Kakching

2. Increased risk of Water-borne Diseases like diarrhea after flooding

Flash floods occur every year in the valley districts of Imphal East, Imphal West, Bishnupur, Thoubal, and Kakching due to heavy runoff with less infiltration in the degraded upper catchment area of rivers and poor draining conditions. This impact the drinking water and results in the outbreak of water-borne diseases like ADD, Enteric fever, etc.

Landslides occur in Noney during the rainy season. Drought-like situations in the state is also contributing factor to water-borne diseases. The absence of rainfall from January to mid-March this year (2023) caused the drying up of rivers and huge water scarcity in the state.

Sl. No.	Water borne diseases	2022		2021		2020	
		Cases	Deaths	Cases	Deaths	Cases	Deaths
1.	Acute diarrhoeal diseases	5275	1	576	576	0	0
2.	Acute hepatitis	1	0	0	0	0	0
3.	Enteric fever	1163	0	84	84	0	0

Disease	Priority districts
Acute diarrhoeal diseases	Bishnupur, Chandel, Churachandpur, Imphal West, Imphal East, Tengnoupal, Kakching, Tamenglong, Kangpokpi
Acute hepatitis	Tamenglong, Tengnoupal
Enteric fever	Bishnupur, Chandel, Churachandpur, Noney, Kakching

3. Air pollution-related illnesses

Energy consumption for domestic heating and lighting, accumulation of solid wastes, use of old vehicles, increased number of vehicles in the state, burning of trashes, construction works, and brick fields, in the state, are major contributors to Greenhouse gas emission leading to air pollution which might be impacting the health in the state by increasing the number of air pollution-related illnesses like Acute Respiratory Infections (ARI), Allergy, COPD, etc.

District-wise Consolidated Disease Summary Status Report for Manipur State for January 2023 and February 2023 for Form – Type: P Form					
Sl. No.	District	ARI/Influenza like			
		January 2023		February 2023	
		Cases	Death	Cases	Death
1	Bishnupur	381	0	255	0
2	Chandel	1	0	4	0
3	Churachandpur	3	0	2	0
4	Imphal East	71	0	66	0
5	Imphal West	104	0	54	0
6	Jiribam	0	0	Nil	0
7	Kakching	14	0	4	0
8	Kamjong	12	0	7	0
9	Kangpokpi	70	0	101	0
10	Noney	5	0	Nil	0
11	Pherzawl	0	0	Nil	0
12	Senapati	25	0	33	0
13	Tamenglong	0	0	Nil	0
14	Tengnoupal	166	0	96	0
15	Thoubal	71	0	83	0
16	Ukhrul	5	0	Nil	0
17	**Total**	**928**	**0**	**705**	**0**

Source: IDSP (IHIP), Manipur

Air Pollution related Disease	Priority districts
ARI/Influenza like	Bishnupur, Tengnoupal, Imphal East, Imphal West, Kangpokpi, Thoubal

CHAPTER 4

Vision, Goal and Objectives

Vision: Strengthening of healthcare services for all the citizens of the state especially vulnerable populations including children, women, elderly, tribal and marginalized people against climate-sensitive illnesses**.**

Goal: To reduce morbidity, mortality, injuries, and health vulnerability due to climate variability and extreme weather events.

Objective: To strengthen health care services against the adverse impacts of climate change on health.

Specific Objectives

Objective 1: To create awareness amongst the general population (vulnerable community), healthcare providers, and policy makers regarding the impacts of climate change on human health.

Objective 2: To strengthen the capacity of the healthcare system to reduce illnesses/diseases due to variability in climate.

Objective 3: To strengthen health preparedness and response by performing situational analysis at national/state/district/below district levels.

Objective 4: To develop partnerships and create synchrony/synergy with other missions and ensure that health is adequately represented in the climate change agenda in the country.

Objective 5: To strengthen state research capacity to fill the evidence gap on climate change impact on human health.

CHAPTER 5
Organisational Structure

ORGANISATIONAL STRUCTURE

NATIONAL LEVEL

Key Nodal Agency
Head, NPCCHH
(NCDC, MoHFW)

- Prime Minister's Council on Climate Change
- Health Mission
- Ministry of Health and Family Welfare (MoHFW), Govt of India

STATE LEVEL

Key Nodal Point
(SNO-NPCCHH)

- State Governing Body - Environmental Health
- State Level Task Force - Environmental Health
- State Environmental Health Cell

DISTRICT LEVEL

Key Nodal Point
(DNO-NPCCHH)

- District Task Force - Environmental Health
- District Environmental Health Cell

A. State Level – Governing Body – Environment Health

The state-level governing body for policy-level decisions shall be working under the Chairpersonship of the Hon'ble State Health Minister [DHS Manipur File approval No.

1/ENVT/H/2019- DHS (Pt)] dated 7/12/2019. The other members may be as follows:

Hon'ble State Health Minister	Chairperson
Principal Secretary (Health)	Vice Chairperson
Director Health Services/Head of Health System	Member Secretary
Mission Director - National Health Mission	Member
Principal secretary, Ministry of Revenue(Disaster)	Member
Principal Secretary, Ministry of Agriculture	Member
Principal Secretary, Ministry of water and sanitation	Member
Principal Secretary, Ministry of Transport	Member
Principal Secretary, Ministry of Animal Husbandry	Member
Principal Secretary, Ministry of Environment & Forests	Member
Principal Secretary, Ministry of women and child development/social justice	Member
Principal Secretary, Ministry of science and technology/Earth Sciences	Member
Principal Secretary, Ministry of Education	Member
Principal Secretary, Ministry of Public Works	Member
Principal Secretary, Ministry of Finance	Member
Principal Secretary, Ministry of Law	Member
Principal Secretary, Ministry of Food & Civil	Member
Principal Secretary, Ministry of Panchayati Raj	Member
Principal Secretary, Ministry of Urban Development	Member
Principal Secretary, Ministry of Power	Member
Director Medical Education and Research	Member
Regional Director, Health & Family Welfare (GoI)	Member
SNO-Climate Change	Member

B. State-Level Task Force – Environmental Health

This task force shall be working under the guidance of the Principal Secretary (Health) of the state. It is responsible for directly overseeing the implementation of the State Action Plan for Climate Change and Human Health (SAPCCHH).

The State level Task Force shall have inter-ministerial members which are reconstituted as: (File approval No.1/ENVT/H/2019-DHS (Pt.-1) dated 2nd March, 2022)

1	Principal Secretary (Health)	Chairperson
2	Director Health Services	Vice Chairperson
3	Mission Director - National Health Mission	Member- Secretary
4	Administrative Secretary/Nominee, Forest Department	Member
5	Regional Director, Health & Family Welfare	Member
6	Director/Nominee, Meteorological Department	Member
7	Director/Nominee, ICMR	Member
8	Member-Secretary/Nominee, State Pollution Control Board	Member
9	Chairperson/Nominee, Disaster Management Authority	Member
10	Secretary/Nominee, State Ground Water Board	Member
11	Secretary/Nominee, State Agriculture Department	Member
12	Director/Nominee, Power Department	Member
13	Secretary/Nominee Director, Department of Veterinary and Animal Husbandry	Member
14	Director/Joint Director/Nominee, Department of Env. & Climate Change	Member
15	Director/Nominee, Manipur Remote Sensing Applications Centre (MARSAC)	Member
16	Chief Engineer/Nominee, Department of Public Works Department	Member
17	Director/Nominee, Department of Panchayati Raj	Member
18	Addl. Director (MC)	Member
19	Addl. Director, Planning & Finance	Member
20	Addl. Director, Public Health	Member
21	State Nodal Officer, Climate Change	Member
22	State Surveillance Officer, IDSP	Member
23	State Nodal Officer, NVBDCP	Member
24	State Nodal Officer, NCD	Member
25	State Nodal Officer, Mental Health	Member
26	State Nodal Officer, IEC	Member
27	State Nodal Officer, Child Health & Nutrition	Member
28	State Nodal Officer, Maternal Health	Member
29	State Epidemiologist, IDSP	Member

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

C. Structure at State Environment Health Cell

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

Sr. Public Health Expert	1
State Nodal Officer, Climate Change	1
Consultant, Climate Change	1
Data Manager & Analyst	1
Secretarial Assistants cum Data entry Operator	1

Executive members of EHC

SNO-Climate Change	Chairperson
State Program Manager-NHM	Member
SSO	Member
SNO-NVBDCP	Member
SNO- IEC/Mass Media	Member
State Epidemiologist, IDSP	Member
Microbiologist, IDSP	Member
SNO-Mental Health	Member
SNO- NCD	Member

Roles and Responsibilities of the State/UT Environmental Health Cell

- Preparation and implementation of the State Action Plan for Climate Change and Human Health
- Conduct Vulnerability assessment and risk mapping for commonly occurring climate- sensitive illnesses in the state/UT.
- Assessment of needs for health care professionals (like training and capacity building) and organize training, workshops, and meetings.
- Maintain state and district-level data on physical, financial, and epidemiological profiles for climate-sensitive illnesses.
- Ensure convergence with NHM activities and other related programs in the state/district Monitor program, review meetings, and field observations
- Timely issue of warnings/alerts to health professionals, related stakeholders as well as the general public through campaigns or using mass media (electronic or printed)
- Social mobilization of community people against preventive measures through involvement of women's self- help groups, community leaders, NGOs, etc.
- Advocacy and public awareness through media (Street Plays, wall paintings, hoardings, etc.)
- Conduct operational research and evaluation studies for climate change and its impact on human health.

District Level

A District Level Task Force will be constituted by the District Nodal Officer - Climate Change in consultation with the District Medical Officer/Chief Medical Officer.

Structure of District Level Task Force, Climate Change

District Collector/Deputy Commissioner	Chairperson
Chief Medical Officer/District Medical Officer/District	Member Secretary
Officer, Climate Change	Member
District Surveillance Officer	Member
District Program Manager, NHM	Member
District Head/Nominee, Department of Revenue	Member
District Head/Nominee, Department of Agriculture	Member
District Head/Nominee, PHED	Member
District Head/Nominee, Department of Transport	Member
District Head/Nominee, Department of Veterinary and Animal Husbandry	Member
District Head/Nominee, Department of Environment & Climate Change	Member
District Head/Nominee, MSPDCL	Member
District Head/Nominee, Department of Rural Development & Panchayati Raj	Member
District Head/Nomi	Chairperson
District Nodal Officer, Climate Change	Chairperson
District Surveillance Officer/District Epidemic Officer	Member
District Family Welfare Officer	Member
District Epidemiologist	Member
District Microbiologist	Member
Data entry operator	Supporting

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

Structure of District Environment Health Cell

Roles and Responsibilities of the District Environmental Health Cell

- Preparation and implementation of the District Action Plan for Climate Change and Human Health.
- Conduct Vulnerability assessment and risk mapping for commonly occurring climate sensitive-illnesses in the district.
- Maintain and update the district database of illnesses identified in the district.

