



Ministry of Health and Family Welfare
Government of India



STATE ACTION PLAN FOR CLIMATE CHANGE & HUMAN HEALTH

Tamil Nadu

(Revised Version- 10.10.2022)



National Programme on Climate Change & Human Health
CEOH & CCH-National Centre for Disease
Control Ministry of Health and Family Welfare, Government
of India, 22, Sham Nath Marg, Delhi-110054
Email- npcchh.hq-ncdc@ncdc.gov.in





Ministry of Health
and Family Welfare
Government of India

Tamil Nadu



National Centre for
Disease Control
Government of India

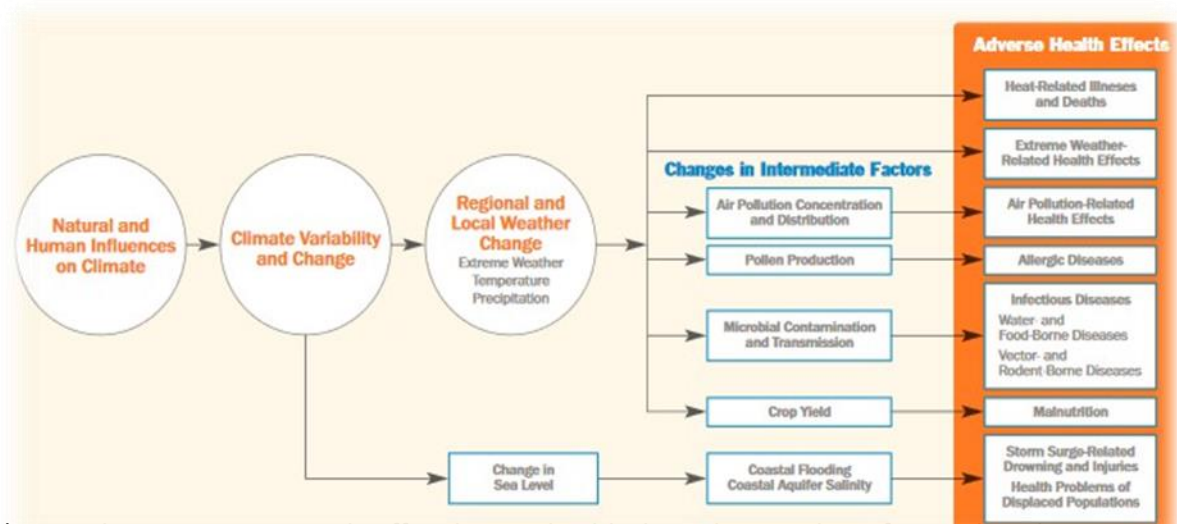


National Programme
on Climate Change
and Human Health

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.” (Source: UNFCCC). It affects social and environmental determinants of health like –clean air, safe drinking water, sufficient food and secure shelter.



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

Over the last several decades, governments have collectively pledged to slow global warming. But despite intensified diplomacy, the world could soon face devastating consequences of climate change. Through various protocols and agreements, countries agreed to reduce greenhouse gas emissions, but the amount of carbon dioxide in the atmosphere keeps rising, heating the Earth at an alarming rate. If this warming continues unabated, it could bring environmental catastrophe to much of the world, including staggering sea-level rise, record-breaking [droughts and floods](#), and widespread species loss.

UN Framework Convention on Climate Change (UNFCCC), 1992. Ratified by 197 countries, including the India, was the first global treaty to explicitly address climate change. It established an annual forum, known as the Conference of the Parties, or COP, for international discussions aimed at stabilizing the concentration of greenhouse gases in the atmosphere

Kyoto Protocol, 2005, adopted in 1997 and entered into force in 2005, was the first legally binding climate treaty. It required developed countries to reduce emissions by an average of 5 percent below 1990 levels, and established a system to monitor countries' progress. But the treaty did not compel developing countries, including major carbon emitters China and India, to take action

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

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

MoEFCC has developed National Action Plan on Climate Change with eight missions. Later on four new missions (including Health Mission) were identified.

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

National Centre for Diseases Control (NCDC) is identified as the 'technical nodal agency' by MoHFW for the proposed National Mission on Health. The Centre for Environmental and Occupational Health Climate Change & Health (CEOH&CCH), NCDC, is implementing the National Programme of Climate Change and Human Health (NPCCHH), under which the Tamil Nadu has prepared its State Action Plan on Climate Change and Human Health (SAPCCHH). Since the inception of the programme i.e. 2019, the SAPCCHH is a long-term vision and planning document prepared by the Department of Health & Family Welfare, Tamil Nadu, applicable for up till year 2027. Based on this document, district specific action plans will also be prepared. The Tamil Nadu 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 AND CLIMATE SENSITIVE ISSUES IN THE STATE OF TAMIL NADU

Tamil Nadu extends from 8° 5' and 13° 35' N latitude and between 76°15' and 80°20' E longitude with a total area of 1,30,060 sq.km., It accounts for about 4 percent of the total area of the country. The State lies at the South Eastern extremity of the Indian Peninsular surrounded by Karnataka on the north-west, Andhra Pradesh on north, by Bay of Bengal in the east, by the Indian Ocean in the south and by Kerala State in the west. The State has a coastal line of 1076 km.

The climate of Tamil Nadu is strikingly different from the general climate of the country. Due to its topographical features and geographical area the climate of Tamil Nadu is referred to as semi-arid and tropical monsoon. The long coastal stretch in the east, hill orography of the western rim, and plain inlands play a significant role and influence the climate of the State. The Climate of the State is tropical with little variation in summer, winter temperatures and features hot temperatures over the year except during the monsoon season. Due to proximity to the sea, the temperatures and humidity remain relatively high all the year round. The summer is hot with the temperature rising to 43°C and extends from April to June. November to February is the coolest winter period with temperatures around 18 °C. The regional centre for meteorology has provided projections for Tamil Nadu, The analyses primarily focus on maximum and minimum temperatures and rainfall over the region.

For the state of Tamil Nadu as a whole, the projections of maximum temperature show an increase of 1.0 °C, 2.2 °C and 3.1 °C for the periods 2020s (2005–2035), 2050s (2035–2065) and 2080s (2065–2095), respectively, with respect to baseline period (1970–2000). Similarly, the projections of minimum temperature show an increase of 1.1, 2.4 °C and 3.5 °C, respectively.

The annual rainfall projections for the same periods indicate a general decrease in rainfall of about 2–7, 1–4 and 4–9 %, respectively. However, significant exceptions are noticed over some pockets of western hilly areas and high rainfall areas where increases in rainfall are seen. There are also indications of increasing heavy rainfall events during the northeast monsoon season and a slight decrease during the southwest monsoon season.

CLIMATE SENSITIVE ISSUES IN THE STATE OF TAMIL NADU

Tamil Nadu is already facing various consequences of climate change, causing distress to its farmers and other local communities. State is vulnerable to different types of hazards such as

floods, hailstorms, heat waves, drought, thunder and lightning, forest fires, etc. Most of these hazards mentioned above have some direct or indirect linkages with climate change. Detrimental challenges of these hazard effects Tamil Nadu agricultural crops, livestock's milk productivity, forest's net primary productivity etc.

Health System risks expected due to Climate Change in Tamil Nadu are:

Increased injury, death, and post-traumatic stress disorders from increases in storms, cyclones, and floods. Increased illnesses and deaths from more severe heat waves. Increased risks of water-borne diseases. Change in the range, distribution, and incidence of outbreaks of vector-borne diseases (e.g. dengue, chikungunya). Adverse health effects of more severe drought and long-term drying conditions on rural and remote communities. Exposure to extremes of heat, dust, and smoke.

- Increased Respiratory illnesses and allergens due to Air Pollution.
- Fresh water shortages with consequences for hygiene and sanitation.
- Change in food production pattern; Malnutrition.
- Mental health impact (depression and suicide).
- Increase in flow of environmental refugees.
- Increased risk of toxic contamination and industrial disasters.

Climate sensitive Diseases in Tamil Nadu

Sl. No	Climate Sensitive Illness	2021		2020		2019		2018		2017	
		Total no. of Cases	Deaths	Total no. of Cases	Deaths	Total no. of Cases	Deaths	Total no. of Cases	Deaths	Total no. of Cases	Deaths
1	Dengue	6039	8	2410	0	8527	5	4486	13	23294	65
2	Malaria	772	0	891	0	2088	0	3758	0	5444	0
3	Scrub Typhus	2455	0	1574	0	2030	0	1038	0	541	0
4	Chikungunya	153	0	224	0	681	0	284	0	131	0
5	Kala-Azar	0	0	0	0	0	0	0	0	0	0
6	Filaria	0	0	0	0	0	0	0	0	0	0
7	Leptospirosis	1069	0	376	0	849	0	693	2	1080	1
8	Japanese Encephalitis	38	2	47	1	231	1	147	0	127	2
9	Rabies	19	19	20	20	23	23	31	31	16	16
10	Acute Diarrhoeal Disease	82879	4	207704	0	391076	0	389393	0	402661	0
11	Hepatitis A	363	0	278	0	724	0	456	0	424	0
12	Hepatitis E	52	0	77	0	283	0	280	0	292	0
13	Acute Respiratory Illness	678713	45	2638960	0	4930188	0	4788333	0	5052061	0
14	Enteric Fever	12312	0	14408	0	52974	0	44643	0	75459	0
15	Typhoid Fever	8762	0	4114	0	16987	0	18223	0	27772	0

The above highlights the trend of Climate sensitive Health issues of the state of Tamil Nadu.

CLIMATE SENSITIVE VULNERABILITIES PREVALENT IN TAMIL NADU

Drought vulnerability

Drought variability has a direct and significant impact on food production and the overall economy. Drought is more recurrent during June to September months in Tamil Nadu. Traditionally, the districts which are severely prone to drought hazard are Dharmapuri, Madurai, Coimbatore, Ramanathapuram, Salem, Tiruchirapalli, Thirunelveli and Kanyakumari. But during 2017, Tamil Nadu experienced the severest drought unheard so far that adversely affected the agricultural and drinking water sectors.

Coastal Vulnerability

There are 13 coastal Districts, 25 coastal blocks and 561 fishing villages in the coastal areas. The coastal ecosystems are now encountering problems ranging from pollution, siltation and coastal erosion to that of flooding, saltwater intrusion and storm surges. Sea level rise induced storm surges and flooding can also affect critical infrastructure that impacts a healthy community life. Water treatment facilities, desalination plants, garbage disposal areas, emergency health care services, road and transportation systems can all be interrupted and compromised. This affects not only the coastal inhabitants, but affects all population dependent on coastal infrastructure.

Erosion zones along the Tamil Nadu coast include the districts of Kanyakumari, Thirunelveli, parts of Tuticorin, Ramanathapuram, Pudukkottai, Thanjavur, Thiruvarur, Nagapattinam, Cuddalore, Villupuram, Kancheepuram, Chennai and Thiruvallur. Sea erosion not only impacts the livelihood of fishermen but also adversely affects the housing, road infrastructure and ground water.

Flood vulnerability

Every year, number of people are affected, some succumbing to the floods, thousands are rendered temporarily homeless and several hectares of crops are damaged. Floods in the State are mainly caused during cyclones and heavy rains. Extremely heavy rainfall caused severe floods in most of the coastal areas and affected the districts of Chennai, Kancheepuram, Thiruvallur, Cuddalore, Thanjavur, Nagapattinam, Thiruvarur, Pudukkottai and Thoothukudi.

Heat Wave vulnerability

A Heat Wave is a period of abnormally high temperatures, more than the normal maximum temperature that occurs during the (Hot weather) summer season. Heat Waves typically occur between March and June. The extreme temperatures and resultant atmospheric conditions adversely affect people living in these regions as they cause physiological stress, sometimes resulting in death. Some of the districts in Tamil Nadu that have witnessed heat wave impacts are Vellore, Thiruvannamalai, Krishnagiri, Dharmapuri, Salem, Namakkal, Tiruppur, Coimbatore, Erode, Karur, Tiruchirapalli, Ariyalur, Perambalur, Sivagangai, Virudhunagar, Theni, Dindigul and Madurai.

Vector and Zoonotic Disease vulnerability

In Tamil Nadu there are few vector and zoonotic borne diseases outbreaks every year, namely: Malaria, Dengue, Chikungunya, Filariasis and Leptospirosis, Japanese encephalitis.

Malaria: Malaria is caused by Plasmodium parasites. The parasites are spread to people through the bites of infected female Anopheles mosquitoes, called "malaria vectors." There are 5 parasite species that cause malaria in humans, and 2 of these species – *P. falciparum* and *P. vivax* – pose the greatest threat. In Tamil Nadu, Malaria is common in urban, coastal and riverine areas of Chennai, Ramanathapuram, Paramakudi, Thoothukudi, Kanyakumari, Krishnagiri, Dharmapuri, Madurai, Karur and Thiruvannamalai.

Dengue: Dengue is a mosquito-borne viral infection causing a severe flu-like illness and, sometimes causing a potentially lethal complication called severe dengue. Dengue Fever is caused by the dengue virus which are transmitted through the Aedes type of mosquitoes. Dengue is fast emerging pandemic-prone viral disease in many parts of the world. Dengue flourishes in urban poor areas, suburbs and the countryside but also affects more affluent neighbourhoods in tropical and subtropical countries. During the rainy seasons, survival of the virus increases which leads to outbreak of the disease all most throughout the state. According to the IDSP weekly report districts in Tamil Nadu that reported dengue outbreak in 2019 were Dharmapuri, Tirunelveli, Erode, Viruddhnagar- Sivakasi, Pudukottai and Thiruannamalai.

