



स्वास्थ्य एवं
परिवार कल्याण मंत्रालय
MINISTRY OF
HEALTH AND
FAMILY WELFARE

सत्यमेव जयते



GOVT. OF SIKKIM

SIKKIM

STATE ACTION PLAN ON CLIMATE CHANGE AND HUMAN HEALTH



National Centre for
Disease Control
Government of India



National Programme
on Climate Change
and Human Health



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PART I

Climate Change and its Health Impacts



CHAPTER 1

Introduction

INTRODUCTION

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

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

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

India is a signatory to the “*Male’ Declaration*” which calls for the strengthening of the health sector and achieving climate resilience. According to the “*Male’ Declaration*”, it is desired that the health-care facilities should be prepared to address the human needs in face of climate change-induced vagaries and adopt climate-resilient practices, particularly to encourage that these are able to withstand any climatic event, and that the essential services such as water, sanitation, waste management and electricity are functional during such events. Further, for achieving climate resilience, health department has to undertake measures to initiate the greening of the health sector by adopting environment-friendly technologies, and using energy-efficient services.

In this regard, initiatives undertaken by the Government of India include identification of Ministry of Environment, Forest & Climate Change (MoEF&CC) as the nodal ministry, formulation of the National Environmental Policy 2006, and formulation of the Prime Minister’s Council on Climate Change for matters related to Climate Change.

MoEF&CC 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, the Ministry of Health and Family Welfare (MoHFW) constituted a National Expert Group on Climate Change & Health (NEGCCH) to prepare National Action Plan on Climate Change and Human Health (NAPCCHH) and recommend strategies for indicators, mitigation, capacity building, etc. for the health sector to respond to the climate emergency.

National Centre for Diseases Control (NCDC) is identified as the 'technical nodal agency' by MoHFW for the proposed National Mission on Health. The Centre for Environmental and Occupational Health Climate Change & Health (CEOH&CCH), NCDC, is implementing the National Programme of Climate Change and Human Health (NPCCHH), as a part of which State Action Plan on Climate Change and Human Health (SAPCCHH) has been prepared for the state of Sikkim. SAPCCHH is a long-term vision and planning document prepared by the Department of Health & Family Welfare, Sikkim, applicable for up till year 2027. Based on this document, district specific action plans will also be prepared. Sikkim state action plan 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 same by addressing the climate-sensitive diseases and develop a climate responsive and sustainable health care ecosystem in the state.

Sikkim is one of the mountainous state of the Indian Union. Here, elevation varies from 300 meters to more than 8000 meters within the 113 km North-South extension and 64 km East-West extension which makes the steep gradient topography of the state. The geographical area of Sikkim is 7096 sq. km. Landslides and flashfloods are common during the rainy season. In addition to this, the state is located in the tectonic active area in Himalayas wherein earthquakes are a frequent phenomenon. In this scenario the state population is directly as well as indirectly vulnerable to climate change. Its impacts are seen in the form of unusual weather phenomena like droughts, heavy rainfall, melting of the glacier and ice masses etc., which results in various kind of natural disasters, extinction of plant and animal species, and decrease of food production which ultimately affects the survival of human beings.

Therefore, the climate change and its impacts are likely to pose serious impact on the life of the people in this Himalayan state. This situation makes the state vulnerable to climate change. The SAPCCHH presents a plan of action to adapt to the current and future climate vulnerabilities in the state.



CHAPTER 2

Climate Vulnerability

Sikkim is a north-eastern state lying between 27°04' 46"N to 28°07' 48"N latitudes and 88° 00'58"E to 88° 55'25"E longitudes. The total geographical area of the state is only 7,096 km² and is strategically located sharing international borders with Bhutan, China and Nepal, and in the south, it is bordered by the state of West Bengal in India. It merged with India in the year 1975, prior to which it was ruled by a monarch. Sikkim's climate ranges from sub-tropical in the south to tundra in the north. Most of the inhabited regions of Sikkim experience a temperate climate seldom exceeding 28°C (84°F) in the summer. The average annual temperature for most of the state is around 18°C (64°F).

Sikkim is a vulnerable state in terms of climate change and global warming because of the presence of snow-capped mountains and glaciers.

Landslides, which are primarily caused by excessive rainfall, forest fires, which may or may not be caused by climate change, glacial lake outburst flood (GLOF), and earthquakes are among the primary natural catastrophes that Sikkim is vulnerable to. As the temperature in the state does not exceed 28°C in the summer season and 13°C during winters, the state is not prone to heat-related mortality, yet it may experience heat-related disease during the summer, in the current scenario. In contrast, the minimum temperature in the winter is 0°C, and the minimum temperature in the summer is 13°C. As a result, the state is more vulnerable to cold waves than heat waves.

The SDMA and the Geological Survey of India (GSI) have come together to develop a regional level early warning system for excessive rainfall resulting in landslides. The warning system consists of over 200 sensors that can measure geophysical and hydrological parameters like rainfall, pore pressure and seismic activities. It will monitor a densely populated area which has seen landslides in the past. The system is capable of warning about 24 hours in advance.

With the support of nine Air Quality Monitoring Stations, the State Pollution Control Board (SPCB) leads in monitoring the state's air quality under the National Air Monitoring Programme (NAMP). The differences in Air Quality Index between stations are primarily attributable to heavy traffic movement.