- Assess the needs of health care professionals and conduct sub-district/CHC level training/workshop and meetings for capacity building.
- Ensure the appointment of contractual staff and engage them in the assigned task of data management under NPCCHH.
- Maintain district-level data on physical, financial, and epidemiological profiles for these illnesses.

Community Health Centre Level

The proposed CHC Level Structure is as under:

Medical Officer-in-charge (CHC Hospital)	Chairperson
CHC Nodal Officer(CC)	Member Secretary
Block Development Officer	Member
Health Supervisor	Member

Health Facility Level (PHC)

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

PART II

Health Action Plans on Priority Climate Sensitive Health Issues

CHAPTER 6

Health Action Plan on Air Pollution Related Diseases

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

Two types of Air Pollution:

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

Causes of Ambient Air Pollution in the state of Manipur

1. Pollution by Automobiles
2. Dust-fall due to bad road management
3. Brick kilns
4. Stone crushers
5. Burning of wastes
6. Construction works
7. Municipal and community Waste dumping sites
8. Earth-moving activities like excavating, loading, hauling, placing compacting of soil and rock, etc.
9. Huge amounts of stubble burnt in the fields as a way of preparing the ground for the next crop.
10. Auto-rickshaws and taxis run on fuel that has been adulterated by other, cheaper ingredients, second-hand vehicles, and diesel vehicles which are in use for more than 10 years
11. Slashing and burning of fresh forest during February- March every year for the preparation of the Jhum practices adds a huge amount of fumes and particulate matter into the atmosphere.

Causes of Household Air Pollution in the state of Manipur

1. Use of biomass, kerosene as fuel for cooking Burning of waste, cow dung, coal
2. Burning of incense sticks, mosquito coils, and candles
3. Floor cleaners, room- fresheners, and disinfectants

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

Air Quality Index (AQI) Category	
Good	0-50
Satisfactory	51-100
Moderately Poor	101-200
Poor	201-300
Very Poor	301- 400
Severe	401-500

As per the report from State Pollution Control Board, Manipur (SPCB) 2 online and 12 manual AQI monitoring stations have been installed but only 2 in Imphal West District, one at Kangla and another at MU gate are functional.

The vulnerable population includes elderly people above 60 years, children less than 5 years, pregnant women, traffic police, outdoor workers, sweepers, rickshaw pullers, auto-rickshaw drivers, street vendors and women not having clean fuel for cooking etc.

Sl. No.	Districts	Category of vulnerable population		
		Elderly people age more than 60 years (2011 census)	Children less than 6 years	Pregnant women (April-Dec 2021) (Maternal Health Report)
1	Bishnupur	District-wise data not available	31303	2685
2	Chandel		17187	762
3	Churachandpur		37445	3478
4	Imphal East		59936	3771
5	Imphal West		61875	4654
6	Jiribam		-	407
7	Kakching		-	1692
8	Kamjong		-	350
9	Kangpokpi		-	2884
10	Noney		-	685
11	Pherzawl		-	467
12	Senapati		63335	6182
13	Tamenglong		19307	1196
14	Tengnoupal		-	470
15	Thoubal		60556	2841
16	Ukhrul		24413	986
Total		**200020**	**375357***	**33510**

*Only 9 districts were identified till the 2011 census

District-wise No. of Blocks, No. of Traffic Police, No. of Municipal Workers

Sl. No.	District	No. of Block	No. of Traffic Police	No. of Municipal Worker
1	Bishnupur	3	102	110
2	Chandel	3	11	23
3	Churachandpur	10	63	65
4	Imphal East	2	400	250
5	Imphal West	3		
6	Jiribam	3	4	30
7	Kakching	2	68	42
8	Kamjong	3	50	50
9	Kangpokpi	3	4	10
10	Noney		20	15
11	Pherzawl	2	0	0
12	Senapati	4	48	20
13	Tamenglong	3	25	25
14	Tengnoupal	3	5	8
15	Thoubal	3	120	70
16	Ukhrul	4	50	25
	Total: 16	**51**	**946**	**690**

Sl. No.	Category of vulnerable population	Total count for the district
1	Traffic policemen	
2	Road sweepers	
3	Auto-rickshaw drivers	
4	Rickshaw pullers	
5	Roadside vendors	
6	Construction Workers	
7	Women not having clean fuel for cooking	
11	People having any pre-existing lung disease like asthma, COPD, Bronchitis, TB, lung cancer etc	
12	Individuals with heart disease, coronary artery disease or congestive heart failure	

Adaptation Plan for Air Pollution

Roles and Responsibility of a few Key Members of Task Force

Sl. No.	Task force	Role and Responsibility for Air Pollution related illnesses
1	SNO-CC	Overall responsibility to coordinate activities of assessing the impact of air pollution on health and to suggest measures to reduce the same. • Coordinate with the **Directorate of Medical Education to** collect and compile data of patients with respect to Air • Pollution effects on human health. • To assist research on air pollution impact on health initiated by central/state Government, Ministry, ICMR, or any other agencies. • To regularly seek information from MPCB to determine the AQI of the State.
2	Director/ Representative, from any research institute	• To create evidence of air pollution impact on health by undertaking various studies and research for the same.
3	Director/representative, Meteorological department of State/UT	• To provide timely data of temperature, rainfall, wind speed 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.
4	Chairperson/ Re presentative, State Pollution Control Board	• 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	Chairperson/ Representative	• To monitor the situation of the Air Pollution in different cities of state.
6	State Surveillance Officer	• To take necessary actions in regular data collection and analysis of data. • To prepare and disseminate IEC on regular basis to the cities where air pollution is the big issue for public
7	Environmental Engineer/Senior Scientist	• To enlist & share probable causes of increase in air pollution within cities of the state. • To give necessary inputs to reduce air pollution as per the causes identified.
8	Secretary/ Representative	• Prevent farm burning of crop residue.

Health Adaptation Plan

i. Awareness Generation

Awareness generation activities are a key component of the NPCCHH. Activities include awareness campaigns and dissemination of IEC materials on air pollution and its impacts on human health, ways of protecting the population from exposure, and steps that can be taken by the population to protect themselves. These activities are targeted amongst all the relevant stakeholders including the common population, vulnerable

communities, healthcare providers, and policymakers. Under the NPCCHH, the following key activities are to be conducted:

A. IEC Campaign

The content of the IEC for air pollution-related issues will be provided by the state NPCCHH division (as per the guidelines from NCDC, NPCCHH division MoHFW). The state will translate the content into the local or regional language and the role of the districts is to utilize these materials and disseminate them at all levels.

Sl. No.	IEC content	Priority Districts	Timeline	Dissemination plan for 5 years 2022-27	Budget for 5 years (in lakhs)				
					2022-23	2023-24	2024-25	2025-26	2026-27
1.	Posters	2 posters for Healthcare facilities of all districts (English)	Oct-Nov	At least 2 posters to translate into the local dialect and disseminate in all districts	44. 70	46. 90	53. 93	62.0 2	71. 33
2.	Audio	Radio Talk/Discussion	Oct-Nov	Every year					
3.	Video	At least two TV channels in Manipur	Oct-Nov	Every year					
4.	Public Health	All districts	Oct-Nov	All district headquarters					

*No subject specific separate budget calculated and budget have been planned for a tentative increase of 15%.

B. Observation of special events

Event	Date	Key activities
World Environment Day	5 June	Observance & Tree Plantation at State and District Health Facilities
International day of clean air for blue skies	7 September	Observance & Tree Plantation at State and District Health Facilities: • Mask distribution to the Traffic Police & Municipal Workers • Painting/Essay Competition

C. Awareness Generation mechanisms

a. Radio communication system by district administration.

b. Air quality alerts, based on the air quality index thresholds determined by the local Government

c. Leaflets and pamphlets describing prevention guidelines

d. Hoardings to be put up in a public place in all the districts

D. Masks or particulate respirators

a. Masks may help in special circumstances if we have to be outside for long periods.

b. Masks should be disposable, regularly changeable, and preferably N-95 or N-99 meaning that the mask is adequate for filtering out most of the PM2.5 particles.

c. Distribution of N-95 or N-99 masks to traffic police and municipal workers whenever feasible.

Activities conducted and planned for awareness generation on the health impacts of Air pollution

1. Carry out mass media campaigns
2. Engage local and regional media (community radio, TV)
3. Encouraging policies to promote access to nonpolluting sources of energy
4. Encourage to use the public transport thereby reducing the private traffic in towns and improving public transport
5. Decreasing the use of fossil fuels and controlling vehicle emissions
6. Planting non-allergenic trees in cities and premises of health facilities

Schedule for IEC Plan for 5 years (2022-27)

Indicator statement	Indicator	Target					Budget (in lacs)				
		2022-23	2023-24	2024-25	2025-26	2026-27	2022-23	2023-24	2024-25	2025-26	2026-27
IEC Campaign	% of districts implemented IEC on Air Pollution	50%	80%	100%	100%	100%	44.70	46.90	53.93	62.02	71.33
PRI &VHSNC	% of districts included climate-sensitive issues in Village Health Sanitation &Nutrition Committee	25%	50%	75%	100%	100%					
Community participation	Sensitization on Air Pollution to the rural population	Pilot study Imphal West district	25%	50%	75%	100%					

*No subject specific separate budget calculated and budget have been planned for a tentative increase of 15%.

ii. Capacity Building

Medical professional training

i. Expanded training of doctors and associate staff

ii. Increased training of NGOs, PRI members, community health workers and ASHA workers