Chikungunya: According to the WHO Chikungunya has been identified in over 60 countries in Asia, Africa, Europe and the Americas. The virus is transmitted from human to human by the bites of infected female mosquitoes. Most commonly, the mosquitoes involved are Aedes aegypti and Aedes albopictus, two species which can also transmit other mosquito-borne viruses, including dengue. These mosquitoes can be found biting throughout daylight hours, though there may be peaks of activity in the early morning and late afternoon. Both species are found biting outdoors, but Ae. aegypti will also readily feed indoors. Chikungunya is characterized by an abrupt onset of fever frequently accompanied by joint pain. Other common signs and symptoms include muscle pain, headache, nausea, fatigue and rash. The joint pain is often very debilitating, but usually lasts for a few days or may be prolonged to weeks. Hence the virus can cause acute, subacute or chronic disease.

In Tamil Nadu, according to the IDSP weekly report Jan 2019 19.15% cases were reported. According to IDSP, the districts reporting Chikungunya were Madurai, Theni, Salem, Dharmapuri, Pudukottai, Ramanathapuram, Karur, Ariyalur, Erode and Trichy.

Filaria: Filariasis is caused by several round, coiled and thread-like parasitic worms belonging to the family filaridea. These parasites after getting deposited on skin penetrate on their own or through the opening created by mosquito bites to reach the lymphatic system. The disease is caused by the nematode worm, either Wuchereria bancrofti or Brugia malayi and transmitted by ubiquitous mosquito species Culex quinquefasciatus and Mansonia annulifera/M.uniformis respectively. The disease manifests often in bizarre swelling of legs, and hydrocele and is the cause of a great deal of social stigma. Filariasis is caused by several round, coiled and thread-like parasitic worms belonging to the family filaridea. These parasites after getting deposited on skin penetrate on their own or through the opening created by mosquito bites to reach the lymphatic system¹⁸. Filaria endemic districts in Tamil Nadu are, Kancheepuram, Thiruvallur, Vellore, Cuddalore, Villupuram, Trichy, Perambalur, Pudukottai, Thiruvannamalai, Thanjavur, Thiruvarur, Ariyalur, Nagapattinam, Kanniyakumari.

Leptospirosis: The only epidemic-prone infection which can be transmitted directly from contaminated water is leptospirosis, a zoonotic bacterial disease. Transmission occurs through contact of the skin and mucous membranes with water, damp soil or vegetation (such as sugarcane) or mud contaminated with rodent urine. The occurrence of flooding after heavy rainfall facilitates the spread of the organism due to the proliferation of rodents which shed large amounts of leptospire in their urine. According to the IDSP weekly report Jan 2019, 3.43% cases are from Tamil Nadu which was considered as outbreak. Districts that reported cases of Leptospirosis in 2019 were Ariyalur, Karur, Dindigal-Palani and Pudukottai.

Japanese encephalitis: Japanese encephalitis virus (JEV) is a flavivirus related to dengue, yellow fever and West Nile viruses, and is spread by mosquitoes. JEV is the main cause of viral encephalitis in many countries of Asia with an estimated 68 000 clinical cases every year. Although symptomatic Japanese encephalitis (JE) is rare, the case-fatality rate among those with encephalitis can be as high as 30%. Permanent neurologic or psychiatric sequelae can occur in 30%–50% of those with encephalitis.²⁴ countries in the WHO South-East Asia and Western Pacific regions have endemic JEV transmission, exposing more than 3 billion people to risks of infection. There is no cure for the disease. Treatment is focused on relieving severe clinical signs and supporting the patient to overcome the infection²⁰. JE had reported in states of Villupuram, Cuddalore and Perambalur in 2017.

Water Borne Diseases: Water borne diseases are caused by the toxic contaminants, micro- organism in the water. Generally, the outbreak of water borne diseases occurs during rains and floods. Common water borne diseases in Tamil Nadu are typhoid fever and Acute Diarrheal Disease (ADD), Hepatitis A.

Typhoid Fever: According to WHO, “typhoid fever is a systemic infection caused by Salmonella Typhi, usually through ingestion of contaminated food or water. The acute illness is characterized by prolonged fever, headache, nausea, loss of appetite, and constipation or sometimes diarrhoea. Symptoms are often non-specific and clinically non-distinguishable from other febrile illnesses. However, clinical severity varies and severe cases may lead to serious complications or even death. It occurs predominantly in association with poor sanitation and lack of clean drinking water”. As per the IDSP weekly report Jan 2019 4.19% laboratory confirmed typhoid cases were reported in Tamil Nadu. Districts that reported typhoid outbreak in 2019 were Dharmapuri, Salem and Virudhnagar- Sivakasi.

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

According to Integrated Disease Surveillance Program (IDSP) weekly reports of 2019 districts of Madurai, Tuticorin, Ariyalur, Nagapattinam, Tiruvarur, Villipuram, Dindigal-Palani, Nilgiris and Thiruvallur have reported outbreaks of ADD in Tami Nadu.

Hepatitis A: Hepatitis A is an inflammation of the liver that can cause mild to severe illness. The hepatitis A virus (HAV) is transmitted through ingestion of contaminated food and water or through direct contact with an infectious person. Almost everyone recovers fully from hepatitis A with a lifelong immunity. However, a very small proportion of people infected with hepatitis A could die from fulminant hepatitis. The risk of hepatitis A infection is associated with a lack of safe water and poor sanitation and hygiene (such as contaminated and dirty hands). WHO estimates that in 2016, 7134 persons died from hepatitis A worldwide (accounting for 0.5% of the mortality due to viral hepatitis). Hep A outbreak was reported in Karur District of Tamil Nadu 2019.

Air Pollution Vulnerability

Tamil Nadu is one of the top most industrialized states with Air Pollution as the biggest threat to the health of the population. Air pollution has a wide range of health effects, such as - cardiovascular diseases, respiratory diseases, hypertension, diabetes, and obesity. All the big cities in the state are reeling under the effects of air pollution. Air pollution has also been linked to have a detrimental impact on food productivity - for instance, increase in ground level ozone pollution affects the crop yield. In addition to all the major cities in the State, the districts of Chennai, Kancheepuram, Cuddalore, Tuticorin, Coimbatore, Vellore and Salem are particularly vulnerable to the threats of air pollution.

Vulnerable Populations

Some people are more vulnerable to the effects of climate change and health:

Children are vulnerable for several reasons. For example, children are more susceptible to heat stress and dehydration and are more sensitive to exposure to air pollution and smoke from day-to-day activities. Their immune systems are not fully developed, putting them at increased risk of infections. They often need to rely on adults to keep them safe during emergencies and help them to recover afterwards.

Pregnant women are at increased risk of heat stress during heatwaves due to the physiological demands of pregnancy. They and their unborn babies are particularly sensitive to exposure to air pollution.

Older people and people with pre-existing medical conditions are more prone to dehydration, heat stress, infections and exacerbation of heart and lung disease.

People living in rural and remote areas, people on low incomes and other vulnerable populations are also at increased risk, in part due to inequalities in underlying health outcomes and limited accessibility of healthcare and other services. People living in rural or remote communities or along the coast are also at risk from extreme events such as, droughts, storms and sea level rises.

CHAPTER – 4

TNAPCCHH: Vision, Goal & Objectives

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

Goal: To Reduce morbidity, mortality, injuries and health vulnerability due to climate variability and extreme weathers

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

Specific Objectives of TN action Plan -

Objective 1: To create awareness among general population (vulnerable community), health care providers and Policy makers regarding impacts of climate change on human health.

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

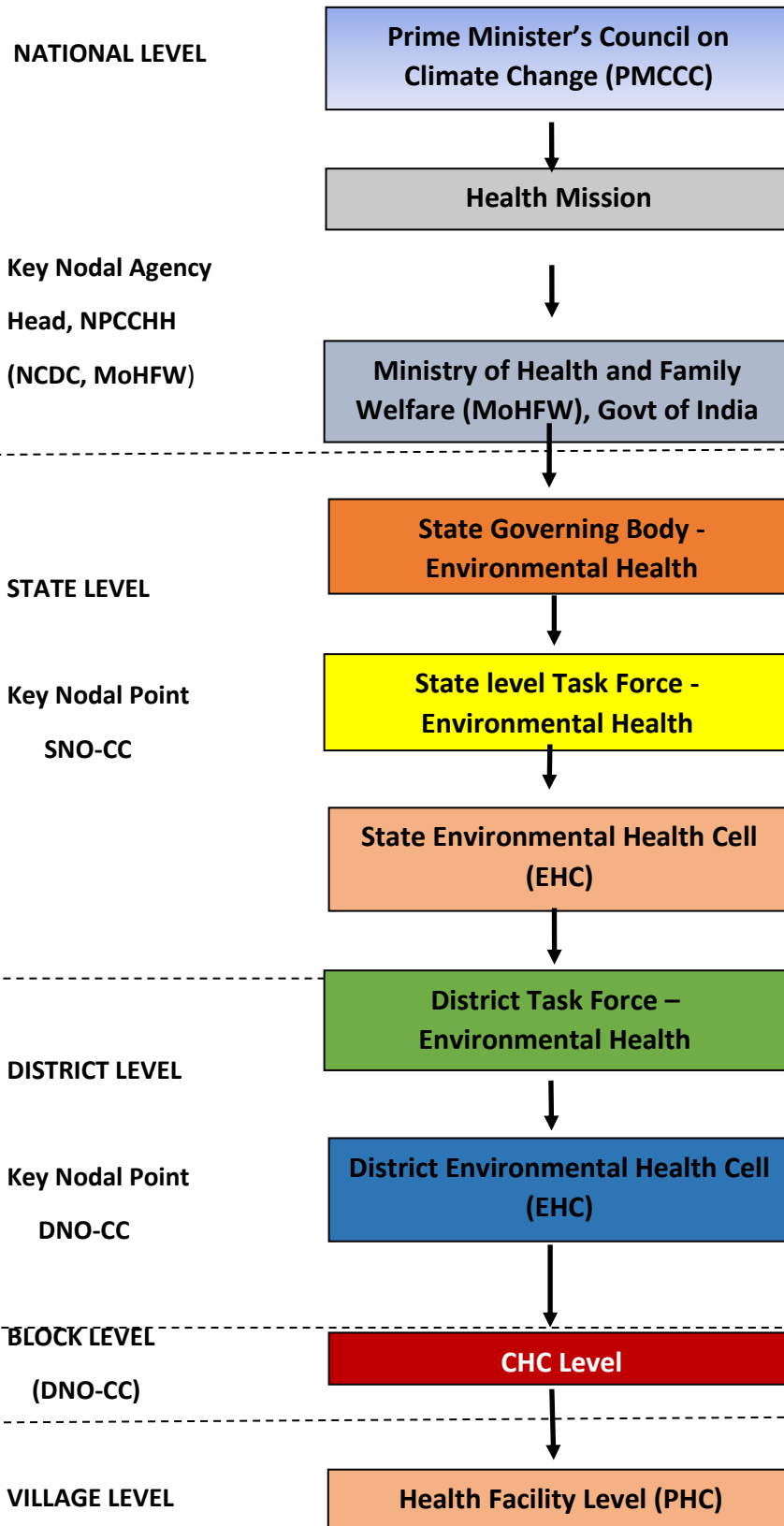
Objective 3: To strengthen health preparedness and response by performing situational analysis at national/ state/ district/ below district levels.

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 in coordination with the Ministry of Health & Family Welfare.

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

CHAPTER 5

SAPCCHH: Organizational Framework



(DNO-CC)

State Level - Governing Body - Environmental Health

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

Honourable State Health Minister	Chairman
Principal Secretary(Health)	Vice Chairman
Director Health Services/Head of Health System	Member Secretary
Mission Director-National Health Mission	Member
Principal Secretary, Ministry of Revenue (Disaster)	Member
Principal Secretary, Ministry of Agriculture	Member
Principal Secretary, Ministry of Water and Sanitation	Member
Principal Secretary, Ministry of Transport	Member
Principal Secretary, Ministry of Animal Husbandry	Member
Principal Secretary, Ministry of Environment and Forests	Member
Principal Secretary, Ministry of Women and Child Development / Social Justice	Member
Principal Secretary, Ministry of Science and Technology/ Earth Sciences	Member
Principal Secretary, Ministry of Education	Member
Principal Secretary, Ministry of Human Resource Development	Member
Principal Secretary, Ministry of Public Works Department	Member
Principal Secretary, Ministry of Power	Member
Principal Secretary, Ministry of Urban Development (Municipalities)	Member
Principal Secretary, Ministry of Finance	Member
Principal Secretary, Ministry of Law	Member
Principal Secretary, Ministry of Food and Civil Supplies	Member
Principal Secretary, Ministry of Panchayati Raj	Member
Regional Director -Health & Family Welfare (GoI)	Member
Director Medical Education and Research	Member
State Nodal Officer- Climate Change	Member
Head – NAPCCHH, CEOH&CCH Division, NCDC	Member

State Level Task Force - Environmental Health

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

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

Principal Secretary (Health)	Chairperson
Mission Director-National Health Mission	Vice Chairman
Director Health Services/Head of Health System	Member Secretary
Director/ Chairman - Department of Revenue (Disaster)	Member
Director/ Chairman - Department of Agriculture	Member
Director/ Chairman - Department of Water and Sanitation	Member
Director/ Chairman - Department of Transport	Member
Director/ Chairman - Department of Animal Husbandry	Member
Director/ Chairman - Department of Environment and Forests	Member
Director/ Chairman - Department of Women and Child Development / Social Justice	Member
Director, Meteorological department of State/UT	Member
Director/ Chairman - Department of Public Works Department	Member
Director / Chairman – Department of Urban Development (Municipalities)	Member
Director/ Chairman -Department of Education	Member
Director/ Chairman - Department of Food and Civil Supplies	Member
Director/ Chairman - Department of Human Resource Development	Member
Director/ Chairman - Department of Power	Member
Director/ Chairman - Department of Finance	Member
Director/ Chairman - Department of Law	Member
Director/ Chairman - Department of Panchayati Raj	Member
Director/ Chairman - State Ground Water Board	Member
Head - State Disaster Management Authority	Member
Environmental Engineer/ Scientist from Ministry of Environment	Member
Chairman, State Pollution Control Board	Member
Regional Director -Health & Family Welfare (GoI)	Member
Director Medical Education and Research	Member
State Nodal Officer- Climate Change	Member
Director, ICMR Institute/Centre (If any branch in the State/UT)	Member
State Surveillance Officer	Member
Head – NAPCCHH, CEOH &CCH Division, NCDC, MoHFW	Member
Head, NCDC Branch of the state	Member

The Task force of the Environmental Health Cell will coordinate with the Centre (MoHFW, NCDC) for execution of the SAPCCHH. An Environmental Health Cell has been formed by DHS within State Health Department, and a Nodal Officer from the Health department has been identified.