As, Government of Sikkim is concerned about climate change, the Department of Science and Technology has been designated as the nodal department for dealing with the subject. In accordance with the prepared State Action Plan on Climate Change, supporting communities to adapt to changing climate and its consequences, the identified key areas of concern for addressing the crisis are:

a. Water

The threats to water resources due to climate change which are relevant to Sikkim are as follows:

1. Drinking water dependent on rainfall likely to become more scarce as rainfall may increasingly get restricted to only monsoon period (as is the present situation) and there might be a reduced amount of rainfall as the number of rainy days decrease.
2. Increase in intensity of rainfall will lead to high run off and less infiltration, and consequently adversely affecting spring recharge.
3. Increased drought-like situations due to the overall decrease in the number of rainy days.
4. Warming may lead to a decline in the glaciers and snowfields.

b. Agriculture, horticulture and livestock

Some of the key concerns in the agriculture sector due to climate change are as follows:

1. Loss of production and quality (due to variable rainfall, temperature, etc.) Decreasing water availability for crop production leading to crop yield instability. Increased risk of extinction of threatened crop species including traditional crop varieties.
2. Loss of soil fertility and soil nutrients due to the erosion and runoff of topsoil.
3. Loss of fields due to flash floods, landslides with rill and gully formation.
4. Crop yield loss with flowers and fruit dropping due to hailstorms. Deteriorating quality in fruits and vegetables by untimely heavy rains and hailstorms.
5. Delayed sowing and late rainfall, damage to crops by sudden, early and late, spring frost in paddy and potato crops respectively, indicating a shifting of seasons.
6. Outbreak of pests and diseases in the fields and during storage.
7. Damages to road infrastructure, risking food security.

c. Biodiversity, forest, wildlife and eco-tourism

The vulnerabilities of the biodiversity are further described below:

1. Species at risk - Although there could be some benefits for at-risk species, in general, there is significant concern for species at risk that are already threatened by small population size, loss of unique habitats, and low reproduction/dispersal rates (among others). The potential for climate change to further exacerbate these existing causes could greatly increase the risk of extinction.
2. Aquatic habitats - Extended summer low flow periods are expected in rain-fed streams. This will further increase water temperature, favoring warm water species and altering community structure and functioning. Conversely, in snowmelt and glacier-fed streams, the magnitude and duration of summer floods is expected to increase. In either case, significant impacts on aquatic habitats are expected.
3. Wetlands - Wetlands are particularly vulnerable to climate change. As physiographically limited systems, they are unable to migrate and, hence, are vulnerable to changes in hydrology, nutrient inputs etc.
4. Alpine ecosystems - Given their restricted geographic area and narrow elevation range, alpine ecosystems are particularly vulnerable to climate change. Climate and vegetation change rapidly,

with altitude over relatively short distances in mountainous terrain and as a result alpine ecosystems are particularly vulnerable to encroachment by lower elevation ecosystems.

5. Forest and grassland ecosystems - Ongoing concerns include the increased potential for major widespread wildfires and the subsequent potential for transformations in disturbed ecosystems, such as the colonisation by invasive species and resultant new species assemblages. Grassland ecosystems may expand in range, yet face threats in terms of lost species diversity.
6. Invasive species - Climate change may expedite the colonisation of some areas by invasive species in both terrestrial and freshwater realms. Increased frequency and magnitude of forest disturbances will create openings vulnerable to colonisation by invasive plants.

d. Impacts on hydropower generation

There are three main impacts of climate changes on hydropower projects.

1. First, the available discharge of a river may change, since hydrology is usually related to local weather conditions, such as temperature and precipitation in the catchment area. This will have a direct influence on economic and financial viability of a hydropower project.
2. Second, an expected increase in climate variability may trigger extreme climate events, by increasing the volume of water suddenly leading to floods or decrease in water leading to droughts.
3. Finally, closely related to the above, changing hydrology and possible extreme events must of necessity impact sediment risks and measures. More sediment, along with other factors such as changed composition of water, could raise the probability that a hydropower project suffers greater exposure to turbine erosion.

e. Impacts on habitats and transport

The types of changes that will affect urban areas can be due to changes in mean as well as extreme temperatures and the changes in the exposure of the urban areas to climate related vagaries. With the continued expansion in urban habitats, population rise, changes in means of climate parameters will intensify the stresses faced by poor urban residents on a daily basis impacting in a reduction or depletion of their stocks, assets and resources required to face occasional extreme events. The transport sector is a major source of Greenhouse Gases (GHG) emission. However, other than being the source of emissions, the road transport sector is also at risk due to climate change in Sikkim. This is as the roads may be exposed to increased incidences of landslides. Also increase in extreme precipitation may increase the number of accidents due to increased skidding on wet roads. Further melting of permafrost at higher altitudes may affect the high altitude roads that link the international borders. Therefore, a strong road network that is resilient to climate change is essential for the economy of the state due to Sikkim being land-locked.

Vulnerability Assessment of Rural Communities

Long term climate observations in Sikkim, indicate that increasingly the winters are becoming warmer and dryer. Due to increased runoff and dry winters, springs have started drying up and their lean season discharge is reducing drastically. Annual mean rainfall show high variation due to the geography, with the rain shadow areas in the lower part of South and West districts receiving only half the rainfall compared to the East District. All this has resulted in a decline in the production of the winter crops and an increased incidence of forest fire which is now ascending into the temperate zone. 88.9% of the population are residing in the

rural areas of Sikkim. Being dependent on agriculture, horticulture, livestock rearing and forest products are already at risk due to the current climate change and would be further vulnerable with the projected changes in climate in the future.

Further it is seen that, in spite of being a small state, there is a high variation over short spatial scales of exposure to temperature and rainfall; sensitivity of water resources, livelihoods and health; and adaptive capacity of the population defined by the level of poverty, literacy, environment and connectivity by roads and telecommunication indicators. It is therefore imperative that a strategy be put in place, where by the communities in villages dependent on climate sensitive sectors can be made to adapt to the changing climate scenario which is likely to see warmer temperatures and intense extreme events in the future.



CHAPTER 3

Climate Sensitive Issue/ Diseases Prevalent in the State

Sikkim does not have to deal with the negative effects of climate change on account of extreme heat, but the state deals with numerous issues as a result of the cold wave during the winters, particularly in the North District. But as the temperature has risen in recent years, human health has been negatively impacted, with environmental concerns coming in second. The effects of climate change have led to a sharp rise in the number of climate-sensitive diseases that are common in the State. As a result of rising temperatures, the population is now more susceptible to a wide range of diseases and health problems. Among Sikkim's four districts (East, West, North, and South), some areas of the East district have been put on the priority list because of an increase in cases of illnesses that are exacerbated by the climate.