Training Plan

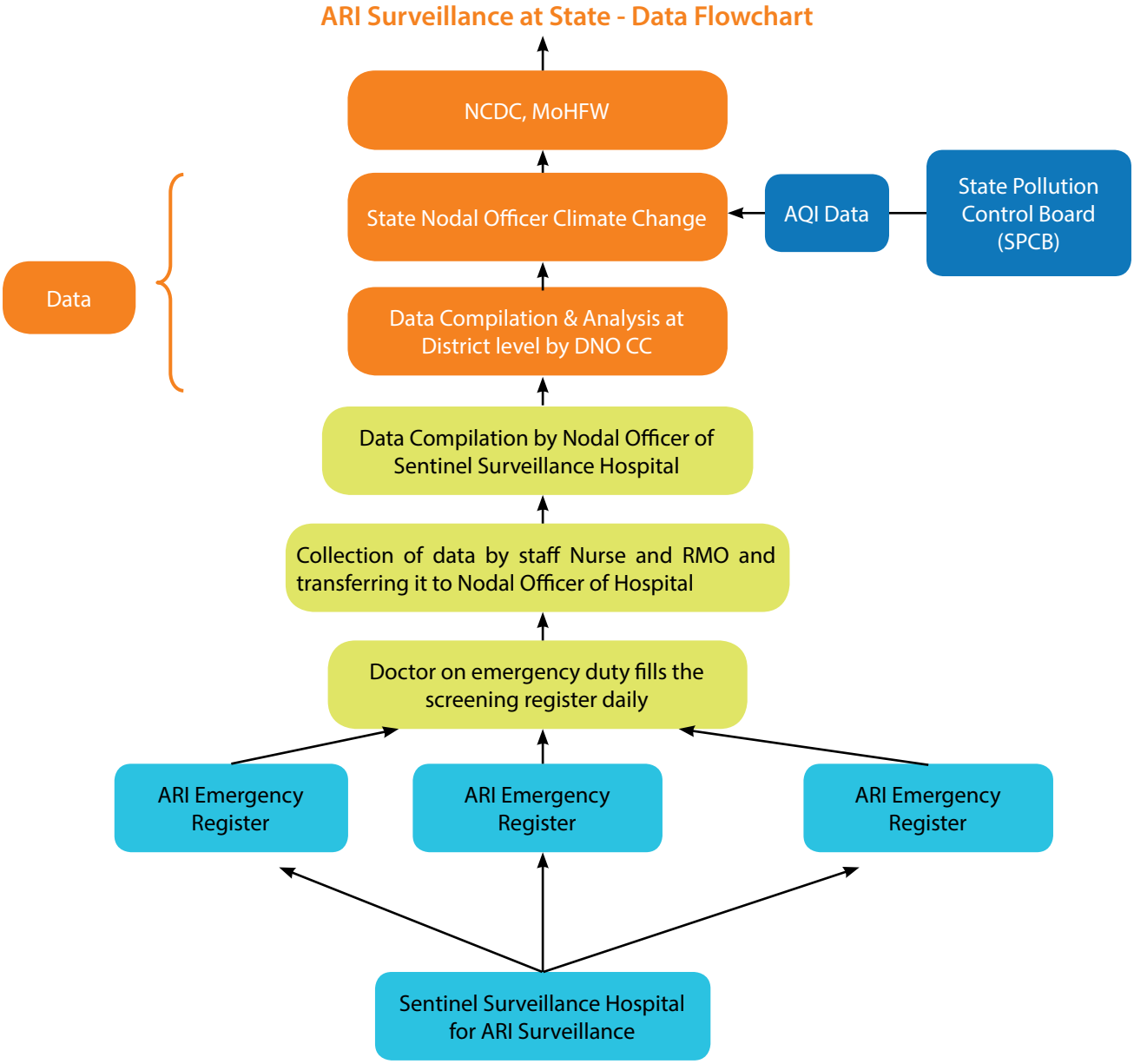
Training program	Trainers	Participants	Timeline	Training manuals
DNOs-CC of all 16 districts	5 identified master trainers	DNOs-CC of all 16 districts	Done on 8 Dec, 2022	Modules on air pollution for Women, Children, Traffic Police and Municipality Workers
Male Health Workers	Master trainers	In-service Male Health Worker Trainees (76 in no.)	Done on 9 Dec, 2022	Modules on Air pollution for Women and Children
Block MOs	Master trainers	2 MOs each from 2 blocks of 15 districts and 3 from IW (33 doctors)	Done on Feb 28, 2023	Modules on air pollution for Women, Children, Traffic Police and Municipality Workers
Traffic police	DNOs & Block MOs	Traffic police of the districts	March-April, 2023	Module for traffic police
PRI	ANMs and CHOs	PRI members of 33 Blocks	March-April, 2023	Module for women and children
Municipal workers	DNOs and MOs	Municipal workers of districts	March-April, 2023	Module for municipal workers
ANMs and CHOs	DNOs and MOs	ANMs and CHOs	April-May, 2023	Module for women and children
Community Health Workers	ANMs and CHOs	ASHAs and MHW	April-May, 2023	Modules for women and children

Sensitization Workshop

State-level sensitization workshop done on 2 September 2022 for the DNOs Climate Change of 16 districts. Sensitization Program on NPCCHH done for PGTs & Interns posted at Community Medicine Department, RIMS & JNIMS on 7th February, 2023. Further, it is planned for workshops to update knowledge on various air pollution-related issues among SNO, DNOs, resource persons from Medical colleges and Research Institutes, and Environment Department. A sensitization workshop is also planned for all 16 districts of Manipur.

iii. Surveillance

ARI surveillance is to be conducted to identify the trend of air pollution-related illnesses in the context of outdoor air quality for the district and share the findings with all relevant authorities to plan further actions to undertake timely intervention.



Status of ARI Surveillance data collection at the state

Name of District	Name of the sentinel Hospital	Capturing ARI data as per the format of annexure 3 from different departments (Yes/No)	Data compilation in format of annexure 4 (Yes/No)	Data is sent to the state office on a daily basis (Yes/No)
Bishnupur	Bishnupur DH	NA	NA	NA
Chandel	Chandel DH	NA	NA	NA
Churachandpur	Churachandpur DH	NA	NA	NA
Imphal West	CHC Wangoi	NA	NA	NA
Thoubal	Thoubal DH	NA	NA	NA

ARI/Flu-like illnesses reporting to the IHSP, IDSP for all the districts has been initiated since January, 2023. Identified Sentinel hospitals are also communicated to submit the ARI reports in the prescribed format by January 2023 onwards. Regarding the AQI monitoring stations, only Imphal West is functional out of the 16 districts at present as per the report of Manipur Pollution Control Board. ARI reports from the sentinel hospitals through IHIP IDSP shall be collected monthly at the state level and for onward submission to NCDC.

Air pollution-related illnesses

Energy consumption for domestic heating and lighting, accumulation of solid wastes, use of old vehicles, increased number of vehicles in the state, burning of trashes, construction works, brick fields, in the state are major contributors to Greenhouse gas emission leading to Air Pollution which might be impacting the health in the state by increasing the number of Air Pollution related illnesses like Acute Respiratory Infections (ARI), Allergy, COPD, etc.

District-wise Consolidated Disease Summary Status Report for Manipur State for January 2023 and February 2023 for Form – Type: P Form

Sl. No.	District	ARI/Influenza like			
		January 2023		February 2023	
		Cases	Death	Cases	Death
1	Bishnupur	381	0	255	0
2	Chandel	1	0	4	0
3	Churachandpur	3	0	2	0
4	Imphal East	71	0	66	0
5	Imphal West	104	0	54	0
6	Jiribam	0	0	Nil	0
7	Kakching	14	0	4	0
8	Kamjong	12	0	7	0
9	Kangpokpi	70	0	101	0
10	Noney	5	0	Nil	0
11	Pherzawl	0	0	Nil	0
12	Senapati	25	0	33	0
13	Tamenglong	0	0	Nil	0
14	Tengnoupal	166	0	96	0
15	Thoubal	71	0	83	0
16	Ukhrul	5	0	Nil	0
17	**Total**	**928**	**0**	**705**	**0**

Source: IDSP (IHIP), Manipur

CHAPTER 7

Health Action Plan on Heat Related Illnesses

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

A. Based on Departure from Normal

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

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

B. Based on Actual Maximum Temperature (for plains only)

Heat Wave: When actual maximum temperature ≥45°C Severe

Heat Wave: When actual maximum temperature ≥47°C

To declare a 'Heat wave', the above criteria should be met at least in two stations in a Meteorological Sub Division for at least two consecutive days. A 'Heat Wave' is declared on the second day.

The adverse health effects of hot weather and heat-waves are largely preventable. Prevention requires a series of actions at different levels which can be integrated in a defined 'Heat-Health Action Plan'.

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

Manipur state is susceptible to anthropogenic greenhouse gas (GHG) emissions. The surface temperature variation observed during 1954–2011 shows an increasing trend in both the minimum and maximum temperatures. When the maximum temperature has increased from 26.5°C to 27.3°C, the minimum temperature has increased from 13.8°C to 15.3°C. Amongst the 16 districts of Manipur, the South-Western part of the state ie, Jiribam, Churachandpur, Bishnupur, Thoubal, Imphal East & West, Chandel & some parts of Tamenglong has experienced an increase in both maximum and minimum temperatures of ≥1.75°C.

Even the night temperature has rapidly risen as compared to day time temperatures because of the greenhouse gases. With the projected increase in surface temperature, increase in heat and heavy precipitation, etc. in the future due to anthropogenic causes, human health impacts are likely to escalate with respect to their virulence and spread to hitherto disease-free areas.

Different type of heat-related illness includes:

1. Minor heat related Illnesses: Heat rash, heat cramps, heat syncope
2. Major heat related Illnesses: Heat Exhaustion and heat Stroke

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. Seen in 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 EFFECTED LIMBS/JOINTS**	No contaminated wounds/tetanus exposure; no seizure activity
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 or speech
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** ≥40°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

The vulnerable population to heat-related illnesses primarily includes elderly, children less than 5 years, slum dwellers, urban poor, outdoor workers, and migrant or displaced people. Other vulnerability factors include the health status, socio-economic status, occupation, working place and working conditions, unplanned urban housing, overcrowding, drought/flood-prone area, water scarcity zone, the proportion of population-malnourished, and non-accessibility to the health care facilities.

Health Adaptation Plan on Heat-related Illness

1. Awareness Generation

A. IEC Campaign

The content for the IEC related to heat wave issues will be provided by the State NPCCHH division as per the guidance of the MoHFW, NCDC, NPCCHH division. The state will translate the content into the regional language (Manipuri) and the districts will utilize these materials and disseminate them at all levels.

B. Public Health Advisories

- Health advisories are issued to alert the population of the potential harmful impact of increasing heat.
- Advisories are issued at the central level and forwarded to districts through state/UT for public dissemination.
- Districts should ensure timely dissemination of health advisories in locally acceptable language.

Establishment of an Early Warning System to provide advance weather forecast.