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

Structure at State/ UT Environment Health Cell:

Nodal Officer (Public Health Expert - State Health Department)	1
Consultant-Capacity building/ Training/ HR Management	1
Consultant-Environmental Health	1
Data Manager & Analyst	1
Secretarial Assistants cum Data entry Operator	1
Executive Members of EHC	
State Nodal Officer- Climate Change	Chairman
State Program Manager – NHM	Member
Additional Director Public Health/NCD	Member
Additional Director NVBDCP	Member
Additional Director Immunization / Family Welfare	Member
Additional Director Medical (Mental Health)	Member
State Surveillance Officer/ Additional Director Epidemic	Member
Head, State Nutrition Bureau	Member
Consultant, SHSRC	Member
Additional Director , IEC/ State Mass Media	Member
State Epidemiologist, IDSP	Member
State Veterinary Consultant	Member
Microbiologist , IDSP	Member

Roles and Responsibilities of the State/ UT Environmental Health Cell

Preparation and implementation of State Action Plan for Climate Change and Human Health

Conduct Vulnerability assessment and risk mapping for commonly occurring climate-sensitive illnesses in the state. Assessment of needs for health care professionals (like training, capacity building) and organise training, workshop, and meetings. Maintain state and district level data on physical, financial, epidemiological profile for climate-sensitive illnesses. Ensure convergence with NHM activities and other related programs in the state / district Monitor programme, review meetings, and field observations

Timely issue of warning/ alerts to health professionals and related stakeholders as well as general public through campaign or using mass media (electronic or printed) Social mobilization against preventive measures through involvement of women's self-help groups, community leaders, NGOs etc.

Advocacy and public awareness through media (street Plays, folk methods, wall paintings, hoardings, etc.)

Conduct of operational research and evaluation studies for climate change and its impact on human health

District Level:

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

Structure of District Level Task Force- Environmental Health

District Collector	Chairman
Dean – Govt Medical College in the district/ Head- Department of Community Medicine of the Medical College	Vice Chairman
Chief Medical Officer/ District Medical Officer / District Nodal Officer – Climate Change.	Member Secretary
District Surveillance Officer	Member
District Programme Manager – NHM	Member
District Head, Department of Revenue (Disaster)	Member
District Head, Department of Agriculture	Member
District Head, Department of Water and Sanitation	Member
District Head, Department of Transport	Member
District Head, Department of Animal Husbandry	Member
District Head, Department of Environment and Forests	Member
District Head, Department of Women and Child Development / Social Justice	Member
District Head, Department of Science and Technology/ Earth Sciences	Member
District Head, Department of Education	Member
District Head, Department of Food	Member
District Head, Department of Human Resource Development	Member
District Head, Department of Public Works Department	Member
District Head, Department of Power	Member
District Head, Department of Finance	Member
District Head, Department of Law	Member
District Head, Department of Panchayati Raj	Member

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

Structure at District Environment Health Cell:

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

Roles and Responsibilities of the District Environmental Health Cell

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

Assess needs for health care professionals and conduct sub-district/ CHC level training/ workshop and meetings for capacity building. Ensure appointment of contractual staff and engage them in the assigned task of data management under the NAPCCHH.

Maintain district level data on physical, financial, and epidemiological profile for these illnesses.

Community Health Centre Level

The CHC Level Structure is as under:

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

At the health facility, the responsibility for implementation rests with the Medical Officer (in-charge) of the facility. The existing machinery of NHM will be utilised for the related activities. The Rogi Kalyan Samiti (RKS) would be reviewing and monitoring the 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.

Health Adaptation Plan for Air Pollution

CHAPTER 6

DISTRICT	AQI
Chennai	77
Kancheepuram	43
Cuddalore	58
Tuticorin	38
Coimbatore	103
Vellore	71
Salem	42

Climate change can have a significant combined effect on regional air quality as it affects the conditions that impact the pollutants transportation like changes in chemical reaction rates and boundary layer mixing. Carbon dioxide (CO₂), one of the major drivers of climate change can slow down the dispersal of air pollutants and increase the frequency of stagnation episodes, which results in the degradation of air quality.

With the increased industrial and commercial activities in the vicinity of major cities, the quality of the ambient air is being affected by emissions from the industries and from the ever-increasing vehicular population. As per the provision of Air (Prevention and Control of Pollution) Act, 1981, the entire state of Tamil Nadu has been declared as an air pollution control area. Tamil Nadu Pollution Control Board is operating eight ambient air quality monitoring stations in Chennai under National Air Quality Monitoring Programme (NAMP) funded by Central Pollution Control Board. Ambient Air Quality Monitoring are located in Thoothukudi, Coimbatore, Selam, Madurai, Trichy, Cuddalore and Mettur.

Tamil Nadu is one of the top most industrialized states with Air Pollution as the biggest threat to the health of the population. Air pollution has a wide range of health effects, such as - cardiovascular diseases, respiratory diseases, hypertension, diabetes, and obesity. In poorly ventilated dwellings, indoor smoke can be 100 times higher than acceptable levels for fine particles. Exposure is particularly high among women and young children, who spend the most time near the domestic health. It also enhances the production rate of pollutants such as Ozone and PM_{2.5}, especially in the urban areas. All the big cities in the state are reeling under the effects of air pollution

Air Pollution Vulnerability in TN

In addition to all the major cities in the State, the following districts are particularly vulnerable to the threats of air pollution.

Vulnerable Population

- Children
- Pregnant Women
- Older people
- People with pre-existing health problems
- People living in Industrial hotspots
- Outdoor workers

- People working in dusty areas (e.g., Mining, Quarry, Construction, Saw Mill, Rice mill, etc)

AIR QUALITY DATA

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 color.

Air quality Monitoring Stations in the state of Tamil Nadu, The state has 8 AQ monitoring stations set up as shown below

Air Quality Index (AQI) Category			
Good			0-50
Satisfactory			51-100
Moderately Poor			101-200
Poor			200-300
Very Poor			300- 400
Severe			401-500
SL. NO	NAME OF THE MONITORING STATIONS	LATITUDE ° N	LONGITUDE ° E
01.	Chennai	13.074737	80.267689
02.	Thoothukudi	8.810166	78.148882
03.	Coimbatore	10.994743	76.96688
04.	Salem	11.65821	78.152968
05.	Madurai	9.924937	78.129356
06.	Trichy	10.82225	78.681043
07.	Cuddalore	11.75553	79.762325
08.	Mettur	11.7863	77.8008

ACTION PLAN ON AIR POLLUTION

Awareness Generation

To increase general awareness among all the relevant stakeholders including people especially vulnerable communities, health-care providers and policy makers regarding impacts of air pollution and ways to address them.

IEC Campaign

The Districts are aimed to create awareness through Information Education and Communication Activities (IEC) through development of locally and culturally more acceptable messages in posters, audio, video, organizing public health events, issuing advisories related to air pollution.

The content for the IEC for the air pollution related issues will be provided by the State NPCCHH division. 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 at all levels.

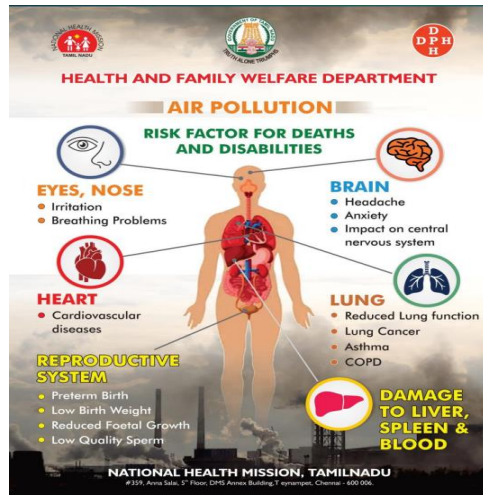
The available IEC content at programme division

Posters

Videos

SL. no	IEC Content	Content Translated
1.	Posters	Translated in Tamil
2.	Videos	Ads on local TV channels

IEC IN ENGLISH AND TRANSLATED IN TAMIL



Dissemination Plan

IEC type	Material	Timeline	Mechanism
Advisory	bit.ly/NPCCHHPrg	September	By email to DNO for further dissemination to health facilities
Early warning	AQI level with health risk category	September-March (Priority) Year around (Ideally)	Digital display on public places and health facilities-News-paper-Health department/other government website/application
Posters	5 posters on Air Pollution and health impacts (English) Same Translated into Tamil bit.ly/NPCCHHIEC	September-October	Printing of copies for state-level dissemination at health facilities, public places/buildings By email to DNO for printing at district level and dissemination to health facilities, schools and other public/government buildings
Social medial	All above material + Relevant activity updates	Throughout the year	Facebook and Twitter WhatsApp groups (State DNO, Health facility group)

Public Health Advisories

Health advisories are issued to alert the population of the potential harmful impacts of air pollution. Advisories are issued at the central level and forwarded to the districts through the state for public dissemination.

District should ensure timely dissemination of health advisories in locally acceptable language, Observance of important environment-health days

Day	Activities
International Day of Clean Air for Blue Skies (September 7)	IEC Campaigns Health facility-based patient awareness sessions Audio-video spots broadcasting Targeted awareness sessions: traffic police, schools, women, children
Other days:	
World Car Free Day (September 22)	Street plays and local cultural activities, Rallies
World Environmental Health Day (September 26)	Sports events
Green Consumer Day (September 28)	Competition: poster, poem/essay, quiz

2. Capacity Building

Conduct Training and Monitoring for Health professionals on Air Pollution and health Impacts Train hospital and health centre staff (doctors, nurses, para medical staff) on identifying and dealing with cases related to air pollution Develop health advisories for hospitals based on Air quality index Enforcement Ensure tightening legal compliance for emission norms, which will have immediate payback on air quality and health dividends

Training Programme	Participants	Training Content
Medical Officers (5 Days)	MO (DH,CHC,PHC)	Climate Sensitive Health Issues
Community Health Care Workers (HWC) (2 Days)	Community Health Workers (MPHW, ASHA)	
Panchayati Raj Institutions (1 Day)	Panchayati Raj Institutions, communities	

S.No	Training programme	Timeline	Priority Districts
01.	DNO	August	East, South, West, North
02.	MO	September	East, South, West, North
03.	Community Health Workers	October	East, South, West, North

3. Surveillance

Health Adaptation Plan for Disease Due to Air Pollution <https://bit.ly/NPCCHHNOADS>

There are 4 Non-Attainment Cities identified under National Clean Air Programme (2018)

Chennai, Madurai, Thoothukudi, Trichy

All health facilities in a district (PHC and above) especially in NCAP cities and cities with high air pollution levels should ensure implementation of this plan to prepare health facility to prevent and manage cases arising/aggravating from high air pollution exposure.