Climate Sensitive Illnesses prevalent in Sikkim are:

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

Major Vector-borne diseases

Year	Malaria			Dengue		Chikungunya		Scrub Typhus	
	Cases	PF	Death	Cases	Death	Cases	Death	Cases	Death
2019	13883	1045	1	18455	17	689		534	
2020	4771	329	1	1564	2	1059		312	
2021	4921	4921	0	10983	14	4044		784	

Disease	Priority Districts
Malaria	East, South
Dengue	East, South
Chikungunya	East, South

- 2. Air pollution related illness:** With regard to the Air Quality given by the State Pollution Control Board, the priority area falls on the East district with 85 at Rangpo with 85 (April), 54 (December) at Singtam, 67 (February) at Deorali for the year 2021.

After East district the South district follows to be the priority district in terms of the increasing temperature and heavy vehicular movements.

Year	ARI	
	Cases	Death
2019	74282	Nil
2020	50626	Nil
2021	21243	Nil

3. Health impacts due to disasters: Sikkim is a state prone to disasters specially landslides, heavy rainfall and earthquake. Major risks in human lives are caused due to the accidents occurring due to heavy rainfall causing landslides in the state. Some risk prone districts are the North and some parts of the West district.

4. Water Borne Diseases: Due to the experience of heavy rainfall the state has increased deteriorating health conditions due to the consumption of water every year.

Year	Typhoid Fever		Acute Diarrhoeal Disease	Hepatitis A		Hepatitis B	
	Cases	Death	Cases	Cases	Death	Cases	Death
2019	431	Nil	18217	25	Nil	49	Nil
2020	224	Nil	14556	8	Nil	1	Nil
2021	444	Nil	10241	14	Nil	3	Nil

Disease	Priority Districts
Typhoid Fever	East, South
Acute Diarrhoeal Disease	East, South
Hepatitis A	East, South
Hepatitis B	East, South

Climate Sensitive Issues/Disease in Sikkim

Sl. No.	Climate Sensitive Illness	2021		2020		2019		2018		2017	
		Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
1.	Dengue	718	Nil	11	Nil	444	Nil	145	Nil	312	Nil
2.	Malaria	04	Nil	04	Nil	07	Nil	06	Nil	14	Nil
3.	Scrub Typhus	784	Nil	312	Nil	534	Nil	312	Nil	425	Nil
4.	Chikungunya	32	Nil	13	Nil	95	Nil	28	Nil	09	Nil
5.	Kala-Azar	01	Nil	03	Nil	06	Nil	01	Nil	02	Nil
6.	Filaria	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
7.	Typhoid Fever	444	Nil	224	Nil	431	Nil	522	Nil	449	Nil
8.	Acute Diarrheal Disease	12,041	Nil	14,556	Nil	18,217	Nil	19,584	Nil	19,384	Nil

Sl. No.	Climate Sensitive Illness	2021		2020		2019		2018		2017	
		Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
9.	Hepatitis A	14	Nil	8	Nil	25	Nil	48	Nil	37	Nil
10.	Hepatitis B	3	Nil	1	Nil	49	Nil	629	Nil	1330	Nil
11.	Acute Respiratory Illness	21,243	Nil	50,626	Nil	74,282	Nil	73,593	Nil	62,415	Nil
12.	Enteric Fever	509	Nil	8	Nil	313	Nil	436	Nil	122	Nil



CHAPTER 4

Vision, Goal and Objectives

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

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

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

Specific Objectives

Objective 1: To create awareness among the general population (vulnerable community), healthcare 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.