IEC Dissemination Plan

Sl. No.	IEC Content	Districts	Dissemination Plan	Timeline
1.	Posters	All 16 districts	2 posters for each health facility in the state	March-April, every year
2.	Audio/Video	All 16 districts in TV/Radio	Social media	March-April, every year
3.	Public Health Advisories	All 16 districts	Health Advisory in English and local language to be disseminated in all Health Care Facilities	March-April, every year

Sl. No.	Training program	Timeline	Target	Priority districts
1.	DNOs	April-May	50%	All 16 districts
2.	MOs	April-May	50%	All 16 districts
3.	Community health workers	April-May	80%	All 16 districts
4.	Traffic police and municipal workers	April-May	80%	All 16 districts

2. Capacity Building

Training agenda on various health impacts of heat (at the state and district level)

Training program	Trainer	Participants	Training content
DNOs of 16 districts	Master trainers	DNOs of 16 districts	Clinical management of heat-related illness in adults and children
MOs	DNOs	MO DH, CHC, PHC	- do -
CHW	DNO & MO	CHW (MHW, ASHAs)	Heat-related illnesses and preventive
PRI members	DNO & MO	PRI and communities	- do -

Budget (in lakhs) for 5 years with 15% increment

	2022-2023	2023-2024	2024-2025	2025-2026	2026-2027
IEC	44.70	46.90	53.93	62.02	71.33
Capacity building	30.00	31.50	36.22	41.66	47.91

*No subject specific separate budget calculated and budget have been planned for a tentative increase of 15%.

Sensitization/knowledge building workshops will be planned for seeking updates on various heat related issues amongst the District Nodal Officers, State Nodal Officer and academic institutions working on Climate Change issues.

Roles and responsibilities

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

	Responsibilities
SNO	• Disseminate early warnings to the district level • Finalization of IEC material and dissemination Plan • Liaison with IMD for weather alerts and its dissemination • Liaison with other departments for combined IEC campaigns, coordinated response and information sharing of health indicators for targeted action • Organize the IEC campaigns at the state level in the observance of important environment-health days • Organize training sessions for the district level and the district nodal officers • Facilitate training of medical officers in clinical aspects of the heat-health impact • Review health facility preparedness and ambulance services to manage HRI • Identify health facilities at different levels that can have heat illness wards with necessary medications for treatment and cooling facilities • Keep existing Rapid Response Teams under IDSP prepared to manage HRI if needed for an emergency response to extreme heat • Review implementation of the IEC and surveillance activities at all levels Evaluate and update relevant sections of SAPCCHH with support from State Task Force • Create organizational support and strengthen the Environmental Health cell to implement NPCCHH vision, goal, and objectives • Organize sensitization workshops for other stakeholders and line departments • Organize seminars and conferences to share knowledge and action under NPCCHH. • Collaborate with academic institute/s for support in updating SAPCCHH, Surveillance activity monitoring, training of health care professionals, vulnerability assessment, and applied research • Submit a report of activities on heat-health under NPCCHH • Advocate for the reduction in source of greenhouse gas emissions

	Responsibilities
DNO	• Disseminate early warning to block and health facility level • Ensure IEC dissemination to the community level and facilitate community-level IEC activities • Liaison with IMD to receive daily observed temperature and relative humidity information • Liaison with other departments for combined IEC campaigns, coordinated response and information sharing of health indicators for targeted action Conduct training for block health officers, and medical officers, with relevant training manuals • Conduct sensitization of vulnerable groups: police officers, outdoor works, women, children, etc. • Organize IEC campaigns at the district level in the observance of important environment-health days • Coordinate with other agencies for response • Update DAPCCHH with support from District Task Force • Submit a report of activities on heat-health under NPCCHH • Advocate for a reduction in source of greenhouse gas emissions through a proper energy audit and tree plantation (canopy trees).
Block health officer	• Conduct community-level IEC activities • Ensure training of medical officers • Organize PRI sensitization workshop, and training for vulnerable groups • Implement heat mitigation efforts
Medical officer	• Conduct health facility-based IEC activities • Support community-level IEC activities • Ensure necessary health facility preparedness in early diagnosis and management of cases
Panchayati Raj Institution	• Conduct community-level IEC activities

Suggested & proposed activities for Manipur state

- Improved water delivery systems such as water bank/water ATM in public areas
- Regulation of school timing & college
- Improving the forest coverage and green area such as tree plantation at urban parks, schools, colleges and other Institutes, road medians, road side, and individual lands
- Regulation of improved Bus Stand and Resting Sheds, wherever necessary.

CHAPTER 8

Health Action Plan on Extreme Weather Event-Related Health Issues

Manipur is a scenic state in North Eastern part of India with Imphal as its capital. It is surrounded by lush green hills and exotic landscapes richly endowed with the natural beauty of waterfalls, lakes, streams, and evergreen forests. But in recent years, Manipur is already experiencing climate change, resulting in morbidity and mortality due to the effect of extreme weather conditions, frequent and severe episodes of heavy rainfall, earthquake, increasing heat, floods, droughts, and fires as direct impact of climate variability and affecting the population at large.

The State Relief & Disaster Management Directorate (R & D) in Manipur is the nodal institution for disaster prevention, mitigation, preparedness, and management of disaster impacts as a result of climate change.

According to the State Relief & Disaster Department, the following hazards are considered to be common in the state owing to its geo-climatic, geological, and physical features:

1. Earthquake
2. Landslide
3. Fire
4. Flood/flash flood
5. Drought
6. Hailstorms, cyclones, thunder, and lightning

1. Earthquake

Manipur is classified as a severe seismic hazard zone (Zone V). In Manipur, all the districts are vulnerable to earthquakes; the damage is most likely to occur in Imphal Valley which has multi-storeyed buildings. A powerful earthquake of magnitude 6.7 on the Richter scale struck Manipur on 4th January 2016, killing at least 10 people and injuring 300 people. The earthquake caused damage to properties and lives in Imphal West, Senapati, Imphal East, Thoubal, Bishnupur, and Tamenglong districts of Manipur. The latest record of an earthquake was on 24th March 2023 (3.4 R) at Churachandpur. A total of 582 earthquakes with a magnitude above 4 have struck within 300 km of Manipur during the past 10 years.

2. Landslide

Landslides and mudslides are quite common in Manipur. In 2004, several landslides affected the Senapati district. Mudslides due to the construction of the Jiribam - Tupul line have affected many families in the Tamenglong district. Hill districts of Manipur ie, Churachandpur, Tamenglong, Senapati, Ukhrul, and Chandel are most vulnerable to landslides. The landslide in Noney on 30th June 2022 killed 61 and injured 18 people.

3. Fire

Fire is also very common in Manipur. As bamboo is extensively used in the construction of residential huts, many a time, whole dwellings are reduced to ashes. In March 2009, the whole Wino Bazar in Ukhrul District Headquarters in Manipur was reduced to ashes. Forest fires are also common in the forest areas adjoining the valley. The hill forests get burnt every year due to the wildfire spreading from burning for Jhum cultivation. Most fires occur in unclassed forests.

4. Drought

In recent years, the state is facing drought-like situations due to altered patterns of normal rainfall and human activities like deforestation, etc. In 2019, the Centre declared a 'drought' in Manipur as many regions across the state are adversely affected due to a significant deficit in rainfall. This year (2023), due to the absence of rainfall from January to mid-March, most of the rivers have dried up and there is an extreme scarcity of water for domestic and agricultural purposes rendering a drought- like situation in the state.

5. Flash floods

As per the 2011 census, about 2/3rd of the population of Manipur state is concentrated in the valley region surrounded by hills. River flooding is a common phenomenon faced by people in the past. Flash floods in the state are mainly due to drainage failure in urban areas, large-scale deforestation, illegal encroachments near river banks and lack of proper drainage system, heavy runoff, and less infiltration in the upper catchment area. Manipur valley is traversed by the Imphal river, Iril river, Thoubal river, Sekmai river, Khuga river, Chakpi river, Nambul river etc which usually overflows during heavy rainfall and causes flooding in the valley.

6. Hailstorms, Cyclone, thunders, and lightning

The state was hit by Cyclone "Mora" accompanied by heavy rainfall, and windstorms in May 2017 causing floods and landslides that led to huge damage to properties, crops, and injuries to people.

Human lives lost due to Floods/Landslides/Cyclones

Sl. No.	Year	Human lives lost (in no.)
1	2021-2022	62
2	2020-2021	NIL
3	2019-2020	7

Sl. No.	Year	Human lives lost (in no.)
4	2018-2019	23
5	2017-2018	21
6	2016-2017	-
Total		**113**

Source: Relief & Disaster Management Directorate, Manipur.

Health Adaptation Plan for Disaster Management

I. Awareness Generation

Under the program, awareness generation is to be done among all the relevant stakeholders including the common population, vulnerable communities, healthcare providers, and policymakers around the impacts of disaster events.

IEC Campaign

Sl. No.	IEC Content	Priority districts	Dissemination Plan	Timeline
1	Posters	All districts	Flood & Earthquake	May-June every year
2	Audio/Video	Imphal/Thoubal/Bishnupur/ Kakching	-do-	May-June every year

a. Training on Disaster Management

NPCCHH training plan at district level

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

b. Sensitization/knowledge

Sensitization/knowledge building workshops shall be planned for updates on Disaster Management between district officials, medical officers, and academic institutions working on climate change impact.

Roles & Responsibilities

	Responsibilities
SNO	• Disseminate early warnings to the district level • Finalization of IEC material and dissemination plan • Formalize inter-sectoral coordination for disaster planning, management, and response with R&D/IMD and other responsible departments • Organize training of district-level officers • Facilitate assessment and implementation of climate-resilient measures in health facilities • Review implementation of IEC, training, and surveillance activities at all levels • Evaluate and update relevant sections of SAPCCHH with support from State Task Force • Create organizational support and strengthen the Environmental Health cell to implement NPCCHH vision, goal, and objectives • Organize sensitization workshops for other stakeholders and line departments • Collaborate with academic institute/s for support in updating SAPCCHH, Surveillance activity monitoring, training of health care professionals, vulnerability assessment, and applied research • Submit reports of activities on EWE and health under NPCCHH
DNO	• Disseminate early warning to the block and health facility level • Ensure IEC dissemination to the community level and facilitate community-level IEC activities • Organize training for block health officers and MO • Formalize intersectoral coordination for disaster planning, management, and response with SDMA/IMD and other response departments • Liaison with other departments for combined IEC campaigns, coordinated response and information sharing of health indicators for targeted action • Identification and communication of evacuation routes &relief camps • Support planning and management of health care services in relief camps • Provide necessary IEC on health and sanitation in relief camps • Training for block health officers, and medical officers, with relevant training manuals • Conduct sensitization of vulnerable groups: police officers, outdoor workers, women, children, etc. • Organize IEC campaigns at the district level on the observance of important environment-health days • Facilitate disaster vulnerability assessments in health facilities and maintain records of such assessments and health facility damage due to EWE (Extreme Weather Events) • Update DAPCCHH with support from District Task Force • Submit reports of activities on EWS and health under NPCCHH
Block health officer	• Conduct community-level IEC activities • Ensure training of medical officers • Organize PRI sensitization workshops and training for vulnerable groups • Facilitate disaster vulnerability assessments in health facilities and maintain records of such assessments and health facility damage due to Extreme Weather Events (EWE)
Medical officer	• Conduct health facility-based IEC activities • Support community-level IEC activities • Preparation of Disaster Management Plans and hospital safety plan • Assessment of health facilities in the context of climate change-extreme weather events • Identifying structural changes/retrofitting measures at the facility level to equip the healthcare facility • Ensuring routine monitoring and maintenance of support functions (Water quality, waste management) • Health facility preparedness for seasonal events
Panchayati Raj Institution	• Conduct community level IEC activities • Community involvement in planning and demonstration of measure taken before-during- after an EWE

CHAPTER 9

Health Action Plan on Vector-borne Illnesses in Context of Climate Change

The major vector-borne diseases constitute about 17% of the infectious diseases in the world. (An insect or any living carrier that transports an infectious agent from an infected individual or its wastes to the susceptible individual is called a 'vector'. More than 7 lakh persons die of vector-borne diseases annually worldwide.