Sentinel surveillance Hospitals at Tamil Nadu

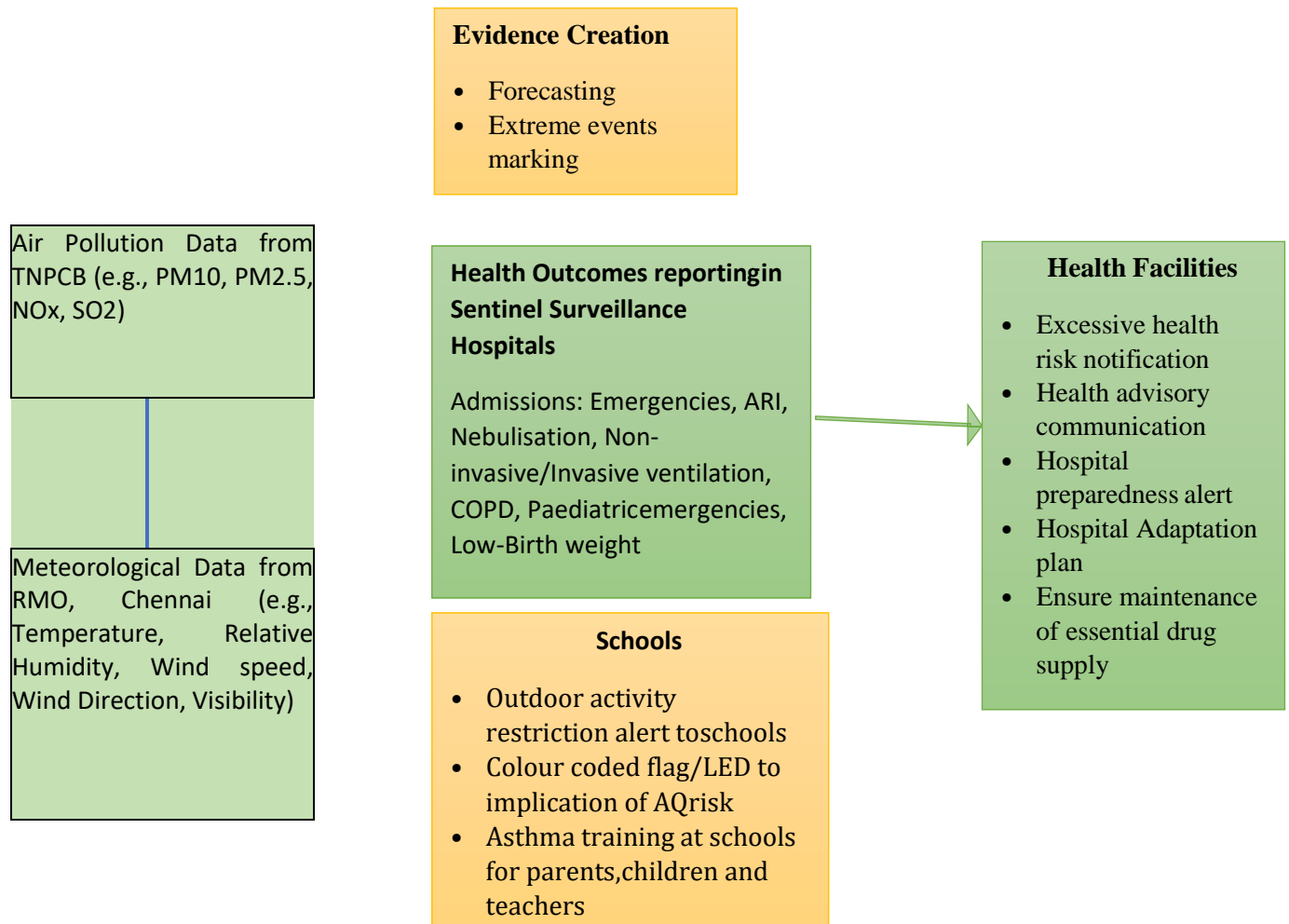
S.NO	Name of the City	Name of Medical College	Name of the Nodal Officer	Designation	Contact Number	Email id
1	Chennai	Govt. Rajiv Gandhi General Hospital	Dr. Nancy Glory	Prof. of Thoracic Medicine, Unit IV	9841123088	rmorgggh@gmail.com
2	Chennai	Govt. Stanley Medical College & Hospital	DR. Vengada Krishnaraj SP	Associate Professor, Dept. of Respiratory Medicine	9444752717	smctbrd@gmail.com
3	Salem	Govt. Mohan Kumaramangalam Medical College Hospital, Salem	Dr.S.Irsath Seeni Mohamed	Asst. Professor, General Medicine	9865736037	drirsath1981@gmail.com , msgmkmchsalem@gmail.com
4	Madurai	Govt. Rajaji Hospital, Madurai	Dr. R.Prabhakaran	Prof. & Head, Respiratory Medicine	9840003404	rmorgggh@gmail.com, deanmdu@gmail.com
5	Coimbatore	Govt. Medical College Hospital, Coimbatore	Dr. Keerthivasan		9443823390	cmcthoracicmedicine@gmail.com
6	Trichy	Govt. Mahatma Gandhi Memorial Medical College Hospital, Trichy	Dr.Sudhakar	Associate Professor	9345182828	deantrichy@gmail.com
7	Thoothukudi	Government Thoothukudi Medical College	Dr.Gracy Paulin	Asst. Professor	9994043764	ccchanarun@gmail.com

Roles and Responsibilities

	Responsibilities
SNO	<p>Finalization of IEC material and dissemination plan</p> <p>Organize IEC campaigns at the state level on the observance of important environment-health days</p> <p>Organize training sessions for district level and surveillance nodal officer</p> <p>Facilitate training of medical officers in clinical aspects of air pollution's health impact</p> <p>Real-time air quality data dashboard in proposed cities</p> <p>Monitor AQI levels in states especially in hotspots and NCAP cities</p> <p>Ensure reporting from sentinel hospitals and DNO</p> <p>Ensure necessary health facility preparedness</p> <p>Review surveillance reporting and monthly report submission by DNO</p> <p>Submit a report of activities</p> <p>Review implementation of IEC and surveillance activities at all levels</p> <p>Evaluate and update relevant section of SAPCCHH with support from State Task Force</p> <p>Liaison with the State Pollution Control Board for AQI alerts and their dissemination</p> <p>Liaison with the Department of Environment for combined IEC campaigns and information sharing on health indicators for targeted air pollution reduction activities</p> <p>Awareness and action plan input sharing with GHMC and other Municipal</p>

	<p>corporations</p> <p>Create organizational support and strengthen the Environmental Health cell to implement NPCCHH vision, goal, and objectives</p> <p>Organize sensitization workshops for other stakeholders and the line departments</p> <p>Organize seminars on air pollution and conferences to share knowledge and action under NPCCHH.</p> <p>Collaborate with academic institute/s for support in updating SAPCCHH, Surveillance activity monitoring, vulnerability assessment, and applied research</p> <p>Advocate for a reduction in the source of air pollution</p>
DNO	<p>Ensure IEC dissemination to the community-level</p> <p>Facilitate community-level IEC activities</p> <p>Conduct training for Block Health officers, Medical officers, Sentinel hospital nodal officers with relevant training manuals</p> <p>Conduct training of vulnerable groups i.e. police officers, outdoor workers, women, children</p> <p>Organize IEC campaigns at the district level on observance of important environment-health days</p> <p>Collect and monitor AQI levels in states, especially in hotspots and NCAP cities</p> <p>Ensure daily reporting from Sentinel hospitals and compile the data</p> <p>Analyze daily health data with AQI level to monitor trends and hotspot in health impacts</p> <p>Submit analyzed monthly reports to SNO, NPCCHH, and other departments for necessary action</p> <p>Submit a report of activities</p> <p>Update DAPCCHH with support of the District Task Force</p> <p>Advocate for reduction in source of air pollution</p>
Surveillance hospital nodal officer	<p>Train hospital staff and clinician responsible for daily reporting in case indentation and reporting flow</p> <p>Compile daily reports for the health facility and submit it to DNO and NPCCHH.</p>
Block Health Officer	<p>Conduct community level IEC activities</p> <p>Ensure training of medical officers</p> <p>Organize PRI sensitization workshops and training for vulnerable groups</p>
Medical Officer	<p>Conduct health facility-based IEC activities</p> <p>Support community-level IEC activities</p> <p>Be aware of AQI levels and the health impact of air pollution</p> <p>Ensure necessary health facility preparedness in early diagnosis and management of cases</p>
Panchayati Raj Institutions	<p>Conduct community level IEC activities</p>

Air Pollution notification and warning system



Monitoring

Surveillance of Acute Respiratory illness in the hospitals which had real-time monitors to understand the disease pattern.

Air pollution is known to cause respiratory diseases, cardiovascular and neurological diseases in the long term, the State will develop a policy or a system to monitor these trends at the health center level

Research studies

Conduct health Impact Assessment in air pollution hotspots in Tamil Nadu Conduct district and state-level studies to understand the sources of air pollution and its impact on various demographics like children, pregnant women, the elderly etc

Health Adaptation Plan for Heat Related Illnesses

A heat wave is a period of unusually hot weather that typically lasts two or more days. The temperatures have to be outside the historical averages for a given area. The United Nations has warned of more heat wave deaths across the world, especially in tropical countries as climate change pushes up temperatures. 2016, closely followed by 2019 was declared as the top two warmest years by the world meteorological organization. In 2019

alone, more than 65% of Indians were exposed to heat waves. According to a November 2018 study by Indian Institute of Technology-Gandhinagar, India will see a four-fold rise in heat waves if global temperature rise is restricted to 1.5 deg C by the turn of this century.

According to research by CCCAR Anna University, the regional climate change projections for the Tamil Nadu state simulated by the Met Office Hadley Centre regional climate model PRECIS, using HadCM3Q model under A1B scenario indicated the general increase in maximum and minimum temperature over Tamil Nadu by end of the century. The increase in maximum temperature would be 1.0, 2.2 and 3.1 °C for the periods 2020s (2005–2035), 2050s (2035–2065) and 2080s (2065–2095), respectively, with respect to baseline period (1970–2000). Similarly, the projections of minimum temperature showed an increase of 1.1, 2.4 and 3.5 °C, for the periods 2020s (2005–2035), 2050s (2035–2065) and 2080s (2065–2095) with respect to baseline period (1970–2000). For the whole state, projections indicated warmer summers, maximum temperature increasing by about 3.1 °C with a general maximum increase of 3.3–3.5 °C over

western zone and minimum temperature by about 3.5 °C. The minimum temperature projections consistently show higher values when compared to maximum temperature. With a difference ranging from 0.2 to 0.5 °C for different projections.

PRIORITY DISTRICTS

On 31 March 2019, Chennai recorded a temperature of 39 deg C, 4 degrees higher than the average temperature for the season. Some of the districts in Tamil Nadu that have witnessed severe heat wave impacts in the recent years are Vellore, Thiruvannamalai, Krishnagiri, Dharmapuri, Salem, Namakkal, Tiruppur, Coimbatore, Erode, Karur, Tiruchirapalli, Ariyalur, Perambalur, Sivagangai, Virudhunagar, Theni, Dindigul and Madurai. The frequency and intensity of heat waves are only expected to increase due to climate change.

VULNERABLE POPULATION

Rising global ambient temperatures affect all populations. However, some populations are more exposed to, or more physiologically or socio-economically vulnerable to physiological stress, exacerbated illness, and an increased risk of death from exposure to excess heat. Gender can play an important role in determining heat exposure.

These include the Children, Pregnant women and senior citizens, People with pre-existing health problems
Labourers including those at construction sites/ Outdoor workers/ Farmers/ MNREGS workers
Police personnel/ security staff, Industrial workers working at High Temperatures, Street hawkers/ salesmen
Auto drivers/ Travellers/ Bus drivers, Coolies/ Slum residents/ Beggars/ Homeless

EARLY WARNING SYSTEM ON HEAT WAVE

The Indian Meteorological Department issues a Weekly Bulletin with Current Temperature Status and Warning for next five days. The Commissionerate of Revenue Administration and Disaster Management instantly shares this info to the District Disaster Management Authorities (DDMAs). The District Administration communicates this in multiple channel to the public

Heat wave is considered if maximum temperature of a station reaches at least

40°C or more for plains

37°C or more for coastal stations and

At least 30°C or more for Hilly regions

Heat Wave warning criteria

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 Based on Actual Maximum Temperature

Heat Wave: When actual maximum temperature ≥45°C

Severe Heat Wave: When actual maximum temperature ≥47°C

Heat wave alert

Green (No action)	Normal Day	Maximum temperatures are near normal
Yellow Alert (Be updated)	Heat Alert	Heat wave conditions at district level likely to persist for 2 days
Orange Alert (Be prepared)	Severe Heat Alert for the day	(i) Severe heat wave conditions persist for 2 days. (ii) With varied severity, heat wave is likely to persists for 4 days or more
Red Alert (Take Action)	Extreme Heat Alert for the day	(i) Severe heat wave persists for more than 2 days. (ii) Total number of heat/severe heat wave days likely to exceeds 6 days.

Source: IMD – Heat wave Bulletins

HEALTH ADAPTATION PLAN ON HEAT RELATED ILLNESS

Awareness Generation

To increase general awareness among all the relevant stakeholders including people especially vulnerable communities, health-care providers and policy makers regarding impacts of air pollution and ways to address them.

IEC Campaign

The Districts are aimed to create awareness through Information Education and Communication Activities (IEC) through development of locally and culturally more acceptable messages in posters, audio, video, organising public health events, issuing advisories related to air pollution.

The content for the IEC for the air pollution related issues will be provided by the State NPCCHH division. 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 at all levels.

The available IEC content at programme division

Posters

Videos

SL. no	IEC Content	Content Translated
1.	Posters	Translated in Tamil
2.	Videos	Ads on local TV channels

Dissemination of IEC material

IEC type	Material	Timeline	Mechanism
Advisory	bit.ly/NPCCHHAdvisory	March	By email to DNO for further dissemination to health facilities
Early warning	Daily heat bulleting from IMD with health impact information	March-July	Digital display of temperatures on public places and health facilities Newspaper Health department/other government website/application
Posters	6 posters on heat and health impacts (English, Hindi) bit.ly/NPCCHHIEC posters on heat and health impacts (Tamil)	February-March	Printing of copies for state-level dissemination at health facilities, public places/buildings By email to DNO for printing at district level and dissemination to health facilities, schools and other public/government buildings
Hoardings	Posters in Tamil (above)	March	To be planned with Major Municipalities
Audio-Visual	3 Audio Jingles bit.ly/NPCCHHIEC Audio Jingle	March	Played during primetime/daytime between March-July
	2 Video messages (Hindi, English) bit.ly/NPCCHHIEC Video message	March	Played times a day during primetime/daytime between March-July
Digital display	Available GIF Above mentioned video messages	March-July	Display in health facilities Public digital display boards in major cities
Social medial	All above material + Relevant activity updates	February-July	Facebook and Twitter handle of state NPCCHH, NHM WhatsApp groups (State DNO, Health facility group)

Observance of important environment-health days

Although there is no specific day on heat-health, observance of following days may be recommended for awareness on health impact of extreme heat (outdoor-indoor).