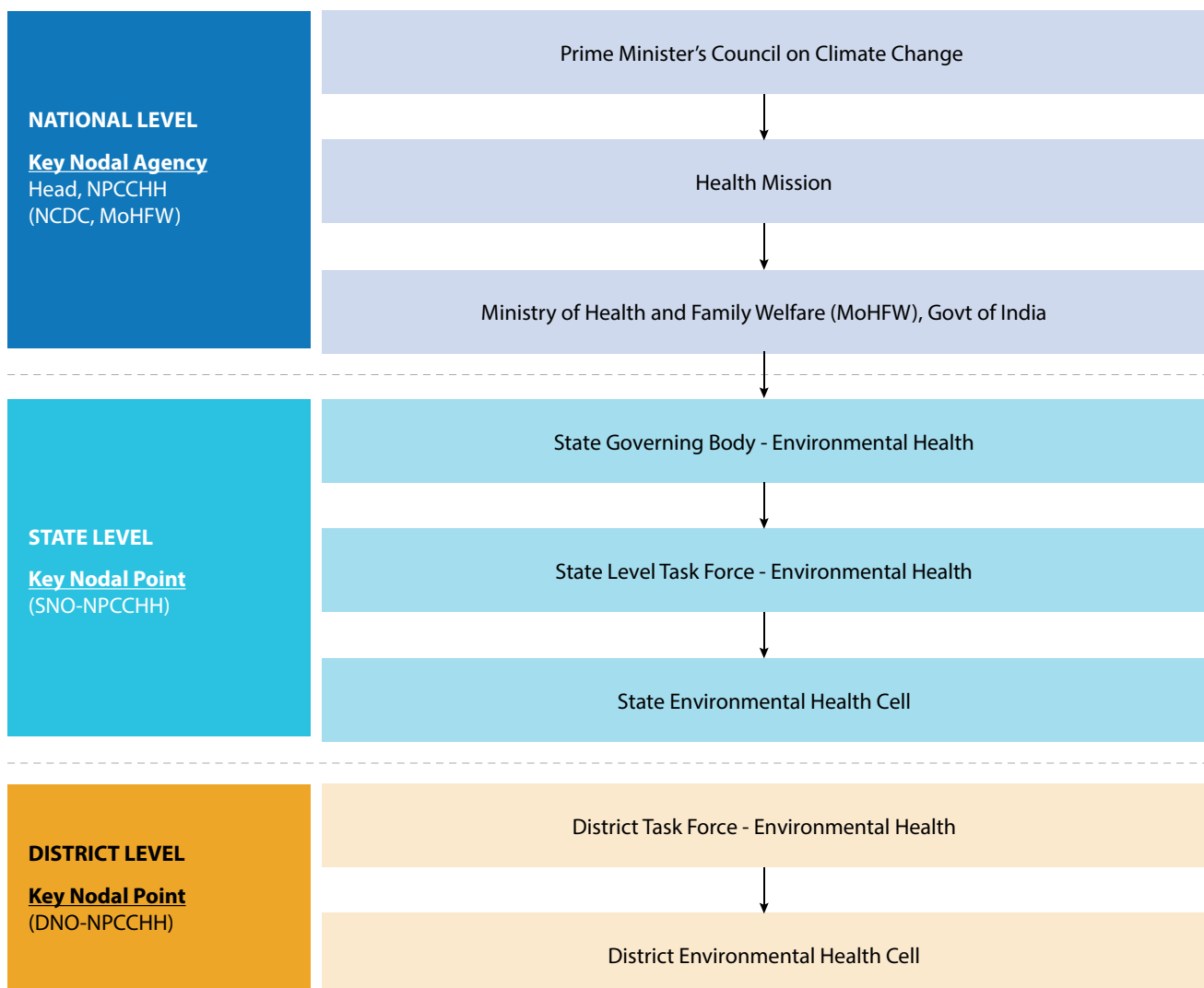


CHAPTER 5

Organisation Structure

The organisational structure of the NPCCHH programme is indicated in the flowchart below:

ORGANISATIONAL STRUCTURE



A. State Level - Governing Body - Environmental Health

The state level governing body for policy level decision in Sikkim is working under Chairpersonship of Honorable State Health Minister. The other members are as follows:

Honourable State Health Minister	Chairperson
Principal Secretary (Health)	Vice Chairperson
Director Health Services/Head of Health System	Member Secretary
Mission Director-National Health Mission	Member
Principal Secretary, Ministry of Revenue (Disaster)	Member
Principal Secretary, Ministry of Agriculture	Member
Principal Secretary, Ministry of Water and Sanitation	Member
Principal Secretary, Ministry of Transport	Member
Principal Secretary, Ministry of Animal Husbandry	Member
Principal Secretary, Ministry of Environment 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 (Gol)	Member
Director Medical Education and Research	Member
State Nodal Officer - Climate Change	Member
Head – NAPCCHH, CEOH&CCH Division, NCDC	Member

B. State Level Task Force - Environmental Health

This task force has been constituted and is working under the guidance of the Principal Secretary (Health) of the state. It is responsible for directly overseeing the implementation of the State Action Plan for Climate Change and Human Health (SAPCCHH). It is functional through the Directorate of Health Services (DHS) of Sikkim, which is the implementing agency for SAPCCHH. The members include:

Principal Secretary (Health)	Chairperson
Mission Director-National Health Mission	Vice Chairperson
Director Health Services/Head of Health System	Member Secretary
Director/Chairperson - Department of Revenue (Disaster)	Member
Director/Chairperson - Department of Agriculture	Member
Director/Chairperson - Department of Water and Sanitation	Member
Director/Chairperson - Department of Transport	Member
Director/Chairperson - Department of Animal Husbandry	Member
Director/Chairperson - Department of Environment and Forests	Member
Director/Chairperson - Department of Women and Child Development/Social Justice	Member
Director, Meteorological department of State/UT	Member
Director/Chairperson - Department of Public Works Department	Member
Director/Chairperson – Department of Urban Development (Municipalities)	Member
Director/Chairperson - Department of Education	Member
Director/Chairperson - Department of Food and Civil Supplies	Member
Director/Chairperson - Department of Human Resource Development	Member
Director/Chairperson - Department of Power	Member
Director/Chairperson - Department of Finance	Member
Director/Chairperson - Department of Law	Member
Director/Chairperson - Department of Panchayati Raj	Member
Director/Chairperson - State Ground Water Board	Member
Head - State disaster Management Authority	Member
Environmental Engineer/Scientist from Ministry of Environment	Member
Chairperson, 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 Sikkim Environmental Health Cell coordinates with the Centre (MoHFW, NCDC) for the reporting and monitoring of the execution of SAPCCHH. Further, DHS the **Environmental Health Cell** within the State Health Department, has identified a **Nodal Officer** from the Health department.

The State Level Structure of 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	Chairperson
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 the State Action Plan for Climate Change and Human Health.
- ▶ Conduct Vulnerability assessment and risk mapping for commonly occurring climate-sensitive illnesses in the state/UT.
- ▶ Assessment of the needs of health care professionals (like training, capacity building) and organizing 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 the programme, review meetings, and field observations.
- ▶ Timely issue of warning/alerts to health professionals and related stakeholders as well as the 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 the climate change and its impact on human health.

District Level

At the district level, District Medical Officer/Chief Medical Health Officer as the District Nodal Officer – Climate Change has been appointed by DHS. A District Level Task Force has been constituted by the District Nodal Officer - Climate Change in consultation with the SNO-CC for all the districts in Sikkim.

Structure of District Level Task Force - Environmental Health

District Collector	Chairperson
Dean – Govt. Medical College in the district/Head - Department of Community Medicine of the Medical College	Vice Chairperson
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 constituted by the District Nodal Officer - Climate Change in consultation with the SNO-CC has following members:

Structure at District Environment Health Cell

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

Community Health Centre Level

At the CHC Level, following members have been identified to be a part of the programme:

Medical Officer In-Charge/Suptd. (CHC Hospital)	Chairperson
MO - or Community 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 programme implementation rests with the Medical Officer (in-charge) of the facility. The existing machinery of NHM is utilized for the related activities. The Rogi Kalyan Samiti (RKS) would be reviewing and monitoring implementation at the health facility level. The ANM, ASHA and Anganwadi workers assist in activities related to the implementation of the action plan at the local level.