India has seen a high burden of vector-borne diseases such as Malaria, Dengue, Chikungunya, Japanese encephalitis, Kala-azar, and Scrub Typhus among others.

There has been a drastic change in the climatic pattern in the recent past, the impact of which can be observed in the rapidly changing trend of many diseases, particularly vector-borne diseases. However, the country is witnessing an emergence and increased threat of new vector-borne diseases such as Chikungunya, Nipah virus, Zika virus, and others.

During the last 57 years (1954-2011) in Manipur, the projected climate variability in terms of rise in average temperature (Minimum and Maximum temperature rise from 13.9 to 14.9°C and 26.6 to 27.3°C); Relative Humidity from 70% to 80% and increase rainfall pattern has led to the rise in incidences of vector-borne diseases like Malaria, Japanese Encephalitis, Dengue and Chikungunya.

Climate changes may alter the distribution of important vector species e.g. mosquitoes and may spread disease to new areas and populations residing at high altitudes outside the stable endemic areas.

Various types of vector-borne diseases prevalent in Manipur are Malaria, Dengue, and Japanese Encephalitis. The main cause of different vector-borne diseases in the state are:

1. Increase in Mean Temperature
2. Increase in Relative Humidity
3. Increase and unusual pattern in Rainfall

Various Types of Vector-Borne Diseases and disease load during the last 10 years in Manipur

Year	Malaria	Dengue	JE	Chikugunya	Kala azar	Filaria
2013	120	9	0	0	0	0
2014	145	0	1	0	0	0
2015	216	50	6	0	0	0
2016	120	51	47	0	0	0
2017	78	193	186	0	0	0
2018	12	14	57	0	0	0
2019	16	359	343	0	0	0
2020	23	37	29	0	0	0
2021	19	203	13	0	0	0
2022	30	503	66	0	0	0

Source: NVBDCP, Manipur

Year-wise Morbidity, Mortality and related statistics of Vector-Borne Diseases in Manipur

Year	Malaria		Dengue		JE	
	Cases	Deaths	Cases	Deaths	Cases	Deaths
2013	120	0	9	0	0	0
2014	145	0	0	0	1	0
2015	216	0	50	0	6	0
2016	120	0	51	1	47	1
2017	78	0	193	1	186	11
2018	12	0	14	0	57	3
2019	16	0	359	0	343	6
2020	23	2 (1 each from Noney & Churachandpur District)	37	0	29	4
2021	19	0	203	0	13	2
2022	30	0	503	4	66	6

Source: NVBDCP, Manipur

5 Years Comparative Data of Pv & Pf positive cases 2018 to 2022

Name of district	2018				2019				2020				2021				2022			
	Pv	Pf	Death	Total	Pv	Pf	Death	Total	Pv	Pf	Death	Total	Pv	Pf	Death	Total	Pv	Pf	Death	Total
Bishnupur	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Chandel	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Tengnoupal	2	1	0	3	0	1	0	1	0	0	0	0	1	0	0	1	1	0	0	1
Churachandpur	5	2	0	7	1	2	0	3	6	5	1	11	3	2	0	5	6	5	0	11
Pherzawl	-	-	0	-	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Imphal East	0	0	0	0	1	0	0	1	1	0	0	1	30	0	0	3	1	0	0	1
Jiribam	1	0	0	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Imphal West	1	0	0	1	1	0	0	1	0	0	0	0	2	1	0	3	1	2	0	3
Imphal Urban	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Kangpokpi	0	0	0	0	2	0	0	2	0	0	0	0	0	3	0	3	2	0	0	2
Senapati	0	0	0	0	1	1	0	2	2	0	0	2	0	0	0	0	1	0	0	1
Tamenglong	0	0	0	0	1	0	0	1	0	0	0	0	0	1	0	1	0	0	0	0
Noney	-	-	0	-	0	0	0	0	1	8	1	9	0	0	0	0	0	1	0	1
Thoubal	0	0	0	0	1	0	0	1	0	0	0	0	0	1	0	1	0	0	0	0
Kakching	-	-	0	-	-	0	0	0	0	0	0	0	1	0	0	1	1	0	0	1
Ukhrul	0	0	0	0	2	0	0	2	0	0	0	0	1	0	0	1	2	0	0	2
Kamjong	-	-	0	-	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	4
State Total	**9**	**3**	**0**	**12**	**11**	**5**	**0**	**16**	**10**	**13**	**2**	**23**	**11**	**8**	**0**	**19**	**20**	**10**	**0**	**30**

Source: NVBDCP, Manipur)

Key Interventions in Vector Borne Diseases in Manipur

The key interventions for reducing VBDs undertaken at the state and districts:

Surveillance

1. Epidemiological Surveillance
2. Case based investigation & line listing:
   Helps to know the travel history & movement of the case & find out whether the case is indigenous or imported. The practice enables the identification of foci of infection for prompt treatment.
3. Entomological Surveillance for possible vectors in the area where the case is detected and for further (Integrated Vector Management) IVM.
4. Surveillance of migrants and mobile population fortnightly is being taken up where there is a congregation of such population.

A. Case detection and management (Early diagnosis and prompt treatment of Malaria, Dengue & JE)

Malaria Microscopy remains the gold standard for diagnosis of Malaria and also RDKs are used where microscopy results cannot be obtained within 24 hours and in emergencies.

For Dengue and JE, strengthening the surveillance through identified Sentinel Surveillance Hospitals (SSHs) namely RIMS and JNIMS and Apex Referral Laboratories (ARLs). The Diagnostic kits are supplied by NIV, Pune for which the cost is borne by NCVBDC. The suspected cases should be referred at the earliest for diagnosis and its proper management.

B. Prevention of VBDs

i. Early case reporting & management

ii. Integrated Vector Management

- Entomological Surveillance – larval and adult surveys is carried out from time to time
- Source reduction – Anti-larval measures, use of insecticides, personal protection, and fogging during outbreaks.

C. Inter-sectoral coordination and monitoring

D. Legislations

Malaria and Dengue are notifiable diseases in the state under the Epidemic Disease Act, 1897 Act No. 3 of 1897

E. Awareness activities & capacity building

Information, Education, Communication & Behaviour change communication activities will play a major role in the efforts to eliminate VBDs from the state. Training capacity building of Medical staff and ASHAs are planned in a phased manner.

a. IEC Campaign- districts aim to create awareness through IEC. IEC materials have been developed in Manipuri, English, and 3 other tribal languages. The content of the IEC materials is provided by State NVBDCP and districts to utilize and disseminate at all levels.

b. Capacity building

Training program	Trainer	Participants	Training content
Medical Officers (3 days)	DNO	MO-DH, CHC, PHC	Vector-borne related illnesses
Community Health Workers (2 days)	MO	MPHW , ASHAs	
PRI members	MO	PRI Members	

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

Roles and Responsibilities

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

NVBDCP, Manipur	Overall guidance and policy formulation	Guide the state governments in the resurgence and containment of any VBD
State Nodal Officer, Climate Change	To support the state govt. in control of VBDs	• Oversee vector control measures • Oversee health sector preparedness • Oversee VBD surveillance, and control in post-disaster situations in community and relief camps • Train DNO, DMO • Sensitization workshops to increase awareness of climate change and its impact on VBD
India Meteorological Department	To provide meteorological data as and when required	• To help the state govt. in building collaboration with any research institute, analysis of the relationship between climatic factors and a particular VBD so as to forewarn the impending outbreaks
NGOs at the state and district level to reach the community	Heath education and awareness generation at the community level	• Conduct workshops/IEC activities for different levels of staff in the identified areas in consultation with the state
State Programme Officer	Overall planning and execution of surveillance and intervention measures to control VBDs	• Supervise and guide the DMOs in control of VBDs
State Entomologist	To provide guidance in vector control	• Generate data on fortnightly fluctuations in the density of vector species so as to guide the state government in choosing the appropriate time of IRS activities. To generate data on the susceptibility status of disease vectors for using appropriate insecticide for IRS/larvicide for vector control
Chief Medical Officer/ District Malaria Officer/ Disease Surveillance Officer	Execution of task assigned by the SPO	• Supervise and guide surveillance and intervention measures for the control of VBDs in the district.

CHAPTER 10

Action Plan for Green and Climate Resilient Health Care Facilities

Climate resilient and environmentally sustainable health care system may be defined as one that is capable to anticipate, respond to, to cope with, recover from and adapt to climate-related shocks and stresses, while minimizing negative impacts on the environment and leveraging opportunities to restore and improve it so as to bring ongoing and sustained health care to the target population and protect the health and wellbeing of the future generations (WHO).

Healthcare facilities (HCF) provide essential services and care to the population affected by extreme weather events and long-term climate hazards (adaptation) and require the reduction of their own greenhouse gas emissions (mitigation). Health care workforce, WASH (Water, sanitation, hygiene) and health care waste management, energy, and four components identified for interrelations for green and climate resilient health systems and HCF.

With increasing global warming, heat waves and rainfall-related extreme weather events will be the new normal in India. Existing HCFs are recommended to undergo retrofitting to implement structural climate resilient (to withstand disasters and provide continuous quality care to the affected population post-disaster) measures as per IPHS guidelines. New HCFs should also comply with green and climate-resilient infrastructure as per IPHS recommendations.

In the recent years, Manipur state too is witnessing higher temperatures, drought-like situations, flash floods in the valley districts, and landslides in hill districts as an impact of climate change. The HCFs, therefore, need to take effective measures to withstand the impacts of increasing extreme weather events and other climate-related hazards such as higher temperature, increasing precipitation, intense short-lived rainfall (causing flash floods) high speed wind and storms etc.

Today, Manipur is facing the challenges of climate-related shocks and stresses, and thus making preparations to make the health facilities climate resilient is necessary by reducing emissions of Green House gases and make environment friendly.