Day	Activities on Heat-Health
World forest Day (March 21) World Water Day (March 22) World Health Day (April 7) Earth Day (April 22) World Environment Day (June 5) World Day to Combat Desertification and Drought (June 17)	IEC Campaigns Audio-video spots broadcasting Targeted awareness sessions: traffic police, schools, women, children Street plays and local cultural activities, Rallies Sports events Competition: poster, poem/essay, quiz Community level heat mitigation measures Plantation drive Cool-roofing drive Energy conservation Health facility level activities Health facility-based patient awareness sessions Energy audit and conservation measures Review of preparedness for heat-related illness

Capacity Building

Guidelines:

National Action Plan on Heat Related Illnesses (<https://bit.ly/NAPHRI>)

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

State-District level training modules

Medical officer training

Para medical officers & Health care workers

Community level training: vulnerable population group such as women/ children/ elderly/ different type occupations

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

Clinical Aspects of Heat-Related Illnesses

Webinars on heatwave and its health impact

HRI surveillance training

Training Programme for	Trainer	Topics	Timeline
District level (DNO-CC, trainers)	State Level Trainers SNO-CC, Consultant	Heat-health impact, prevention measures Surveillance reporting and analysis with weather parameters Health facility preparedness	February

Health facility level (MO DH/CHC/PHC) of	District Trainers DNO-CC	Level	Heat-health impact, prevention measures Surveillance case identification and reporting Health facility preparedness Clinical management of HRI	February
Community Health care workers (MPH, ASHA, ANM etc)	District Trainers, MO	Level	Heat-health impact prevention Indoor and outdoor mitigation measures	February-March
Panchayati Raj Institutions	District trainers, Health workers	level MO, care	Heat-health impact prevention Indoor and outdoor mitigation measures	February-April

Strengthening Health Sector Preparedness National Heat-Related Illness Surveillance (NHRIS), NPCCHH

Surveillance guidelines and reporting formats: National Action Plan on Heat Related Illnesses (<https://bit.ly/NAPHRI>)

Case definitions

HRI reporting formats: health facility to state level (forms 1 to 4) Death investigation form for suspected heatstroke deaths

Reporting units: All health facilities in a district (PHC and above) should submit daily reports from March 1-July 31 regardless of observed temperatures and rainfall.

Surveillance training: included under capacity building section Surveillance activity monitoring:

Review of surveillance activity: every month (March-July)

Health Sector Preparedness

Guidelines National Action Plan on Heat Related Illnesses (<https://bit.ly/NAPHRI>)

Revision of Health Action Plan on Heat Related Illnesses in State Action Plan on Climate Change and Human Health (SAPCCHH):

The section should be revised every year after July based on targets achieved, surveillance data, climate change impacts and health indicators with support from multi-sectoral task force,

Heat Action Plan for Specific Cities/Rural Districts

Urban areas often become hotspots of heat impact due to altered land use, reduced land cover, reduced natural shade and use of built material that trap heat during day and night time. Urban heat island effect poses greater threat to larger swath of population by impeding night natural cooling leading to continuous heat stress compared to that in rural area. As such health-centric multisectoral coordinated adaptation and mitigation efforts at city level are a necessity and an opportunity not only for reducing heat impact but also for reduction of greenhouse gas emission.

City-Specific Heat-Health Action Plans are encouraged and supported by State EHC.

City-Specific Heat-Health Action Plans should include:

Early warning system and inter-agency emergency response plan:

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

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

Identification of roles and responsibilities of coordinating agencies with activity matrix and action checklists
(Refer: Ahmedabad Heat Action Plan)

Public awareness

- Communicating risk to vulnerable population groups
- Capacity building of medical professionals
- On identification, management and reporting of HRI cases and deaths
- Promoting short and long-term adaptation and mitigation measures
- Access to potable water, shaded area, cooling spaces
- Plantation, cool roof

Revision of Health Action Plan on Heat in State Action Plan on Climate Change and Human Health (SAPCCHH):
The section should be revised every year after July based on targets achieved, surveillance data, climate change impacts and health indicators with support from multi-sectoral task force,

Roles and Responsibilities

	Responsibilities
SNO	Disseminate early warnings to 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 IEC campaigns at state level on observance of important environment-health days Organize training sessions for district level and surveillance nodal officer Facilitate training of medical officers in clinical aspects of heat-health impact Ensure daily surveillance reporting from district level Ensure submission and analysis of heat related death at state and district level Monitor daily health data with temperature and humidity levels to monitor trends and hotspots in the state Review health facility preparedness and ambulance services to manage HRI Identify health facilities at different levels that can have heat illness wards with necessary treatment/cooling facilities Keep existing Rapid Response Teams under IDSP prepared to manage HRI if needed for emergency response to extreme heat Review implementation of IEC and surveillance activities at all levels Evaluate and update relevant section of SAPCCHH with support from State Task Force Create organization support and strengthen Environmental Health cell to implement NPCCHH vision, Goal and Objectives Organize sensitization workshops for other stakeholders and line departments Organize seminars and conference 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 report of activities on heat-health under NPCCHH Advocate for reduction in source of greenhouse gas emissions
DNO	Disseminate early warning to block and health facility level Ensure IEC dissemination to community level and facilitate community level IEC activities Liaison with IMD to get 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, medical officers, with relevant training manuals Conduct sensitization of vulnerable groups: police officers, outdoor workers, women, children etc Organize IEC campaigns at district level on observance of important environment-health days Ensure daily reporting from health facilities and compile the data Analyze daily health data with temperature and humidity levels to monitor trends and hotspots in district Support timely suspected heatstroke death analysis and its reporting Submit analyzed weekly report to SNO, NPCCHH, Hq and other departments for necessary action Coordinate with other agencies for response Update DAPCCHH with support from District Task Force Submit report of activities on heat-health under NPCCHH Advocate for reduction in source of greenhouse gas emissions
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
City health department	Support in development and implementation of city-specific heat-health action plan
Medical officer	Conduct health facility-based IEC activities Support community level IEC activities Be aware of AQI levels and health impact of air pollution Ensure necessary health facility preparedness in early diagnosis and management of cases
Panchayati Raj Institutions	Conduct community level IEC activities

Health adaptation plan for Vector Borne Diseases

INTRODUCTION

Vector-borne disease account for more than 17% of all infectious disease, causing more than 700, 000 deaths annually. They can be caused by either parasites, bacteria or viruses. (Vectors are living organisms that can transmit infectious pathogens between humans, or from animals to humans. Many of these vectors are bloodsucking insects, which ingest disease-producing microorganisms during a blood meal from an infected host (human or animal) and later transmit it into a new host, after the pathogen has replicated. Often, once a

vector becomes infectious, they are capable of transmitting the pathogen for the rest of their life during each subsequent bite/blood meal.

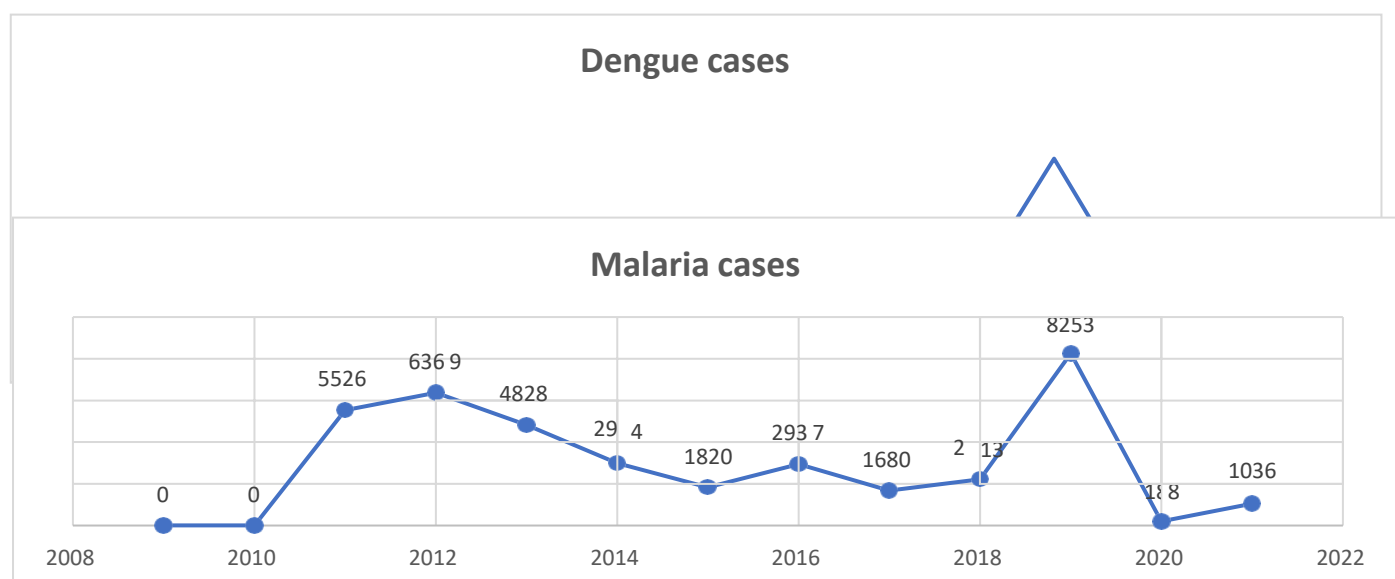
Every year there are more than 700,000 deaths from diseases such as malaria, dengue, schistosomiasis, human African trypanosomiasis, leishmaniasis, Chagas disease, yellow fever, Japanese encephalitis and onchocerciasis. Since 2014, major outbreaks of dengue, malaria, chikungunya, yellow fever and Zika have afflicted populations, claimed lives, and overwhelmed health systems in many countries. Other diseases such as Chikungunya, leishmaniasis and lymphatic filariasis cause chronic suffering, life-long morbidity, disability and occasional stigmatisation.

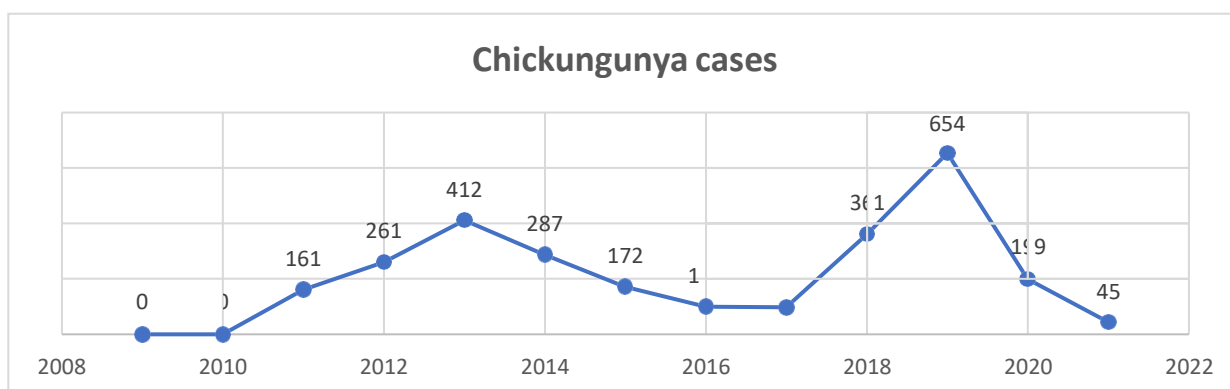
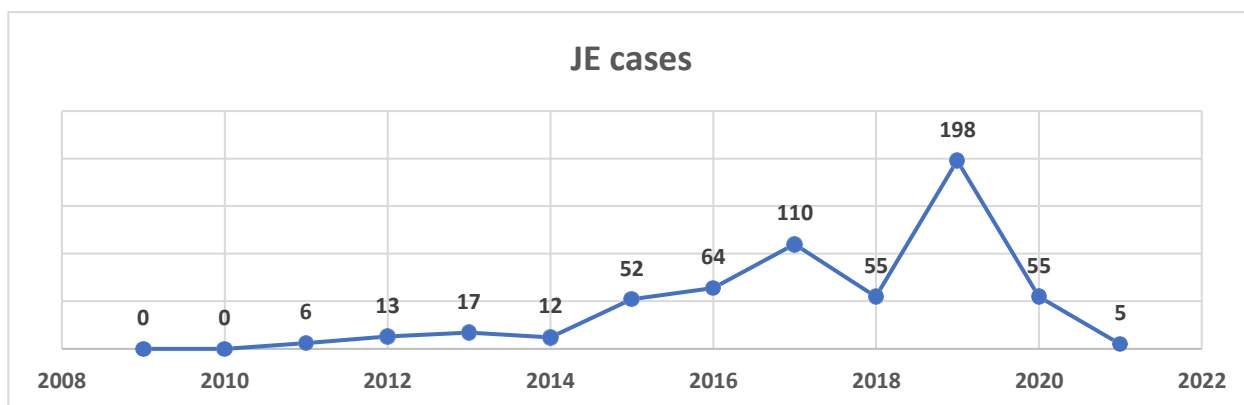
Effect of variation in climate has been well established for illnesses which are spread through vectors or which are transmitted from animals to humans.

Vector-borne diseases are among the most well studied of the diseases associated with climate change, owing to their large disease burden, widespread occurrence and high sensitivity to climatic factors. In contrast to some other climate-sensitive health risks, such as heat-stress, or exposure to storms and floods, the influence of meteorological factors is less direct, and more diverse, both within and between individual diseases. The simplest connections are through temperature, affecting the biting, survival and reproductive rates of the vectors, and the survival and development rates of the pathogens that they carry. Precipitation also exerts a very strong influence, most obviously in the case of diseases transmitted by vectors that have aquatic developmental stages (such as mosquitoes), but also, via humidity, on diseases transmitted by vectors without such stages, such as ticks or sand flies.

Sl. No	Climate Sensitive Illness	2021		2020		2019		2018		2017	
		Total no. of Cases	Deaths	Total no. of Cases	Deaths	Total no. of Cases	Deaths	Total no. of Cases	Deaths	Total no. of Cases	Deaths
1	Dengue	6039	8	2410	0	8527	5	4486	13	23294	65
2	Malaria	772	0	891	0	2088	0	3758	0	5444	0
3	Scrub Typhus	2455	0	1574	0	2030	0	1038	0	541	0
4	Chikungunya	153	0	224	0	681	0	284	0	131	0
7	Leptospirosis	1069	0	376	0	849	0	693	2	1080	1
8	Japanese Encephalitis	38	2	47	1	231	1	147	0	127	2
15	Typhoid Fever	8762	0	4114	0	16987	0	18223	0	27772	0

Vector borne Disease Situational Analysis





HEALTH ADAPTATION PLAN ON VECTOR BORNE DISEASE

Awareness Generation

To increase general awareness among all the relevant stakeholders including people especially vulnerable communities, health-care providers and policy makers regarding impacts of air pollution and ways to address them.

IEC Campaign

The Districts are aimed to create awareness through Information Education and Communication Activities (IEC) through development of locally and culturally more acceptable messages in posters, audio, video, organising public health events, issuing advisories related to air pollution.