PART II

Health Action Plans on Priority Climate Sensitive Health Issues



CHAPTER 6

Health Action Plan on Air Pollution Related Diseases

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

Two major types of Air Pollution

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

Prominent causes of Ambient Air Pollution in Sikkim

- ▶ Pollution by Automobiles (e.g. cars and heavy duty vehicles).
- ▶ Industrial Emission (e.g. pharma companies).
- ▶ Municipal and agricultural waste sites and waste incineration/burning
- ▶ Residential cooking, heating and lighting with polluting fuels

Prominent causes of Household Air Pollution in Sikkim

- ▶ Use of biomass, kerosene as fuel for cooking, heating and lighting
- ▶ Burning of waste, cow dung, coal
- ▶ Home products (e.g. floor care products, furniture and household care fabrics, or when candles and incense are burned).
- ▶ Building materials (e.g. asbestos).
- ▶ Volatile Organic Compounds (VOC's) (e.g. paints, wood preservatives, cleaners and disinfectants).

Air Quality Index

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

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

With a number of industrial units within the state Sikkim mostly the pharmaceuticals, SPCB Sikkim under the National Air Monitoring Programme (NAMP) has established eight (08) Air Quality Monitoring Stations (AQM) for monitor the air quality in the state. As per the information recorded, the following cities/districts in Sikkim have recorded the highest AQI value in the year 2021.

Sl. No.	Name of the city	District	Highest AQI value in previous year 2021	Reasons for High AQI
1.	Rangpo	East	85 (April)	Heavy vehicular movements
2.	Singtam	East	54 (December)	
3.	Deorali (Gangtok)	East	67 (February)	

Source: SPCB Sikkim

Health Adaptation Plan

I. Awareness Generation

Under the programme, awareness generation among all the relevant stakeholders including the common population, vulnerable communities, healthcare providers, and policymakers around the impacts of air pollution along with the ways to address the same is imperative. Thereby, under the programme, Sikkim state will conduct the following key activities.

a. IEC Campaign

The districts are aimed to create awareness through Information, Education and Communication Activities (IEC) through development of locally and culturally acceptable messages by using communication materials such as posters, audios, videos, organizing public health events, and 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 (Nepali) and the role of the districts is to utilize these materials and disseminate at all levels. In accordance with the IEC strategy, the Sikkim state plans to implement the following IEC dissemination strategy over the period of next 5 years.

IEC Dissemination Plan for 5 Years 2022-27

Sl. No.	IEC Content	Priority Districts	Dissemination Plan for 5 Years	Timeline	Budget (in lakhs) for 5 Years (15% Increasing Each Year)				
					2022-23	2023-24	2024-25	2025-26	2026-27
1.	Posters	East, West, North, South	2 Posters for Healthcare facilities in all districts	July-September	0.25	0.28	0.32	0.36	0.41
2.	Audio	East, West, North, South	Social Media (Facebook, Instagram, Twitter etc.)	August-October					
3.	Videos	East, West, North, South							
4.	GIF's	East, West, North, South							
5.	Public Health Advisories	East, West, North, South	1 in all the Healthcare facilities	September-October					

b. Public Health Advisories

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

c. Observation of Special Days

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

II. Capacity Building

To strengthen capacity of healthcare system to adapt/address illnesses/diseases due to impacts of air pollution, the training plan of the state is as follows.

a. Training on air pollution and various health impacts of air pollution

NPCCHH Training Plan at the District Level

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

TABLE 2: Schedule Plan for Training for 5 Years 22-27

Sl. No.	Training programme	Timeline	Target	Priority Districts	Budget (in lakhs) for 5 years 15 % increasing each year				
					2022- 23	2023-24	2024-25	2025-26	2026-27
1.	DNO	August	100%	East, South, West, North	0.55	0.63	0.72	0.83	0.95
2.	MO	September-October	100%	East, South, West, North					
3.	Community Health Workers	October-November	100%	East, South, West, North					
4.	Panchayati Raj Institutions	November	100%	East, South, West, North					

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

Roles and Responsibilities

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

	Responsibilities
SNO	<ul style="list-style-type: none"> Finalization of IEC material and dissemination Plan 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 air pollution's health impact Real time air quality data dashboard in proposed cities Monitor AQI levels in states especially in hotspots and NCAP cities Ensure reporting from sentinel hospitals and DNO Ensure necessary health facility preparedness Review surveillance reporting and monthly report submission by DNO Submit report of activities Review implementation of IEC and surveillance activities at all levels Evaluate and update relevant section of SAPCCHH with support from the State Task Force Liaison with State Pollution Control Board for AQI alerts and its dissemination Liaison with Department of Environment for combined IEC campaigns and information sharing on health indicators for targeted air pollution reduction activities Awareness and action plan input sharing with the local bodies of cities with high AQI 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 on Air Pollution and Conference to share knowledge and action under NPCCHH Collaborate with academic institute/s for support in updating SAPCCHH Surveillance activity monitoring, vulnerability assessment and applied research Advocate for reduction in source of air pollution

	Responsibilities
DNO	<ul style="list-style-type: none"> • Ensure IEC dissemination to the community level • Facilitate community level IEC activities • Organize training for Block health officers, Medical officer, Sentinel hospital nodal officers with relevant training manuals • Organize training of vulnerable groups: police officers, outdoor works, women, children • Organize IEC campaigns at district level on observance of important environment-health days • Collect and monitor AQI levels in states especially in hotspots and NCAP cities • Ensure daily reporting from Sentinel hospitals and compile the data • Analyze daily health data with AQI level to monitor trends and hotspot in health impacts • Submit analysed monthly report to SNO, NPCCHH Headquarter and other departments for necessary action • Submit report of activities • Update DAPCCHH with support from District Task Force • Advocate for reduction in source of air pollution
Surveillance hospital nodal officer	<ul style="list-style-type: none"> • Train hospital staff and clinician responsible for daily reporting in case indentation and reporting flow • Compile daily reports for the health facility and submit it to DNO and NPCCHH, Headquarter
Block health officer	<ul style="list-style-type: none"> • Conduct community level IEC activities • Ensure training of medical officers • Organize PRI sensitization workshop and training for vulnerable groups
Medical officer	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Conduct community level IEC activities

III. Surveillance

The objective of ARI surveillance is to identify the trend of air pollution related illness in the context of outdoor air quality for an area and share the reported findings with all the relevant authorities including public health authorities to minimise the impact of air pollution by undertaking timely intervention.