Framework for building climate-resilient and environmentally sustainable HCF

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

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

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

a. Energy Auditing

b. Installation of LED lighting at Health Care Facilities

c. Installation of Solar panels

d. Water Conservation Measures – Rain water Harvesting

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

i. Environmentally Sustainable (Green) Measures at Health Care Facilities

a. Energy Auditing

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

The guiding principles in this respect include:

- The HCFs would develop a plan for the energy audit to assess the level of energy consumption.
- The responsibility for the energy audit would be of the IPC committee of the facility. If the healthcare facility lacks qualified staff, then the energy audit would be conducted by the state health department as well.

- The energy audit would also consider load management, poor maintenance aspects, and extreme temperature to avoid fire-related accidents. Audit would be conducted in the facility biannually.
- Installing sub-meters in the facility premises would be useful in understanding how much energy is used across the healthcare facility.

b. Replacing the existing non-LED lights with LEDs

Replacing the incandescent bulbs with LEDs leads to 75% less energy consumption.

The guiding principle in this respect would be:

- Healthcare facilities would have a policy on purchasing and using energy- efficient equipment and devices. The facilities would gradually phase out the incandescent bulbs with LEDs.

c. Installation of Solar panels

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

The guiding principle in this area would be

- The state would, in a phased manner, install PV solar panels in unused spaces like the roof of the facility. This would reduce grid-based electricity consumption and decrease the peak demand of a facility, which is cost- effective and also reduces Green House gas emissions

d. Water conservation

HCF can conserve water by close monitoring of water use, installing water efficient fixtures and technologies and quick repairmen for any leakage.

Rainwater harvesting for healthcare facilities has the potential to save thousands of litres of water every year. Water harvested from such source can be utilized during the lean season and also for non -drinking purpose.

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

- The healthcare facility would develop a strategy for the optimum usage of water.
- The HCFs would develop a programme/plan for the conservation of water.
- The HCFs would have a water management committee for the conservation of water, setting goals with timelines, conducting water audits, determining the cost of water, and preparing an action plan.
- The HCFs would have an ongoing educational programme for the efficient usage and conservation of water for all the stakeholders (staff, patients and visitors).
- The HCFs would develop a wide variety of methods to communicate through IEC materials, new and/or revised operating guides and manuals.

ii. Climate Resilient Infrastructure at Health Care Facilities Including Retro Fitting of Existing Health Care Facilities

It is essential that HCF planning and designing should be responsive to local climate and hazard profile of the district. Strong focus should be given to designing all aspects of infrastructure and services as per

relevant IPHS standards, building codes and local bylaws, and history of emergencies in the district to ensure patient safety and continuity of health service during emergencies. A few key interventions that would be undertaken to make the HCFs into green buildings would include:

New Buildings

- Climate risk assessment at the time of planning and designing the building.
- Use of high-performance glass on windows, doors, and roofs to prevent the heat inside and allows sunlight and fresh air to enter the room.
- Use double glazing glass on windows; it provides thermal and optical properties to the building and reduces the noise level.
- Ensure the plinth level is above the high flood level as known locally and make the building accessible with ramps and railings to create a barrier-free environment.
- Installation of Rainwater Harvesting System.
- Installation of alternative energy systems.

Existing Infrastructure (Infrastructure Old)

- Introduction of electronic patient records in the facility to reduce the use of paper.
- Provision of 10-30 per cent area for the herbal garden in the facility.
- Floor and walls are made conducive for infection prevention control practices.
- Modifications in the critical care rooms to make them functional during disasters.
- Installation of Rainwater Harvesting System
- Installation of alternative energy systems/like solar panels, replacement of Non- LED to LED bulbs
- Energy auditing by the Bureau of Energy Efficiency, to produce goods and provide services with the least cost and least environmental effect.
- Plantation of canopy trees in and around hospital premises of health facilities in order to cool the area and provide shade to people.
- Green grass landscape in the premises of health facility.

Adaptation Plan

Awareness Generation

- Awareness and sensitization on climate change events on Heatwave, pollution, and waste management.
- Sensitization Workshop on Sustainable Procurement.
- Awareness on energy efficient measures and water conservation measures.

Capacity Building

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

Health Sector preparedness in the next 5 years (2022-2027)

	Activities	District	Identified Health Facility	Timeline	Target				
					22-23	23-24	24-25	25-26	26-27
Strengthening of Health Care Facility	**Budget for OOC & Civil Works (Rs. in Lakh)**				**13.00**	**13.38**			
	Energy Audit	All 16 districts	Bishnupur, Chandel, Kamjong, Churachandpur, Kakching, Noney, Imphal West submitted	Rest of the districts	50%	50%	75%	100%	100%
	Non-LED to LED Replacement	All 16 Districts	PHC, CHC, DH, HWC	March-April	80%	100%	100%	100%	100%
	Solar Panel Installation		1. Chandel (Labour room of 1 DH, 1 CHC, 1 PHC); 2 PHC, 4 PHSC, 8 HWC 2. Churachandpur (1 DH, 1 CHC, 38 SC) 3. Tamenglong (1 DH, 3 PHC, 15 PHSC, 3 HWC)		25%	40%	70%	85%	100%
	Rainwater harvesting and Green Measures	All Districts	DH Thoubal CHC Khumbong (IW) PHC Sawombung (IE)	May- June	25%	50%	50%	75%	90%
	Retrofitting of Health Facility	All Districts	1 DH Jiribam 2 SDH Moreh	May-June	25%	50%	50%	75%	90%

Roles and responsibilities in making green and climate resilient infrastructure development of health care facility

	Responsibilities
SNO	• Finalization of IEC material and dissemination plan • Organize training sessions for the district-level officers and trainers • Identify health facilities for priority implementation based on disaster and health facility vulnerability • Identify relevant state-level nodal agencies and collaborate with them for assessment of health facilities for implementation of measures • Facilitate and monitor necessary assessments at the health facility level • Facilitate implementation of structural and functional measures at the health facility level • Monitor the implementation of the activities • Support districts to identify sources of funding • Advocate for the reduction in source of greenhouse gas emissions

	Responsibilities
DNO	• Conduct training for block health officers, and medical officers with relevant training manuals • Support conduction for the following assessment at the health facility level ▪ Energy audit ▪ Water audit ▪ Disaster-vulnerability assessment • Support the following functional measures at the health facility level ▪ Water committee ▪ Sustainable procurement committee ▪ Operational measures to make health facilities function during disasters or power cut • Coordinate with other agencies for the assessment and implementation of identified structural and functional measures • Update DAPCCHH with support from District Task Force
Block health officer	• Ensure training of medical officers • Organize PRI sensitization workshop • Coordinate with other agencies for the assessment and implementation of identified structural and functional measures
Medical officer	• Conduct health facility assessment ▪ Energy & Water audit • Lead following functional measures ▪ Water committee ▪ Sustainable procurement committee ▪ Operational measures to make health facility function during disasters or power cuts • Support community-level IEC activities • Identify local funding opportunities: e.g. CSR initiative, NGO funding
Panchayati Raj Institution	• Support retrofitting and new health facilities with local funding sources and community involvement

PART III

Budget

Annexures

Annexure 1: Budget

Tentative budget plan for 5 years (upto FY 2026-2027)

	Year 1	Year 2	Year 3	Year 4	Year 5
					(with an increase of 15% in budget)
Infrastructure and civil works	10	10.5	48.48	61.21	71.21
Capacity building and training	30	31.5	36.23	41.66	47.91
Other operating costs	3	3.15	3.62	4.17	4.79
IEC & printing	44.7	46.9	53.94	62.03	71.33
Planning & Monitoring & Evaluation	21.2	22.25	25.59	29.43	33.84
Surveillance, Review, Research and Evaluation	2	2.1	2.42	2.78	3.19
Total	**110.9**	**116.4**	**167.85**	**198.48**	**229.07**

Note: Year 1 = FY 2022-23; Year 2 = FY 2023-24; Year 3 = FY 2024-25; Year 4 = FY 2025-26; Year 5 = FY 2026-27.

Approved ROP FY 2022-23 & 2023-24

Pool	FMR Code	Programme/ Theme	S. No.	Scheme/ Activity	Amount Proposed (Rs. in Lakhs)		Amount approved (Rs. in Lakhs)		GoI Remarks
					FY 2022-23	FY 2023-24	FY 2022-23	FY 2023-24	
	NCD.7	NPCCHH	114	Implementation of NPCCHH	110.90	116.40	110.90	116.40	**Approved Rs.110.90 lakhs for FY 2022-23 & Rs.116.40 lakhs for FY 2023-24 for following:** 1. Infrastructure - Civil works (I&C)- Rs.10.00 Lakhs for FY 2022- 23 and Rs.10.5 Lakhs for FY 2023-24. 2. Capacity building incl. training- Rs.30.00 Lakhs for FY 2022- 23 and Rs.31.50 Lakhs for FY 2023-24. 3. Others including operating costs (OOC)- Rs.3.00 Lakhs for FY 2022- 23 and Rs.3.15 Lakhs for FY 2023-24. 4. IEC & Printing- Rs.44.70 Lakhs for FY 2022- 23 and Rs.46.90 Lakhs for FY 2023-24. 5. Planning & M&E- Rs.21.20 Lakhs for FY 2022- 23 and Rs.22.25 Lakhs for FY 2023-24. 6. Surveillance, Research, Review, Evaluation (SRRE)- Rs.2.00 Lakhs for FY 2022-23 and Rs.2.10 Lakhs for FY 2023-24.
	NCD.8	NOHP	115	Implementation at DH	--	--	--	--	-

Annexure 2: List of DNOs under the NPCCHH Program Identified by the CMOs of the Respective Districts

Sl. No.	District	Name of the District Nodal Officers (DNOs)	E-mail ID	Contact No.
1	Bishnupur	Dr. Haobam Danny	haobamdanny@yahoo.com	7006531361
2	Chandel	Dr. Sanjay Nandeibam	sanjaynandeibam@gmail.com	9863357874
3	Churachandpur	Dr. Kaisiankhai Haokip	mnchr.idsp@nic.in	7005033584
4	Imphal East	Dr. L. Suranjoy Singh	suranlairen@gmail.com	7008449565
5	Imphal West	Dr. Lukram Sumila	sumilalukram124@yahoo.co.in	8974617003
6	Jiribam	Dr. AK Khelendro	messithesweetest@gmail.com	7085051847
7	Kakching	Dr. Robin	robinpukhrambammeitei@gmail.co	9862882775
8	Kamjong	Dr. Yumnam Kiran Meitei	ykmeitei@gmail.com	7005676388
9	Kangpokpi	Dr. K. Bipin	bipinkeisham1777@gmail.com	8787615826
10	Noney			
11	Pherzawl	Dr. Rahman Newlife	drrahmanwahidur@gmail.com	7085381338
12	Senapati	Dr. SR Augustine	sraugustine7@gmail.com	8974790717
13	Tamenglong	Dr. Homendro Singh	ng.homendrosingh@gmail.com	7005271613
14	Tengnoupal	Dr. Mopham Kanshouwa	mophomk@gmail.com	9774774189
15	Thoubal	Dr. Y. Nokul Singh	drynokulsingh@gmail.com	9612152485
16	Ukhrul	Dr. AS Kapangring	askapangring@gmail.com	8414819221