The content for the IEC for the air pollution related issues will be provided by the State NPCCHH division. 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 at all levels.

Dissemination of IEC material

IEC type	Material	Timeline	Mechanism
Posters	Posters on VBD and climate change (English, Hindi) Adopt posters made by state NVBDC posters on VBD and climate change (Tamil)	After extreme weather events i.e. floods, cyclone, and other natural disaster i.e. earthquake/ tsunami Collaborate with NVBDCP	Collaborate with NVBDCP
Wall painting			In schools and selected colleges
Hoardings	Posters in Tamil (above)	“	To be planned with hotspot Municipalities and District
Digital display	Available GIF video messages	“	Display in health facilities Public digital display boards in major cities
Social medial	All above material + Relevant activity updates	“	Facebook and Twitter handle of state NPCCHH, NHM WhatsApp groups (State DNO, Health facility group)

Observance of important environment-health days

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

Day	Activities on VBD in context of climate change
World malaria day (April 25) World mosquito day (August 20) World Environmental Health Day (September 26)	IEC Campaigns Audio-video spots broadcasting Targeted awareness sessions: urban slums, schools, women, children Street plays and local cultural activities, Rallies Sports events Competition: poster, poem/essay, quiz Collaborate with NVBDCP

CAPACITY BUILDING

Training material

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

State-District level training modules

Medical officer training

Para medical officers & Health care workers

Community level training: vulnerable population group such as women/ children/ elderly/ different type occupations

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

Training on climate change and its impact on VBD burden

Training Programme for	Trainer	Topics	Timeline
District level (DNO-CC, trainers)	State Level Trainers SNO-CC, Consultant	Role of climate change impact in VBD burden, prevention measures Tracking of VBD and Integrating rainfall, humidity and temperature parameters with VBD surveillance Post-disaster VBD surveillance, prevention, management	July or after extreme weather events/natural disasters
Health facility level (MO of DH/CHC/PHC)	District Level Trainers DNO-CC	Role of climate change impact in VBD burden, prevention measures Strengthen surveillance reporting Post-disaster VBD surveillance, prevention, management in community and at relief camps	July-August or after extreme weather events/natural disasters
Community Health care workers (MPH, ASHA, ANM etc)	District Level Trainers, MO	Role of climate change impact in VBD burden, prevention measures Post-disaster VBD surveillance, prevention, management in community and at relief camps	
Panchayati Raj Institutions	District level trainers, MO, Health care workers	Role of climate change impact in VBD burden, prevention measures	

Strengthening Health Sector Preparedness

Integrate weather parameters with VBD surveillance under NVBDC at District level

Surveillance training: included under capacity building section

VBD prevention and control measures

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

Initiate surveillance based on predicted expansion of vectors to pick up emerging foci with support from State Programme Officers (SPO) and District malaria Officers (DMO) should

Management of new foci of transmission in the same way as other endemic areas.

Epidemic preparedness especially after extreme weather events or natural disasters

Roles and responsibilities (Govt & non-Govt)

NVBDCP, Gujarat	Overall guidance and policy formulation	Guide and the state governments in resurgence and containment of any VBD
State Nodal Officer, Climate Change	To support the state govt. in control of VBDs particularly in climate sensitive states	Oversee vector control measures Oversee health sector preparedness Oversee VBD surveillance, control in post-disaster situations in community and relief camps Train DNO, DMO Sensitization workshops to increase awareness on climate change and its

		impact on VBD
India Meteorological Department	To provide meteorological data as and when required	To help the state govt. in collaboration with any research institute, in analysis of relationship between climatic factors and a particular VBD so as to forewarn the impending outbreaks.
NGO at state and district level for reach to community	Health education at community level	Conduct workshops for IEC activities for different level of staff in the identified areas in consultation with the state govts
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 density of vector species so as to guide the state government in choosing appropriate time of IRS activities. To generate data on susceptibility status of disease vectors for using appropriate insecticide for IRS/larvicide for vector control
Chief Medical Officer/District Malaria Officer/Disease Surveillance officer	Execution of task assigned by the SPO	Supervise and guide surveillance and intervention measures for control of VBDs in the district.
Media	To be vigilant for report of any upsurge/outbreak of any VBD.	Impart health education to masses through print and audiovisuals means

Revision of Health Action Plan on VBD in State Action Plan on Climate Change and Human Health (SAPCCHH):

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

The State receives maximum rainfall during the months of October, November, and December (post monsoon), whereas in the rest of the country, the maximum rainfall is received in the months of June, July, August, and September months (monsoon). The State is frequently subjected to extreme weather conditions such as flooding in the coastal districts and severe droughts in some areas due to monsoon failure, which consequently affect the production and productivity of the food grains. Drought, water depletion, soil erosion, sea water incursion, forest fire, species extinction and thermal discomfort etc. are the major evidence of the climate change. Monsoon rains are major source for crop irrigation water supply, and cause people and livestock to suffer heavily when the monsoon fails or delayed. Additionally, due to Climate Extremities, the State is facing noticeably higher incidence of cyclonic events (Vardah 2016, Ockhi 2017 and Gaja 2018) severe floods (2015 and 2017) and hence, immediate action is required to analyse the current and future climate trends of the State.

Department	Initiatives
Meteorological Department	Accurate and timely forecast for extreme weather Communication of 'alert' to state health departments, vulnerable groups/ agencies
Water Board	Management and supply of safe and adequate water to all in the state. support & promote water conservation methods like rain water harvesting
Municipalities	Develop and promote building design and other infrastructure codes supporting 'Green building 'and use of energy efficient and natural ways of lighting and cooling Undertake actions like: planting trees, ensure non-burning of garbage, supply of safe water and maintaining sanitation. build cool shades at public places, cool corridors for pedestrians
Environment, Forest Climate Change	Develop/ encourage projects to decrease the 'Urban Heat Island effect'. Ensure green coverage in the cities through checking deforestation, urban planning and increasing plantation.
Education	Sensitise students towards health impact of extreme events and disseminate health ministry approved prevention and first-aid measures. Train teachers on first aid measures for all possible extreme events (as per state's vulnerability)

	During extreme events: keep a check on outdoor activities and close teaching institutes in case of issue of alert from Government.
Transport	Provision of safe and improved public transport like air-conditioned buses, local trains and other transport at affordable rates.
Media & NGOs	Disseminate success stories, methods and measures to promote community awareness on preventive measures and first aid to reduce health impacts of extreme weather.

Sea Level rise and its impacts

Climate change is causing sea levels around the world to rise, due to melting glaciers and thermal expansion of water. Sea level rise is considered to be a “risk amplifier” for health impacts, meaning few health impacts are caused by sea level rise alone, instead myriad health risks are made worse by sea level rise.

The most prominent impact of sea level rise is flooding, although inundation due to rising sea level by itself is a slow process, flooding due to storm surges, especially when coupled with other weather events such as cyclones and depressions can have huge repercussions.

Information, Education Communication (IEC) Activities

Target population:

Vulnerable districts/hotspots: listed above

Vulnerable groups (Primarily Children, women, older adults, traffic police, outdoor workers/vendors)

Annual IEC dissemination plan for extreme weather events and their health impact under NPCCHH

IEC type	Material	Timeline	Mechanism
Advisory	bit.ly/NPCCHHPrg	Seasonal	By email to DNO for further dissemination to health facilities
Early warning	Bulletins/ advisory by IMD (storm, cyclone), CWC (flood) sent by NPCCHH	Seasonal	Health department/other government website/application Digital display of temperatures on public places and health facilities
Posters	6 posters on various EWE and health impacts (English, tamil) bit.ly/NPCCHHIEC Posters on heat and health impacts	Seasonal, As needed	Printing of _____ copies for state-level dissemination at health facilities, public places/buildings By email to DNO for printing at district level and dissemination to health facilities, schools and other public/government buildings
Social medial	All above material + Relevant activity updates	Seasonal, As needed	Facebook and Twitter handle of state NPCCHH, NHM WhatsApp groups (State DNO, Health facility group)

Observance of important environment-health days

Day	Activities on Heat-Health
International Day for Disaster Risk Reduction	IEC Campaigns Audio-video spots broadcasting Targeted awareness sessions: women, children, occupational groups Mock drill, disaster response exercise Sports events Competition: poster, poem/essay, quiz Health facility level activities Health facility-based patient awareness sessions Conduct assessment of disaster vulnerability/energy/ water conservation measures Review of implementation of climate-resilient measures

Capacity Building Activities

Training material

Guidelines:

National Action Plan on Disaster related Health Issues

Training modules:

State-District level training modules

Medical officer training

Para medical officers & Health care workers

Community level training: vulnerable population group such as women/ children/ elderly/ different type occupations

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

State-Level/ District-Level Supporting Training institutes:

State Institute of Health & Family Welfare

Training on Heat-related illnesses diseases may be expanded to include other climate sensitive health issues specifically extreme weather events.

Annual training plan for Extreme Weather Events and Health under NPCCHH

Training Programme for	Trainer	Topics	Timeline
District level (DNO-CC, trainers)	State Level Trainers SNO-CC, Consultant	Climate change and impact of extreme weather events in India Formation of disaster management committees and plans Health facility vulnerability, resilient measures and disaster preparedness Disaster response in coordination with state/district disaster management authority Post-disaster health impact assessment and response	February
Health facility level (MO of DH/CHC/PHC)	District Level Trainers DNO-CC	Health facility disaster vulnerability assessment Disaster management committee and plan Climate resiliency measures (structural/functional)	February

		Health facility preparedness for EWE/disaster response Post-disaster surveillance and damage assessment	
Community Health care workers (MPH, ASHA, ANM etc)	District Level Trainers, MO	Climate change and health impact of extreme weather events Disaster planning and response	February-March
Panchayati Raj Institutions	District level trainers, MO, Health care workers	Climate change and health impact of extreme weather events Disaster planning and response with community participation	February-April

Strengthening Health Sector Preparedness

Early warning: dissemination of early warnings for Cold wave, Flood, Cyclone etc. to health facility level and community level

Surveillance

Post-disaster health impact assessment:

Support post-disaster surveillance of communicable disease, health facility affected conducted by SDMA, IDSP or other agencies

Health Facility Preparedness

Vulnerability assessment of health facility in context of climate change-extreme weather events

Identify structural changes/retrofitting measures at the facility level to equip the healthcare facility

Formalize disaster management plan and committee

Emergency procurement arrangements & functioning of essential health services (safe water, immunization, maternal-child care etc)

Post-disaster damage assessment and referral plan in case of health facility damage

Ensure routine monitoring and maintenance of support functions (Water quality, waste management)

Establish Sustainable procurement committee

Revision of Health Action Plan on Disaster-Related Health Issues in State Action Plan on Climate Change and Human Health (SAPCCHH):

The section should be revised every year after December with support from coordinating agencies based on updated surveillance data, its analysis with weather parameters, targets achieved, and predicted climate variability with support from multi-sectoral task force.

Roles and Responsibilities

	Responsibilities
SNO	Disseminate early warnings to district level Finalization of IEC material and dissemination Plan Formalize intersectoral coordination for disaster planning, management and response with SDMA/IMD and other response departments Organize training of district level officers Facilitate assessment and implement of climate resilient measures in health facilities Review implementation of IEC, training and surveillance activities at all levels Evaluate and update relevant section of SAPCCHH with support from State Task Force Create organizational support and strengthen Environmental Health cell to implement NPCCHH vision, Goal and Objectives

	<p>Organize sensitization workshops for other stakeholders and line departments</p> <p>Collaborate with academic institute/s for support in updating SAPCCHH, Surveillance activity monitoring, training of health care professionals, vulnerability assessment and applied research</p> <p>Submit reports of activities on EWE and health under NPCCHH</p>
DNO	<p>Disseminate early warning to block and health facility level</p> <p>Ensure IEC dissemination to community level and facilitate community level IEC activities</p> <p>Organize training for block health officers and MO</p> <p>Formalize intersectoral coordination for disaster planning, management and response with SDMA/IMD and other response departments</p> <p>Liaison with other departments for combined IEC campaigns, coordinated response and information sharing of health indicators for targeted action</p> <p>Identification and communication of Evacuation routes & relief camps</p> <p>Support planning and management of health care services in relief camps</p> <p>Provide necessary IEC on health and sanitation in relief camps</p> <p>training for block health officers, medical officers, with relevant training manuals</p> <p>Conduct sensitization of vulnerable groups: police officers, outdoor works, women, children etc</p> <p>Organize IEC campaigns at district level on observance of important environment-health days</p> <p>Facilitate disaster vulnerability assessments in health facilities and maintain records of such assessment and health facility damage due to EWE</p> <p>Update DAPCCHH with support from District Task Force</p> <p>Submit reports of activities on EWE and health under NPCCHH</p>
Block health officer	<p>Conduct community level IEC activities</p> <p>Ensure training of medical officers</p> <p>Organize PRI sensitization workshop and training for vulnerable groups</p> <p>Facilitate disaster vulnerability assessments in health facilities and maintain records of such assessment and health facility damage due to EWE</p>
Medical officer	<p>Conduct health facility-based IEC activities</p> <p>Support community level IEC activities</p> <p>Preparation of Disaster Management Plans and hospital safety plan</p> <p>Assessment of health facility in context of climate change-extreme weather events</p> <p>Identifying structural changes/retrofitting measures at the facility level to equip the healthcare facility</p> <p>Ensuring routine monitoring and maintenance of support functions (Water quality, waste management)</p> <p>Health facility preparedness for seasonal events</p>
Panchayati Raj Institutions	<p>Conduct community level IEC activities</p> <p>Community involvement in planning and demonstration of measure taken before-during-after an EWE</p>