Activities conducted for strengthening of surveillance

1. ARI Surveillance Activity at District and State Level
2. Health Management Information System
3. Mortality and Morbidity Data Related to ARI.
4. Data analysis of different non-communicable and communicable diseases reported to the department of health and family welfare.

Sentinel Hospitals Selected for ARI Surveillance Activity

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

Sl. No.	Name of The District	Name	Designation	Sentinel Hospital for ARI	Phone	E-mail
1.	East Sikkim	Dr. Manisha Rai	Sr. GDMO	UPHC/Gangtok/ East Sikkim	8159079023	
2.		Mr. Prabhakar Dahal	Tech. O	Rangpo PHC/ East Sikkim	7679109264	
3.		Dr. Prabhat Moktan	APO/CD	District Hospital/ East Sikkim	9547091790	drprabhatmoktan@gmail.com
4.		Dr. Raju Singh	MOI/C	Rehnock CHC/ East Sikkim	7407387140	
5.	West Sikkim	Dr. Udit Pradhan	APO	District Hospital/ West Sikkim	7384337870	druditz16@gmail.com
6.	North Sikkim	Dr. Doma Bhutia	DTO	District Hospital/ North Sikkim	9434444611	dtosk@rntcp.org
7.	South Sikkim	Dr. Anju Rai	DTO	District Hospital/ South Sikkim	7797895320	anjurai100@gmail.com
8.		Dr. Kanupriya Rai	MO I/C	Jorethang CHC/ South Sikkim	9007270319	Tryjadu777@gmail.com



CHAPTER 7

Health Action Plan on Heat Related Illnesses

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

a. Based on Departure from Normal

- ▶ *Heat Wave*: Departure from normal is 4.5°C to 6.4°C
- ▶ *Severe Heat Wave*: Departure from normal is >6.4°C

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

- ▶ *Heat Wave*: When actual maximum temperature $\geq 45^{\circ}\text{C}$
- ▶ *Severe Heat Wave*: When actual maximum temperature $\geq 47^{\circ}\text{C}$

Most of the inhabited regions of Sikkim experience a temperate climate, with temperatures seldom exceeding 28°C (82°F) in summer. The average annual temperature for most of Sikkim is around 18°C (64°F).

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

To declare a heat wave, the criteria should be met at least at two stations in a Meteorological sub-division for at least two consecutive days. A heat wave will be declared on the second day.

Different type of heat related illness includes:

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

Types of Heat Related Illnesses

Clinical Entity	Age Range	Setting	Cardinal Symptoms	Cardinal/Important Signs	Pertinent Negative findings
Heat rash/ prickly heat/ Miliaria	All, but frequently children	Hot environment; +/- insulating clothing or swaddling (wrap in tight clothes)	ITCHY RASH with SMALL RED BUMPS at pores in the skin. Seen in setting of heat exposure; bumps can sometimes be filled with clear or white fluid	DIFFUSED RED COLOUR SKIN OR VESICULAR RASH , itching of the skin without visible eruption	NOT FOCALLY DISTRIBUTED like a contact dermatitis
Heat cramps	All	Hot environment, TYPICALLY WITH EXERTION , +/- insulating clothing	PAINFUL SPASMS of large and frequently used muscle groups	Uncomfortable appearance, may have DIFFICULTY FULLY EXTENDING AFFECTED LIMBS/ JOINTS	No contaminated wounds/tetanus exposure; no seizure activity
Heat exhaustion	All	Hot environment; +/- exertion; +/- insulating clothing or swaddling (wrap in a tight clothes)	Feeling overheated, light headedness, EXHAUSTED AND WEAK , unsteady, feeling of VOMITING , SWEATY AND THIRSTY , inability to continue activities	SWEATY/ diaphoretic; flushed skin; hot skin; NORMAL CORE TEMPERATURE ; +/- dazed, +/- generalized weakness, slight disorientation	No coincidental signs and symptoms of infection; no focal weakness; no difficulty in swallowing food or speech; no overdose history
Heat syncope	Typically adults	Hot environment; +/- exertion; +/- insulating clothing or swaddling (wrap in a tight clothes)	Feeling hot and weak; light headed ness followed by a BRIEF LOSS OF CONSCIOUSNESS	Brief, generalized loss of consciousness in hot setting, short period of disorientation, if any	NO SEIZURE ACTIVITY , no loss of bowel or bladder continence, no focal weakness, no difficulties in food swallowing or speech
Heat Stroke	All	Hot environment; +/- exertion; +/- insulating clothing or swaddling (wrap in a tight clothes)	Severe overheating; profound weakness; DISORIENTATION , NOT FULLY ALERT , CONVULSION, OR OTHER ALTERED MENTAL STATUS	Flushed, DRY SKIN (not always), CORE TEMP ≥40°C OR 104°F ; altered mental status with disorientation, incoherent behaviour, COMA , CONVULSION ; tachycardia; +/- hypotension	No coincidental signs and symptoms of infection; no focal weakness; no difficulties in swallowing food or speech, no overdose history

Health Adaptation Plan on Heat Related Illness

I. Awareness Generation

Under the programme, awareness generation among all the relevant stakeholders including the common population, vulnerable communities, healthcare providers, and policymakers around the impacts of heat

related illnesses along with the ways to address the same is imperative. Thereby, under the programme, Sikkim state will conduct the following key activities.

a. 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 increasing heat.