Annexure 3: List of Nominated Master Trainers

Sl. No.	Name	Designation	Qualification	Phone No.	E-mail ID
1	Dr. O. Sanahanbi Devi	Additional Director, FW Services, Manipur	MD, Biochemistry	9774799985	osanahanbi@gmail.com
2	Dr. N. Hemanta Kumar Singh	Addl. Director (MD), Health Services, Manipur	MD, Medicine; DNB, Neurology	8974008358	nskhemanta@gmail.com
3	Dr. W. Ruhinikumar Singh	Pediatrician, MHS – GR-II	MD, Pediatrics	8974007046	drrwikhom@gmail.com
4	Dr. Y. Premchandra Singh	Grade II- MHS & SNO, NCD & CMHA	MD, Biochemistry	7005997969	ypremchandrasingh@gmail.com
5	Dr. Y. Niveda Devi	MHS Grade-II, & SNO, Climate Change & Human Health	MD, Community Medicine	8014075359	nivedayengkhom@gmail.com

Annexure 4: Health care Infrastructure at the State Level

District-wise profile of Government Health Institutions within state: In Manipur at present, there are – 2 Medical College Hospitals – JNIMS and Churachandpur Medical College, 7 District Hospitals, 2 Sub Divisional Hospitals, 17 CHCs, 421 PHSC having Total Bed Strength of 1557. Another Medical College, RIMS Hospital is located at Imphal West district under Ministry of Health, Government of India. Under Private Sector, there are 30 registered hospitals & Nursing Homes with Bed Strength of 1366. At present 404 Health & Wellness Centres (HWCs) are functional, out of which there are 14 AYUSH HWCs, 86 PHC HWCs, 9 UPHC HWCs, 295 SC HWCs. IE district does not have a district hospital; There is 600 bedded JNIMS Hospital. Imphal West has 1074 bedded RIMS Hospital.

Health Infrastructure Status in Manipur

Sl. No.	Dist. Hospital	Dist. Area sq. km	Dist. Population (2011 census) in lakh	Bed			OT Services		Blood Bank	
				Sanctioned	In position	ICU Beds	Maj OT	Min OT	Licensed	Blood Storage Unit
1	DH CCP	4570	2.74	236	320	18	2	2	Yes	Yes
2	DH TBL	514	4.22	100	84	32	Yes	Yes	Yes	Yes
3	DH CDL	3313	1.44	100	72	10	Yes	Yes	No	Yes
4	DH SPT	3271	4.79	100	86+	10+10	Yes	Yes	No	No
5	DH TML	4391	1.41	100	87	20	Yes	Yes	No	No
6	DH UKL	4544	1.84	100	50	0	Yes	Yes	No	No
7	DH BPR	496	2.37	50	93	10	Yes	Yes	No	Yes
8	IE (JNIMS)	709	4.56	600	576	100	Yes	Yes	Yes	Yes
9	IW (RIMS)	519	5.18	1074	1074	70	Yes	Yes	Yes	Yes

Annexure 5: Public Health Advisories on Air Pollution

Air Quality Index (AQI)# (Pollution Level)	Possible Health Consequences	Advice for	
		General Population	Vulnerable Population*
Good (0-50)	Low risk	No special precautions	No special precautions
Satisfactory (51-100)	Minor breathing discomfort in vulnerable population*	No special precautions	Do less prolonged or strenuous outdoor physical exertion
Moderate (101-200)	Breathing or other health related discomfort in vulnerable population*	Do less prolonged or strenuous outdoor physical exertion	Avoid prolonged or strenuous outdoor physical exertion
Poor (201-300)	• Breathing discomfort in healthy People on prolonged exposure • Breathing or other health related discomfort in vulnerable population* on short exposure	Avoid outdoor physical exertion	Avoid outdoor physical activities
Very Poor (301-400)	• Respiratory illness in healthy People on prolonged exposure • Pronounced respiratory or other illnesses in vulnerable population* on short exposure	Avoid outdoor physical activities, especially during morning and late evening hours	Remain indoors and keep activity levels low
Severe (401-500)	• Respiratory illness in healthy People on prolonged exposure • Serious respiratory or other illnesses in vulnerable population* on short exposure	Avoid outdoor physical activities	Remain indoors and keep activity levels low

*Vulnerable population (high risk): Elderly, children under 5 years, pregnant women, pre-existing illnesses like asthma and other airway or lung (respiratory) and heart (cardiovascular) diseases

AQI = Air Quality Index; daily AQI is available on websites

1. CPCB (https://app.cpcbccr.com/AQI_India/) or
2. MAPAN-SAFAR: http://safar.tropmet.res.in/

Health consequences of Air pollution

The health impacts of air pollution depend on the level of pollution & exposure duration. The individuals' vulnerability to the health impacts of pollution can also differ based on demographic factors and predisposing health conditions.

Short-term high-level exposures can result in acute health reactions such as irritation to eyes, nose, and throat, along with coughing, wheezing, chest discomfort and acute upper respiratory infections. Vulnerable groups can experience more severe effects such as lower respiratory tract inflammation and infection, exacerbation of asthma, bronchitis or exacerbation of chronic illnesses such as chronic obstructive pulmonary disease, ischaemic heart disease, and cerebrovascular stroke. Long term exposures to even lower level of pollution can result in chronic illnesses of respiratory and cardiovascular systems, lung cancer and premature death.

Vulnerable Population

Following people may be considered vulnerable to health consequences of air pollution:

1. Age group: Individuals who are under five aged children and in old age.

2. Pregnant Women: Exposure during pregnancy may have consequences for child in womb.

3. Predisposed health or medical conditions: Those with pre-existing illnesses of respiratory and cardiovascular system etc. are at high risk.

4. Low socio-economic conditions: Those with poor nutritional status and those living in conditions of poor housing, using fossil fuels for cooking, heating and lighting purposes have high risk.

5. Occupational group: Those with possibility of prolonged exposures such as traffic policemen, traffic volunteers, construction workers, road sweepers, rickshaw pullers, auto-rickshaw drivers, roadside vendors, and others working outdoors in polluted settings are at high risk. Women burning biomass for cooking, and sweeping dust are vulnerable on account of their household work.

Recommendations for State Health Department

A. State authorities need to keep a check on Air Quality Index data, available at CPCB and MAPAN-SAFAR website or obtain the same from State Pollution Control Board

B. Strengthening of Healthcare services

1. Surveillance and Monitoring:

- Initiate and establish sentinel surveillance of acute illnesses attributed to air pollution in the high polluted cities of the state where not yet done. Record and monitor acute respiratory or coronary events at emergency units of few sentinel hospitals of each city.
- Monitor this against daily AQI levels reported for the cities. Document and maintain statistics of illnesses and their mortality known to be related to air pollution. Statistics should be compiled by healthcare facilities and by cities and to share with NPCCHH programme division at NCDC at email: npcchh@qmail.com

- Identify the hot spots by AQI levels and density of vulnerable population and ensure adequate access for them to essential healthcare services.

2. Develop health action plan for air pollution and health as a priority:

- Identify State and District/City Nodal Officer for Climate Change and Health related services where not yet identified as a priority who would develop and execute air pollution related health services.
- Identify State and District/City Task Force for Climate Change and Health who would provide technical guidance to Nodal officer in air pollution related health services in developing the action plan as a priority.
- Develop State Action Plan on Climate Change and Health, including sub-plans for Districts/Cities, which also has a section on air pollution and health related activities.
- The Health Action Plan for state/district/cities will include:
    i. Documentation of month-wise average air pollution levels recorded in districts/cities
    ii Documentation of the vulnerable population in districts/cities.
    iii. List of operational agencies and stakeholders in districts/cities related to air pollution and associated illnesses.
    iv. List of available healthcare infrastructure and services available in districts/cities for air pollution associated illnesses.
    v. Documentation of month-wise average statistics of diseases related to air Pollution for districts/cities.
    vi. Strategies to integrate air pollution data with disease surveillance data.
    vii. Details of hot spots based on pollution levels and population vulnerability, and plan for appropriate healthcare services in hotspot localities.
    viii. Roles and responsibilities identified for stakeholders in districts/cities.
    ix. Standard procedures for operational co-ordination among local government and stakeholders.
    x. Identified risk reduction activities in districts/cities.
    xi. List of available resources to handle air pollution and health related issues by districts/cities.
    xii. Details of planned awareness and capacity building activities (IEC, advisories, training).
    xiii. Details of plans to make healthcare institutions environment friendly.
    xiv. Details of responsibilities of healthcare facilities towards:
        a. Data surveillance
        b. Response to address increase burden of illness
        c. Logistics required at health care facilities
        d. Preparedness of health personnel
        e. Develop operational communication channel

f. Promote clean air by controlling waste incineration, use of diesel generators, use of vehicles non-compliant to vehicle emission standards

xv. Sharing of this document plan with NPCCHH programme division at NCDC at email: *npcchh@gmail com*

3. Generate awareness to prevent unhealthy effects of Air Pollution:

- **General Population:**

Reduce risk from exposure to air pollutants by followings:

- Avoid places with high pollution like roads with slow & heavy traffic, areas near polluting industries, construction-demolition sites, coal based power plants and brick kilns etc.
- Reschedule outdoor activities as per AQI level, and remain indoors on days with poor to severe AQI.
- On days with poor to severe AQI, avoid outdoor morning and late evening walk, run, jog and physical exercise. Do not open external doors and windows during morning and late evening hours, may ventilate if necessary between 12 pm to 4 pm in afternoon.
- Avoid burning biomass such as wood, coal, animal dung, kerosene. Use clean smokeless fuels (gas or electricity) for cooking and heating purposes. If using biomass, use clean cook stoves.
- Avoid burning firecrackers.
- Avoid burning in open any form of wood, leaves, crop residues, and waste.
- Do not smoke cigarettes, bidis and related tobacco products.
- Avoid burning mosquito coils and incense sticks in closed premises.
- Practice wet mopping instead of sweeping or vacuum cleaning inside homes. If you choose to use vacuum cleaner, use those which has High Efficiency Particulate Air (HEPA) filter.
- Keep washing your eyes with running water regularly and do regular gargles with warm water.
- Consult the nearest doctor in case of breathlessness, giddiness, cough, chest discomfort or pain, irritation in eyes (red or watery).
- As a "no-regret" strategy, healthy diet, with fruit and vegetables rich in antioxidants, and adequate amount of hydration by drinking water is advocated.