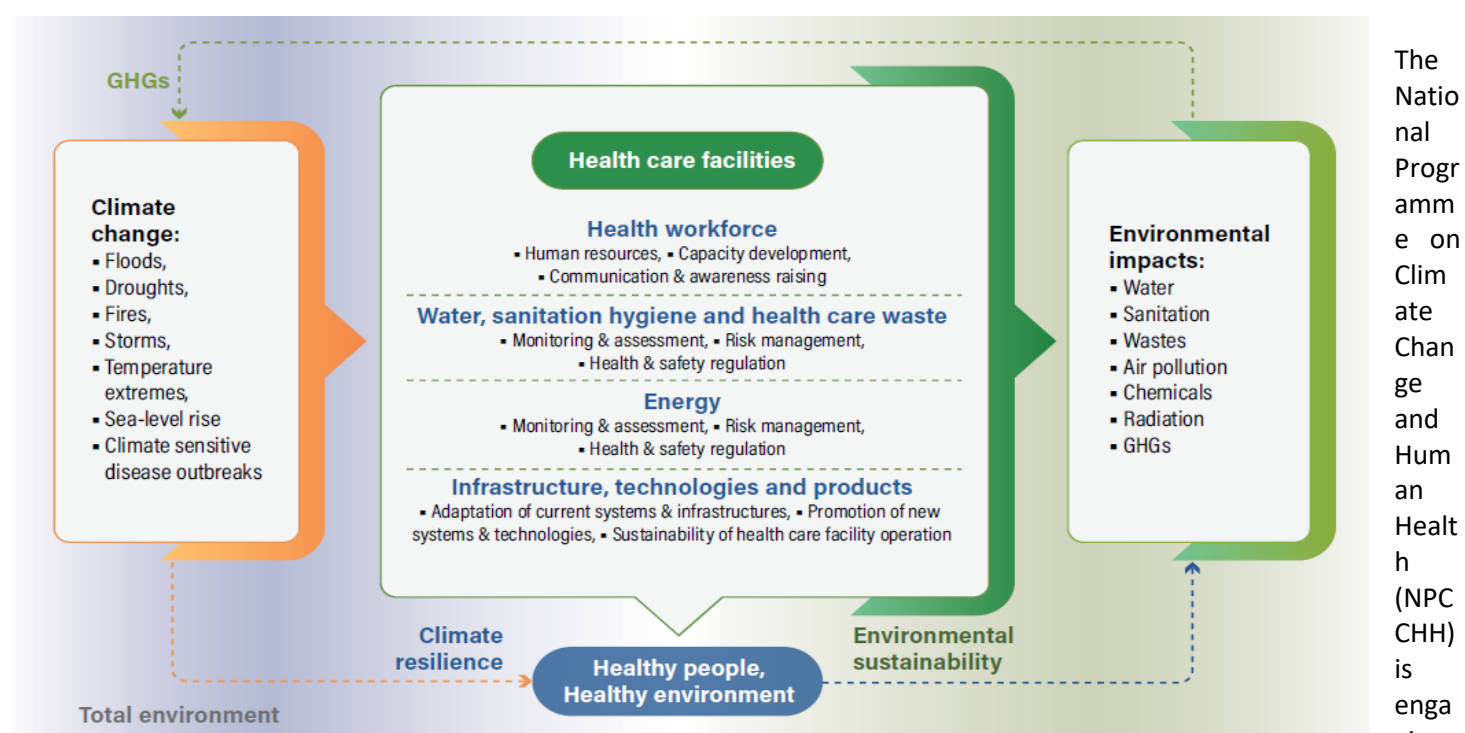
HEALTH ADAPTATION PLAN FOR GREEN AND CLIMATE RESILIENT HEALTHCARE FACILITIES

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

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

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

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



critically with strengthening the healthcare services and facilities to adapt to as well as mitigate the impacts of climate change. The key components recognized under the programme include –

Environmentally Sustainable (Green) Measures at Health Care Facilities

Energy Auditing

Installation of LED lighting at Health Care Facilities

Installation of Solar panels

Water Conservation Measures – Rain water Harvesting

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

Environmentally Sustainable (Green) Measures at Health Care Facilities

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

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

The guiding principle in this respect would be:

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

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

The guiding principle in this area would be:

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

Water conservation: In an HCF, sanitary fixtures consume 42 per cent of water while heating ventilation and air conditioning (HVAC) consumes 23 per cent of water, thus, major water-consuming area needs to be focused on reducing water consumption.

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

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

The healthcare facility would develop a strategy for the optimum usage of water.

The HCFs would develop a plan for the conservation of water. e.g., water- efficient fixtures, dual flush mechanism, sensor operated urinals, waterless urinals, rainwater harvesting

The HCFs would have a plan for the wastewater treatment. e.g., sewage treatment plant and effluent treatment plant at sites of generation of contaminated grey water, like pathology.

The HCFs would develop a programme/plan for the conservation of water

The HCFs would have a water management programme for the conservation of water by establishing a team, setting goals with timelines, conducting water audits, determining the cost of water and preparing an action plan

The HCFs would have an ongoing educational programme for the efficient usage and conservation of water for all the stakeholders (staff, patient and visitors)

The HCFs would have a plan to train the staff on water savings techniques

The HCFs would develop a wide variety of methods to communicate through IEC materials, new and/or revised operating guides and manuals

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

It is essential that HCF planning and designing should be responsive to local climate and hazard profile of the district. Strong focus should be given to designing all aspects of infrastructure and services as per relevant IS standards, building codes and local byelaws, and history of emergencies in the district to ensure patient safety and continuity of health

service during emergencies. Few key interventions that would be undertaken to make the HCFs into green buildings would include:

New Buildings

Climate risk assessment at the time of planning and designing the building.

Use of high-performance glass on windows, doors, and roofs to prevent the heat inside and allows sunlight and fresh air to enter the room.

Use double glazing glass on windows; it provides thermal and optical properties to the building and reduce the noise level.

Insulation of building from inside and outside in colder regions of the country.

Ensure the plinth level is above the high flood level as known locally or storm surge level (in costal districts) and make the building accessible with ramps and railing to create a barrier free environment.

Installation of Rainwater Harvesting System

Installation of alternative energy systems

Installation of STP & ETP

Existing Infrastructure

Introduction of electronic patient records in the facility to reduce the use of paper.

Availability of 10-30 per cent area for the herbal garden in the facility.

Floor and wall finishes are conducive for infection prevention control practices.

Modifications in the critical care rooms to make them functional during disasters.

Installation of Rainwater Harvesting System

Installation of alternative energy systems

Installation of STP & ETP

Source reduction i.e., filling of the breeding places

Proper covering of stored water - Channelization of breeding source

IMPLEMENTATION PLAN:

HEALTH SECTOR PREPAREDNESS FOR 5 YEARS 22-27

Objective	Activities	Priority districts	Identified Health facilities for 5 years for each	timeline	Target for 5 years 22 - 27				
					22 to 23	23 to 24	24 to 25	25 to 26	26 to 27
Strengthening Health care System	Energy Audit	East, South	5PHC, 1CHC, 1DH	February-April	20 %	35%	50%	75%	100%
	Led installation-	East, West South	5PHC, 1DH	April- May	10 %	20%	50%	80%	100%
	Solar Panels installation	East, South	5 PHC, 1CHC	May-August	5%	10%	40%	70%	100%
	Rainwater Harvesting	South	3 PHC	August-October	5%	10%	20%	50%	100%
	Retrofitting of Health care facilities	West, North	1DH	October-December	10 %	20%	50%	80%	100%

AWARENESS GENERATION

Awareness and sensitization on Climate Change events on Green and Climate resilient measures.

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.

Sl. no	Activities	Priority Districts	Timeline
01.	Training of TOTs	East, West, North, South	March - April
02.	Training of DNO-CC	East, West, North, South	May - June
03.	Training of Medical Officers	East, West, North, South	July - August

Roles and Responsibilities

	Responsibilities
SNO	Disseminate early warnings to district level Finalization of IEC material and dissemination Plan on Green and Climate resilient measures Organize training sessions for district level officers and trainers for Green and Climate resilient measures Identify health facilities for priority implementation based on Green and Climate resilient measures and health facility vulnerability Identify relevant state and district level nodal agencies and collaborate with them for assessment of health facilities for implementation of Green and Climate resilient measures Facilitate and monitor necessary assessments at health facility level regarding Green and Climate resilient measures Facilitate implementation of structural and functional measures at health facility level Submit report of activities on Green and Climate resilient measures under NPCCHH Advocate for reduction in source of greenhouse gas emissions
DNO	Conduct training for block health officers, medical officers, with relevant training manuals on Green and Climate resilient measures Support conduction for following assessment at health facility level Energy audit Water audit Disaster-vulnerability assessment Support following functional measures at health facility level Water committee Sustainable procurement committee Operational measures to make health facility functioning during disasters or power cut Coordinate with other agencies for assessment and implementation of identified structural and functional measures

	Update DAPCCHH with support from District Task Force Submit report of activities on Green and Climate resilient measures under NPCCHH
Medical officer	Conduct health facility assessment Energy audit Water audit Disaster-vulnerability assessment Lead following functional measures Water committee Sustainable procurement committee Operational measures to make health facility functioning during disasters or power cut Support community level IEC activities Identify local funding opportunities: e.g. CSR initiative, NGO funding
Panchayati Raj Institution	Support retrofitting and new health facilities with local funding source and community involvement

Part III Budget NPCCHH 2022-27

Table Green Measures in Healthcare facilities activity plan for 2022-2027(please add budget)

Green Measures in Healthcare facilities	Unit					
	2022-23	2023-24	2024-25	2025-26	2026-27	TOTAL
Replace existing Non-LED Lighting with LED in CHC		32.3	37.14	42.71	49.12	161.28
Replace existing Non LED Lighting with LED in PHC		40.00	46.00	52.9	60.83	199.73
Installing Solar panels at CHC		-	-	-	-	-
Installing Solar panels at PHC		-	-	-	-	-
Installing Rainwater harvesting System CHC		80.75	92.86	106.79	122.81	403.21
Installing Rainwater harvesting System PHC		100.00	115.00	132.25	152.09	499.34

Table:

Year		2022-23	2023-24	2024-25	2025-26	2026-27
Infrastructure - Civil works (I&C)	Old / ongoing work	-	-	-	-	-
	New Work	-	80.00	92.00	105.80	121.67
Capacity building incl. training		26.15	26.15	30.07	34.58	39.76
Others including operating costs (OOC)		-	-	-	-	-
IEC & Printing		64.17	64.17	73.79	84.85	97.57
Planning & M&E		10.40	10.40	11.96	13.75	15.81
Surveillance, Research, Review, Evaluation (SRRE)		-	-	-	-	-
Total		100.72	180.72	207.82	238.98	274.81

References:

ANNEXURE - I

The details of Nodal Officer and experts in District Level Task.

District	Nodal officer (Deputy Directors of Health Services at Districts)
Athur	Dr. B.R.Jemini
Aranthangi	Dr. B.Kalaivani
Ariyalur	Dr. M.Geetharani
Cheygar	Dr. P.Priya Raj
Chengelpattu	Dr. Bharanidharan
Coimbatore	Dr.P.Aruna
Cuddalore	Dr. R. Meera
Dharmapuri	Dr.S.Soundammal
Dindigul	Dr. Varadharajan
Hosur	Dr.Vijayalakshmi
Erode	Dr. S.Somasundaram
Kallakurichi	Dr. K.Poonkodi

Kancheepuram	Dr.V.K.Palani
Kanyakumari	Dr. Meenatchi
Karur	Dr.K.Santhosh Kumar
Kovilpatti	Dr. A.D.Bosco Raja
Krishnagiri	Dr. V.Govindan
Madurai	Dr.S.Senthil Kumar
Mayiladudurai	Dr.P.Prathapkumar
Nagapattinam	Dr.P.Vijayakumar
Nagercoil	Dr.S.Meenachi
Namakkal	Dr.J.Prabhakaran
Nilgiris	Dr. P.Balusamy
Palani	Dr. V.Yasodhamani
Perambalur	Dr. S.Senthil Kumar
Pudukkottai	Dr. K.V.Arjunkumar
Poonamallee	Dr.M.Senthil Kumar
Ramanathapuram	Dr.P.Kumaragurubaran
Ranipet	Dr.V.Manimaran
Salem	Dr. V.Nalini
Sivagangai	Dr. S.Ramganes
Sivakasi	Dr.N.Kalusivalingam
Tenkasi	Dr.M.Anitha
Thanjavur	Dr. Ramesh
Theni	Dr.Jegaveerapandian @Gunasekaran
Tiruchirapalli	Dr. A.Subramani
Thirupatur	Dr.T.R.Senthil
Thoothukudi	Dr.S.Porchelvan
Tirunelveli	Dr.G.Krishnaleela
Tiruppur	Dr. K.Jegadeesh Kumar
Tiruvallur	Dr.K.R.Jawaharlal
Tiruvannamalai	Dr.R.Selvakumar
Tiruvarur	Dr. V.C.Hemachand Gandhi
Vellore	Dr.P.G.Bhanumathi
Villupuram	Dr. S.Porkodi
Virudhunagar	Dr. V.Shanmugasundaram

ANNEXURE - II

Health Facility Readiness Equipments:

Oxygen Cylinders

Ventilators

Nebulizers

Spirometer

Spacer

Pulse Oximeter

Health education material

Tracheostomy kit

Diagnostic services/tests:

Blood test

X-ray for chest

ECG

ECHO

Pulmonary Function Test

Sputum Culture

Bronchoscopy

Medicines/Drugs: Respiratory emergency

Salbutamol inhaler

Beclomethasone inhaler

Prednisolone

Hydrocortisone injection

Epinephrine injectable Cardiovascular emergency

ACE inhibitor (e.g., Enalapril)

Beta blocker (e.g., Atenolol)

Calcium channel blocker (e.g., Amlodipine)

Aspirin

Human Resource:

Physician trained in ECG

Pulmonary care staff

PFT Technician

Laboratory technician

ANNEXURE – III

Roles and Responsibilities of other sectors (Air Pollution)

Name of the Department	Action
Environment, Forests and Climate Change	<p>Ensure that State Pollution Control bodies set standards for industry-specific emission and effluent, monitor levels of pollutants and enforce penalties. Enforce strict air quality standards for pollution</p> <p>Strict implementation of Environment Impact Assessments (EIA) to minimize the adverse impact of industrial activities on the environment Effective implementation of 'National Green Tribunal' directives on trash burning/ waste disposal from different sources Take strict measures for unregulated sectors (such as brick kilns, trash burning, stone crushing) which contributes to ambient air pollution</p>
Education	<p>Regular screening of school children Inclusion of harmful health effects of environmental pollution (AAP and HAP) in the school curriculum</p>
	<p>Improve indoor air quality of educational institutions Sensitize students and teachers on using the Air Quality Index</p>
Agriculture	Policy in place to promote multiple uses of crop residues and prevent their on- farm burning.
Rural Development	- Under integrated rural development, develop and implement micro level planning policies/schemes with Panchayat Raj Institutions to address the social determinants of health for reducing the hazards of air pollution (lack of education, unemployment, poverty, poor housing conditions, etc.)
Urban Development	<p>Formulate/revise urban transport policy which reduces vehicular pollution Help cities develop air pollution alerts and emergency plans based on the Air Quality Index or CPCB continuous air monitoring data</p>
New & Renewable Energy (TEDA)	<p>Implement policies for truly clean cook stoves and support research and development. Research and development of other non-conventional/renewable sources of energy and programmes relating thereto, including locally generated power to supply cooking appliances; Support and strengthen Integrated Rural Energy Programme (IREP) with emphasis on indoor air pollution</p>
Road Transport and Highways	<p>Ensure effective implementation of New Motor Vehicles Act, once approved Ensure proper engine checks for vehicles to assess pollution levels</p>

Information and Broadcasting	<p>Develop hard hitting, high impact and cost-effective media plans, strategies and conduct activities for awareness generation on harmful effects of air pollution and options for their mitigation.</p> <p>Ensure enforcement of relevant provisions in the Cable Television Networks Act to regulate advertisements of tobacco etc.</p> <p>Involvement of Songs & Drama division; Department of Field Publicity to promote health promotion activity for air pollution and its impact on respiratory and NCD risk factors</p> <p>Develop policies to ensure that media houses allocate free airtime for health promotion messages as a corporate social responsibility activity</p>
Labour and Employment	<p>Regular health check- ups for early screening of pollution related diseases.</p> <p>Frame guidelines and conduct workshops for health promoting workplaces, (guidelines on indoor air quality),</p> <p>Showcase and support companies which employ workplace policies that can reduce vehicular travel such as telecommuting, or placing the workplace in sites that are accessible through public transportation (e.g. Metro) or non-motorised transport.</p>
Law and Justice	<p>- Support enforcement on bans of burning trash for heating or as a way of disposal.</p>

ANNEXURE - IV
Roles and Responsibilities of other sectors (HEAT)

Department	Season	Roles and responsibilities
Meteorological Department	Pre-Heat	Issue weather forecasts on Short/Medium/Long range duration
	Heat	Issue Heat wave alerts Coordination with health department for analysing cases and death data with meteorological variables like maximum temperature and relative humidity
	Post-Heat	Participate in annual evaluation of heat action plan Review revised heat action plan
Dept of Drinking water & Sanitation	Pre-Heat	Identify vulnerable places Check the groundwater levels before and after March Promote rainwater harvesting
	Heat	Provide drinking water points at identified places and worksites
	Post-Heat	Participate in annual evaluation of heat action plan Review revised heat action plan

Public Works Department	Pre-Heat	To construct cool shelters/sheds at public places, bus stands etc, Establish Cool roof plan Mandatory cool roof for all municipal, commercial and government buildings, Voluntary cool roofing for residential buildings Cool roofing for low income housing under HAPs and through CSR initiative
	Heat	To maintain shelters/sheds, bus stands
	Post-Heat	Participate in annual evaluation of heat action plan Review revised heat action plan
Dept-of Education	Pre-Heat	Train and Sensitise teachers and students towards health impact of extreme events and disseminate health ministry approved prevention and first-aid measures Proper seating and ventilation in classrooms
Department	Season	Roles and responsibilities
		Encourage tree planting in the vicinity of schools (long-term plans)
	Heat	Rescheduling school timing during summer During extreme events keep a check on outdoor activities Close teaching institutes in case of issue of alert from Government Paint the rooftop with white/Albedo painting to reduce heat build-up and ensure cooler classrooms Disseminate IEC at schools for management
	Post-Heat	Participate in annual evaluation of heat action plan Review revised heat action plan
Dept of Labour & employment	Pre-Heat	Reassess 'Occupational Health Standards' for various types of Occupation.Utilize maps of construction sites to identify more high-risk outdoor workers. Heat illness orientation for factory medical officers and general practitioners Communicate directly about heat season with non-factory workers
	Heat	Encourage employers to shift outdoor workers' schedules away from peak afternoon hours (1pm-5pm) during a heat alert or consider extended afternoon break or alternate working hours for workers. Provide water at work sites
	Post-Heat	Participate in annual evaluation of heat action plan Review revised heat action plan
Dept of Power supply	Pre-Heat	Maintenance of electrical lines
	Heat	Ensure uninterrupted supply of electricity
	Post-Heat	Participate in annual evaluation of heat action plan Review revised heat action plan Participate in annual evaluation of heat action plan Review revised heat action plan
Dept of Forest & Climate change	Pre-Heat	Develop/encourage projects to decrease the 'Urban Heat Island effect'

Department	Season	Roles and responsibilities
		Plantation of trees Increase forest cover
	Heat	Ensure implementation of guidelines of heat action plan
	Post-Heat	Review the heat preparation measures and make a note of the lessons learnt for the next season
Dept of Transport	Pre-Heat	Review the road map for preparation for the heat season
	Heat	Ensure implementation of guidelines of heat action plan
	Post-Heat	Participate in annual evaluation of heat action plan Review revised heat action plan
Media or Press officer	Pre-Heat	Secure commercial airtime slots for public service announcements Identify areas to post warnings and information during heat season Activate telephone heat hotline Begin placing temperature forecasts in newspapers Increase installed LED screens with scrolling temperature
	Heat	Issue heat warnings in heat and electronic media Contact local FM radio and TV stations for announcements Use SMS, text and WhatsApp mobile messaging and centralized mobile databases to send warnings Contact transport department to place warnings on buses
	Post-Heat	Evaluate reach of advertising to target groups and other means of communication such as social media
Women and Child Development Dept		Targeted dissemination of public awareness campaigns by the department of Health and Family Welfare with a special focus on infants, children below five years, pregnant and lactating mothers and geriatric population. Create awareness regarding importance of hydration. Create awareness on heat wave prevention and management in anganwadis using IEC activities. Training anganwadi workers to identify heat-related health risks and its management. Anganwadis should be kept functional during summers by planning staggered leaves to Anganwadi helpers/supervisors.

Department	Season	Roles and responsibilities
		<p>Anganwadi timings should be rescheduled to avoid peak heat and ORS packets should be stocked in anganwadis, if necessary. ☐ If needed, buttermilk/curd will be served in anganwadi instead of milk.</p> <p>No outdoor activities should be undertaken during peak heat period; indoor activities should be planned to keep children engaged.</p> <p>Anganwadis should be opened for the general public as a resting place during vacations.</p>

ANNEXURE – V

Health advisory communication

Public Health: Advice on preventing heat-related illnesses

Stay out of the heat: keep out of the sun between 11.00 a.m. and 3.00 p.m. If you have to go out in the heat, walk in the shade, apply sunscreen and wear a hat and light scarf; avoid extreme physical exertion and wear light, loose-fitting cotton clothes.

Cool yourself down: have plenty of cold drinks, and avoid excess alcohol, caffeine and hot drinks; eat cold foods, particularly salads and fruit with a high-water content; take a cool shower, bath or body wash; sprinkle water over skin or clothing or keep a damp cloth on the back of your neck.

Keep your environment cool: keeping your living area cool is especially important for infants, the elderly or those with chronic health conditions or who can't look after themselves; place a thermometer in your main living- room and bedroom to keep a check on the temperature. Keep windows that are exposed to the sun closed during the day and open at night when the temperature has dropped. Close curtains that receive morning or afternoon sun. Care should be taken with metal blinds and dark curtains, as these can absorb heat – consider replacing them or inserting reflective material between them and the window space; turn off non-essential lights and electrical equipment – they generate heat. Keep indoor plants and bowls of water in the house as evaporation helps cool the air. If possible, move into a cooler room, especially for sleeping; electric fans may provide some relief, if temperatures are below 35°C*.

Longer term: consider putting up external shading outside windows; use pale, reflective external paints; have your loft and cavity walls insulated – this keeps the heat in when it is cold and out when it is hot; grow trees and leafy plants near windows to act as natural air-conditioners

Look out for others: keep an eye on isolated, elderly, ill or very young people and make sure they are able to keep cool; ensure that babies, children or elderly people are not left alone in stationary cars; check on elderly or sick neighbours, family or friends every day during a heatwave; be alert and call a doctor or social services if someone is unwell or further help is needed.

- **If you have a health problem:** store medicines below 25°C or in the refrigerator (read the storage instructions on the packaging); seek medical advice if you are suffering from a chronic medical condition or taking multiple medicaments.
- **If you or others feel unwell:** try to get help if you feel dizzy, weak, anxious or have intense thirst and headache; move to a cool place as soon as possible and measure your body temperature; drink some water or fruit juice to rehydrate; rest immediately in a cool place if you have painful muscular spasms (particularly in the legs, arms or abdomen – this occurs in many cases after sustained exercise during very hot weather) and drink oral rehydration solutions containing electrolytes. Medical attention is needed if heat cramps last more than one hour; consult your doctor if you feel unusual symptoms or if symptoms persist.
- *** NOTE:** At temperatures above 35°C, fans may not prevent heat-related illness and can cause excess dehydration. The advice is to place the fan at a certain distance from people, not aiming it directly at the body and to have regular drinks. This is especially important in the case of sick people confined to bed.

Worker's health: Tips on reducing heat stress

Encourage workers to drink plenty of water – about one cup of cool water every 15 to 20 minutes, even if they are not thirsty – and to avoid alcohol, coffee, tea and caffeinated soft drinks that dehydrate the body

Help workers adjust to the heat by assigning a lighter workload and longer rest periods for the first five to seven days of intense heat. This process needs to start all over again when a worker returns from vacation or other absence.

Encourage workers to wear lightweight, light-coloured, loose-fitting clothing. Workers should change their clothes if they get completely saturated.

Use general ventilation and spot cooling at points of high heat production. Good airflow increases evaporation and cooling of the skin.

Train first-aid workers to recognize and treat the signs of heat stress and ensure that all workers know who has been trained to provide aid. Train supervisors to detect early signs of heat-related illness and permit workers to interrupt their work if they become extremely uncomfortable.

Consider a worker's physical condition when determining fitness to work in hot environments. Obesity, lack of conditioning, pregnancy and inadequate rest can increase susceptibility to heat stress.

Alternate work and rest periods, with rest periods in a cooler area. Shorter, more frequent work-rest cycles are best. Schedule heavy work for cooler times of the day and use appropriate protective clothing.

Monitor temperatures, humidity, and workers' responses to heat at least hourly.

ANNEXURE - VI

Basic equipment and medicines required as a part of Hospital preparedness for heat season

Primary Health Centre (PHC), Community Health Centre (CHC), District Hospital (DH) and Medical Colleges should ensure the following requirements before the start of heat season:

Dedicated bed for HRI patients in cooler area of hospital,

Thermometer, ORS packets, ice packs, BP apparatus,

Silver sulphadiazine cream, Calamine lotion, Chlorhexidine in a light cream or lotion base,

Cold IV normal saline (0.9%), dextrose 50% in water solution (D50W),

Glucometer and testing strips,

ECG equipment: ECG machine, Gel, electrodes, ECG paper,

Cooling equipment: AC, cooler, fan as per requirement, cool roofing

Water cooler,

Medicines: Lorazepam, diazepam,

Ambulance with ice packs and cold water.

ANNEXURE - VII
Advisory on Heat Wave
SPECIFIC INTERVENTION FOR HEAT-RELATED ILLNESSES

WHAT TO LOOK FOR	WHAT TO DO
HEAT STROKE (SUN STROKE)	
High body temperature (39°C or higher) Hot, red, dry, or damp skin Fast, strong pulse Headache Dizziness Victim will likely not sweat Confusion	Call 108 right away-heat stroke is a medical emergency Delay can be fatal Move the person to a cooler place Help lower the person's temperature with cool cloths or a cool bath
Losing consciousness (passing out)	Do not give the person anything to drink (NO FLUIDS)
HEAT EXHAUSTION	
Heavy sweating Cold, pale, and clammy skin Fast, weak pulse Nausea or vomiting Muscle cramps Tiredness or weakness Dizziness Headache Fainting (passing out)	Move to a cool place Loosen your clothes Move to place with fan or air- condition Put cool, wet clothes on your body or take a cool bath Sip water Get medical help right away if: You are throwing up Your symptoms get worse Your symptoms last longer than 1 hour
HEAT CRAMPS	

Heavy sweating Muscle pain or spasms usually in leg and abdominal muscles or extremities.	Stop physical activity and move to a cool place • Drink water or a sports drink Wait for cramps to go away before you do any more physical activity Get medical help right away if: Cramps last longer than 1 hour You're on a low-sodium diet You have heart problems
HEAT RASH	
Red clusters of small blisters that look like pimples on the skin (usually on the neck, chest, groin, or in elbow creases)	Stay in a cool, dry place Keep the rash dry Use powder (like baby powder) to soothe the rash