The content for the IEC for the heat related issues will be provided by the State NPCCHH division. The state will translate the content into the local or regional language (Nepali) and the role of the districts is to utilize these materials and disseminate at all levels.

IEC dissemination plan

Sl. No.	IEC Content	Priority Districts	Dissemination Plan	Timeline	Budget (in lakhs) for 5 years with 15% increasing each year				
					2022-23	2023-24	2024-25	2025-26	2026-27
1.	Posters	South	1 Poster for Healthcare facilities in all districts	March-May	0.10	0.11	0.13	0.15	0.17
2.	Audio	South	Social Media (Facebook, Instagram etc.)	March-May					
3.	Videos	South							
4.	GIF's	South							
5.	Public Health Advisories	East, West, North, South	1 Health advisories to all the healthcare facilities	March-May					

b. Public Health Advisories

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

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

II. Capacity Building

To strengthen capacity of healthcare system to adapt/address illnesses/diseases due to impacts of heat.

a. Training on various health impacts of heat is as follows

NPCCHH Training Plan At District Level

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

Schedule Plan for Training

Sl. No.	Training programme	Timeline	Target	Priority Districts	Budget (in lakhs) for 5 years with increasing 15% each year				
					2022- 23	2023-24	2024-25	2025-26	2026-27
1	DNO	February	100%	East, South, West, North	0.25	0.28	0.32	0.36	0.41
2	MO	March	100%	East, South, West, North					
3	Community Health Workers	April	100%	East, South, West, North					
4	Panchayati Raj Institutions	April - May	100%	East, South, West, North					

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

Roles and responsibilities

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

	Responsibilities
SNO	<ul style="list-style-type: none"> Disseminate early warnings to the district level Finalization of IEC material and dissemination Plan Liaison with IMD for weather alerts and its dissemination Liaison with other departments for combined IEC campaigns, coordinated response and information sharing of health indicators for targeted action Organize the IEC campaigns at state level on observance of important environment-health days Organize training sessions for the district level and the surveillance nodal officers 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 the IEC 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 Organize sensitization workshops for other stakeholders and line departments Organize seminars and conference to share knowledge and action under NPCCHH.

	Responsibilities
	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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 receive daily observed temperature and relative humidity information • Liaison with other departments for combined IEC campaigns, coordinated response and information sharing of health indicators for targeted action • Conduct training for block health officers, medical officers, with relevant training manuals • Conduct sensitization of vulnerable groups: police officers, outdoor works, 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 the 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Support in development and implementation of city-specific heat-health action plan
Medical officer	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Conduct community level IEC activities

Health Action Plan on Extreme Weather Event-Related Health Issues



The state has recorded increase in morbidity and mortality due to the effect of extreme weather conditions, frequent and severe episodes of heavy rainfall, increasing heat, floods, droughts and fires as a direct impact of climate variability and affecting the population at large.

Climate change can result in more hot days and cold days resulting in more periods of 'drought', 'dust storms', or 'heavy rains (precipitation)', and even 'flooding' and 'landslides'. Owing to which, the health of the population gets directly affected due to injuries, hypothermia, hyperthermia, drowning and indirectly through population dislocation, crowding, poor living conditions, faeco-oral transmission of gastro-intestinal pathogens causing water and food borne illnesses, respiratory illness and other infectious diseases (e.g. vector-borne disease, cholera and also mental illnesses). The reason primarily is due to contamination of water and sewage disposal.

The State Disaster Management Authority (SDMA) in Sikkim is the nodal institution for disaster prevention, mitigation, preparedness, and management of disaster impacts as a result of climate change. The SDMA and the GSI have come together to develop a regional level early warning system for excessive rainfall resulting in landslides. The warning system consists of over 200 sensors that can measure geophysical and hydrological parameters like rainfall, pore pressure and seismic activities. It will monitor a densely populated area which has seen landslides in the past. The system is capable of warning about 24 hours in advance.

As Sikkim is a mountainous state, according to the State Disaster Management Plan under Multi Hazard Risk Vulnerability Assessment Study (MHRVA), the following hazards are considered to be common in the state:

1. Earthquake
2. Landslide
3. Fire
4. Flood/flash flood
5. Snow avalanches
6. Drought
7. Hailstorm, thundering and lightening

The most prevalent disaster due to climate change in the state are the landslides caused due to heavy rainfall in the months of June – August, the frequency of which has been increasing over years. The rainfall patterns not only result in the damage of human health because of landslides and floods but also increases the mortality and morbidity rates due to the road accidents.

Human Lives Lost Due to Flood/Landslides

Sl. No.	Year	Human Lives Lost (in no.)
1.	2021-2022	03
2.	2020-2021	18
3.	2019-2020	07
4.	2018-2019	07
5.	2017-2018	19
6.	2016-2017	04

According to the Climate Research and Services India Meteorological Department, Ministry of Earth Sciences, Pune, report 'Observed Rainfall Variability and Changes Over Sikkim State', during the last 30 years, highest rainfall of June and July was received in the year 2015 and 1990 (670.5 mm and 737.6 mm respectively) while highest rainfall of 637.0 mm was received in August received in the year 1990 and of 561.0 mm in September was received in the year 2016. Highest annual rainfall of 3105.3mm was received in the year 2018 and highest southwest monsoon rainfall of 2156.7 mm was received in the year 2009.

In the month of June the maximum number of rainy days lies in the range of 26 to 30 days especially in some parts of East Sikkim while minimum number of rainy days lies in the range of 12 to 16 days especially in some parts of North Sikkim and West Sikkim districts.

In the month of July the maximum number of rainy days lies in the range of 31 to 36 days especially in some parts of East Sikkim while minimum number of rainy days lies in the range of 17 to 21 days especially in some parts of North Sikkim and West Sikkim districts.

In the month of August the maximum number of rainy days lies in the range of 30 to 35 days especially in some parts of East Sikkim. While the minimum number of rainy days lies in the range of 15 to 19 days especially in some parts of West Sikkim and North Sikkim districts.