- **Vulnerable Population — additional measures**

Patients with underlying medical conditions such as chronic pulmonary or cardiovascular problems etc. should:

- Be more careful to avoid exposure to air pollution.
- Avoid any strenuous activity if AQI levels are poorer
- Keep a check on exacerbations of symptoms during poorer AQI levels
- Properly follow personal doctor's instructions on healthcare.
- Keep their prescribed medications readily available.
- Seek immediate medical advice if symptoms worsen.

- **Optional choice:**

- If you choose to use face mask, the disposable N95 or N99 is useful provided user instructions are followed. These masks may help provided the period of exposure is short.

Masks should have proper fitting on users' mouth and nose. Ensure to replace the masks after usage as instructed. Paper masks, handkerchiefs, scarves and cloth are not effective.

- If you choose to use air purifier, follow manufacturers' guidelines. Ensure to replace and clean filters as instructed. Avoid using an air purifier that works by generating ozone, as it increases pollution inside rooms.
- When operating air conditioners in buildings or vehicle, use in "re-circulate" mode to avoid contact with outside air.

- **Air Pollution and COVID-19**
  - Air Pollution can affect COVID-19 infection and its outcome.
  - Air pollution has a positive impact on the transmission of and infection by COVID-19
  - Air pollution, and particularly PM2.5 concentrations can increase the hospital admissions and deaths among COVID-19 cases
  - Priority health action plans and measures must be in place to protect, prevent and control from air pollution among the COVID-19 cases
  - Strict COVID-19 guidelines including wearing mask, social distancing, hand washing, crowd avoidance etc. must be in place in more air polluted areas/cities.

For further information, please visit:

http://www.searo.who.int/india/topics/air-pollution/en/

http://www.who.int/airpollution/en/

http://cpcb.nic.in/National-Air-Quality-Index/

http://cpcb.nic.in/cpcbold/AQI-new.php

http://envfor.nic.in/content/downloade-green-good-deed-audio-visual-creatives

http://www.unenvironment.org/explore-topics/air

National Programme on Climate Change and Human Health

Annexure 6: Public Health Advisory for Summer Season in Manipur

National Programme on Climate Change and Human Health

Do's

Stay hydrated

- Drink sufficient water whenever possible, even if you are not thirsty.
- Carry drinking water when traveling
- Use Oral Rehydration Solution (ORS), and consume homemade drinks like lemon water, butter milk/ lassi, fruit juices with some added salt.
- Eat seasonal fruits and vegetables.

Stay covered

- Wear thin loose, cotton garments preferably light coloured
- Cover your head: use umbrella, hat etc.
- Wear shoes or chappals while going out in sun

Stay indoors as much as possible

- Keep your home cool, use curtains, shutters or sunshade and open windows at night.
- Use fan, damp cloths to cool down body

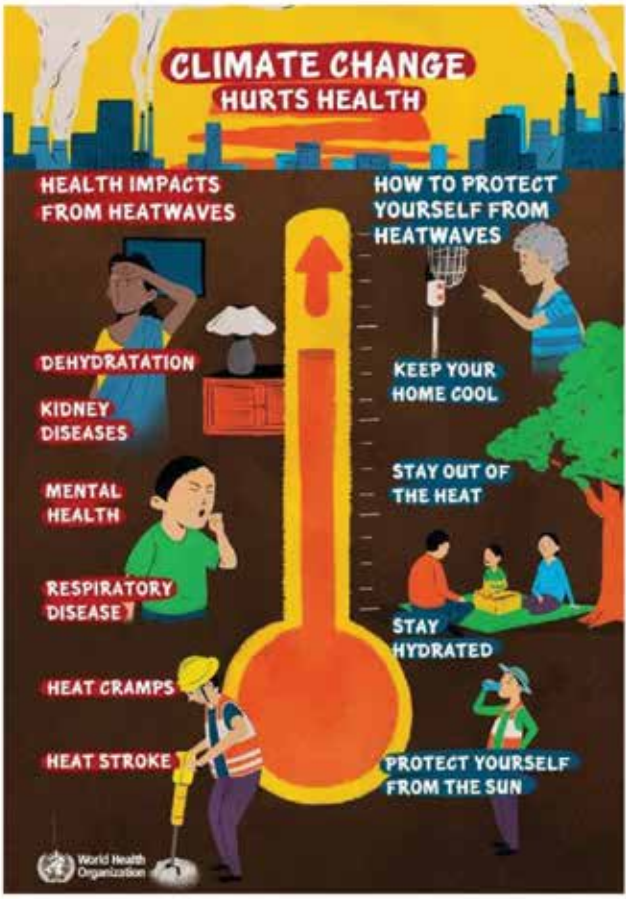
Vulnerable population include

- Infants and young children
- Pregnant women
- People working outdoors
- People who have a mental illness
- People who are physically ill, especially with heart disease or high blood pressure Elderly or sick people living alone

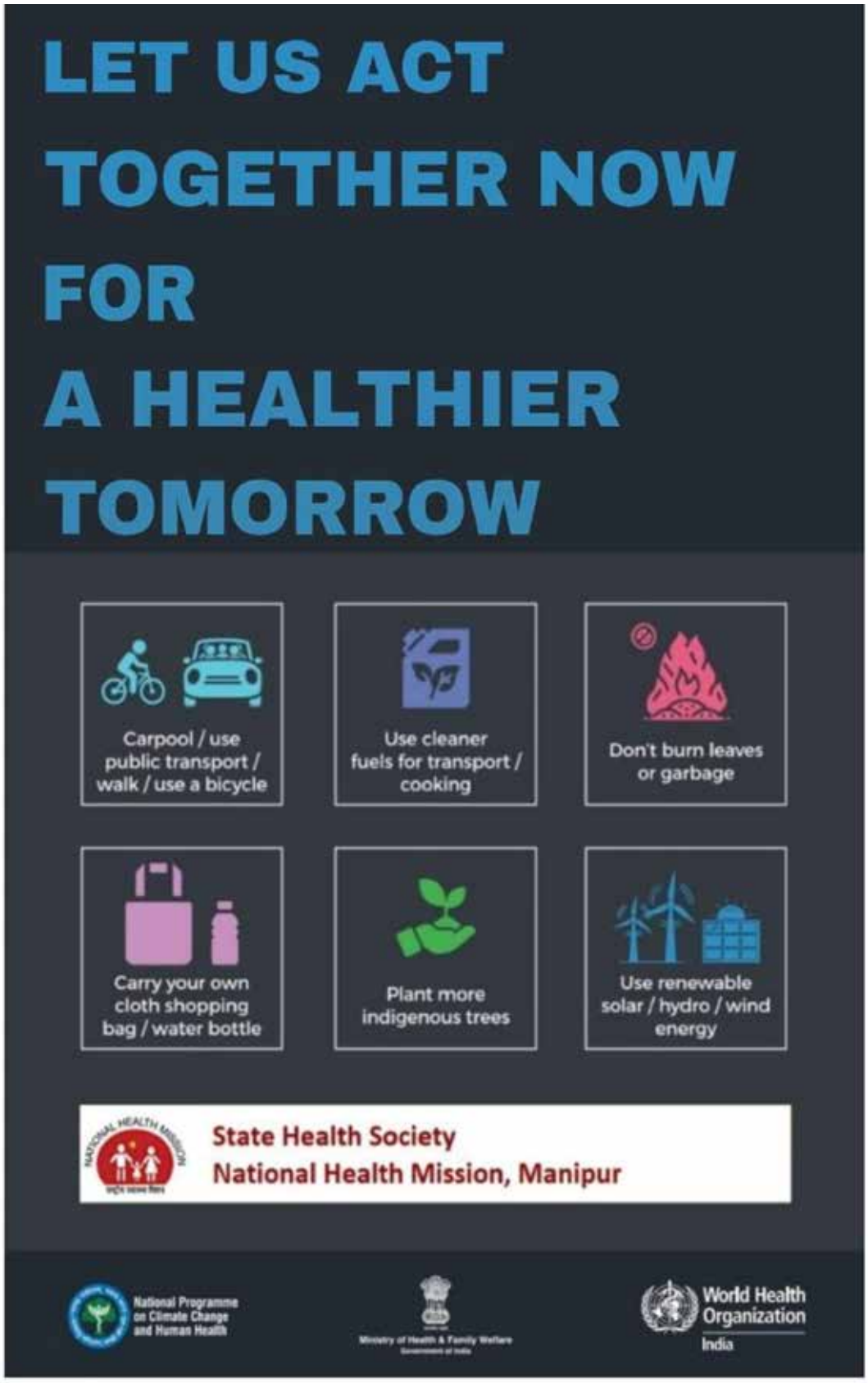
Don'ts

- Avoid getting out in the sun, especially between 12:00 noon and 03:00 pm
- Avoid strenuous activities when outside in the afternoon
- Do not go out barefoot
- Avoid cooking during peak summer hours. Open doors and windows to ventilate cooking are a adequately
- Avoid alcohol, tea, coffee and carbonated soft drinks or drinks with large amount of sugar- as these actually, lead to loss of more body fluid or may cause stomach cramps
- Avoid high-protein food and do not eat stale food
- Do not leave children or pets in parked vehicle.

Annexure 7: Posters Printed and Disseminated to all the 16 Districts of Manipur



Annexure 8: Hoarding



#Printing of Training Manuals and Flipcharts for Children, Women, Traffic Police & Municipal Workers related to Air Pollution – on process.

Annexure 9: Photos Related to Drafting of State Action Plan

One day Consultation Workshop on Finalization of State Action Plan (for Health Sector on Climate Change Ver. 2, Manipur) in collaboration with Directorate of Environment & Climate Change on 6th Jan, 2022

State Level NPCCHH Taskforce Meeting, Manipur (4th November, 2022)

References

Meeting regarding Health Adaptation Plans on Heat related illness, Climate resilient health facility and Disaster management with DHS, AD Planning & Finance, SSO and SNO-Climate Change, Manipur on 7th Oct, 2022

1. https://www.cdcfoundation.org
2. https://www.cdc.goveffect.com
3. https://www.un.org.climatechange
4. https://www.nhp.gov.in/npcchh-pg
5. https://ncdc.gov.in
6. https://www.ipcc.ch
7. District Level Health Vulnerability Index for Manipur (Source: Center for Study of Science, Technology and Policy (CSTEP), Bengaluru Input to SAPCCV.2 for Manipur State Climate Change Cell)