Health Adaptation Plan for Disaster Management

I. Awareness Generation

Under the programme, awareness generation among all the relevant stakeholders including the common population, vulnerable communities, healthcare providers, and policymakers around the impacts of disaster events. Thereby, under the programme, Sikkim state will conduct the following key activities:

a. 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 disaster management. The content for the IEC for the disaster management will be provided by the State NPCCHH division. The state will translate the content into the local or regional language (Nepali) and the role of the districts is to utilize these materials and disseminate at all levels.

II. Capacity Building

To strengthen capacity of healthcare system to disaster management.

Training on disaster management is as follows:

NPCCHH Training Plan at District Level

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

Sensitization/knowledge building workshops will be planned for seeking updates on disaster management between district officials, medical officers and academic institutions working on climate change impact.

Roles and Responsibilities

	Responsibilities
SNO	<ul style="list-style-type: none"> 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 Organize sensitization workshops for other stakeholders and line departments Collaborate with academic institute/s for support in updating SAPCCHH, Surveillance activity monitoring, training of health care professionals, vulnerability assessment and applied research Submit reports of activities on EWE and health under NPCCHH
DNO	<ul style="list-style-type: none"> Disseminate early warning to block and health facility level Ensure IEC dissemination to community level and facilitate community level IEC activities Organize training for block health officers and MO Formalize intersectoral coordination for disaster planning, management and response with SDMA/IMD and other response departments Liaison with other departments for combined IEC campaigns, coordinated response and information sharing of health indicators for targeted action Identification and communication of Evacuation routes & relief camps Support planning and management of health care services in relief camps Provide necessary IEC on health and sanitation in relief camps training for block health officers, medical officers, with relevant training manuals

	Responsibilities
	<ul style="list-style-type: none"> • Conduct sensitization of vulnerable groups: police officers, outdoor works, women, children etc • Organize IEC campaigns at district level on observance of important environment-health days • Facilitate disaster vulnerability assessments in health facilities and maintain records of such assessment and health facility damage due to EWE • Update DAPCCHH with support from District Task Force • Submit reports of activities on EWE and health under NPCCHH
Block health officer	<ul style="list-style-type: none"> • Conduct community level IEC activities • Ensure training of medical officers • Organize PRI sensitization workshop and training for vulnerable groups • Facilitate disaster vulnerability assessments in health facilities and maintain records of such assessment and health facility damage due to EWE
Medical officer	<ul style="list-style-type: none"> • Conduct health facility-based IEC activities • Support community level IEC activities • Preparation of Disaster Management Plans and hospital safety plan • Assessment of health facility in context of climate change-extreme weather events • Identifying structural changes/retrofitting measures at the facility level to equip the healthcare facility • Ensuring routine monitoring and maintenance of support functions (Water quality, waste management) • Health facility preparedness for seasonal events
Panchayati Raj Institutions	<ul style="list-style-type: none"> • Conduct community level IEC activities • Community involvement in planning and demonstration of measure taken before-during-after an EWE

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



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.

Various types of Vector-Borne Diseases in the state for the past years

Sl. No.	Year	Dengue	Chikungunya	Malaria	Kala-Azar	Filaria
1.	2013	679	Nil	38	07	Nil
2.	2014	03	Nil	35	06	Nil
3.	2015	35	Nil	27	05	01
4.	2016	42	01	15	01	Nil
5.	2017	312	09	14	02	Nil
6.	2018	145	28	05	01	Nil
7.	2019	444	95	07	06	95
8.	2020	11	13	04	04	Nil
9.	2021	02	03	01	Nil	Nil

Year wise Morbidity, Mortality and related statistics of Vector-borne diseases

Sl. No.	Year	Dengue		Chikungunya		Malaria		Kala-Azar		Filaria	
		Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
1.	2013	679	0	NIL	0	39	0	07	0	NIL	0
2.	2014	03	0	NIL	0	35	0	06	0	NIL	0
3.	2015	35	0	NIL	0	27	0	05	0	01	0
4.	2016	42	0	01	0	15	0	01	0	NIL	0
5.	2017	312	0	09	0	14	0	02	0	NIL	0
6.	2018	145	0	28	0	06	0	01	0	NIL	0
7.	2019	444	0	95	0	07	0	06	0	95	0
8.	2020	11	0	13	0	04	0	04	0	NIL	0

The causes of different Vector-Borne diseases in the state

- 1, Temperature which affects the biting, survival and reproductive rates of the vectors, and the survival and development rates of the pathogens that they carry.
2. Climate-sensitive health risks, such as heat stress, or exposure to storms and floods, the influence of meteorological factors.

Adaptation strategy and action plan for Vector-borne diseases

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

Health Adaptation Plan on Vector-borne Diseases

I. 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 Vector-borne disease and ways to address them.

a. IEC Campaign

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

The content for the IEC for Vector-borne disease will be provided by the State NPCCHH division. The state will translate the content into the local or regional language (Nepali) and the role of the districts is to utilize these materials and disseminate at all levels.

II. Capacity Building

To strengthen capacity of healthcare system to adapt/address illnesses/diseases due to impacts of air pollution.

NPCCHH Training Plan at District Level

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

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

Roles and Responsibilities

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

NVBDCP, Sikkim	Overall guidance and policy formulation	Guide 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • To help the state govt. in building collaboration with any research institute, analysis of relationship between climatic factors and a particular VBD so as to forewarn the impending outbreaks
NGO at state and district level for reach to community	Health education at community level	<ul style="list-style-type: none"> • Conduct workshops for IEC activities for different level of staff in the identified areas in consultation with the state govt.
State Programme Officer	Overall planning and execution of surveillance and intervention measures to control VBDs	<ul style="list-style-type: none"> • Supervise and guide the DMOs in control of VBDs
State Entomologist	To provide guidance in vector control	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Supervise and guide surveillance and intervention measures for control of VBDs in the district.

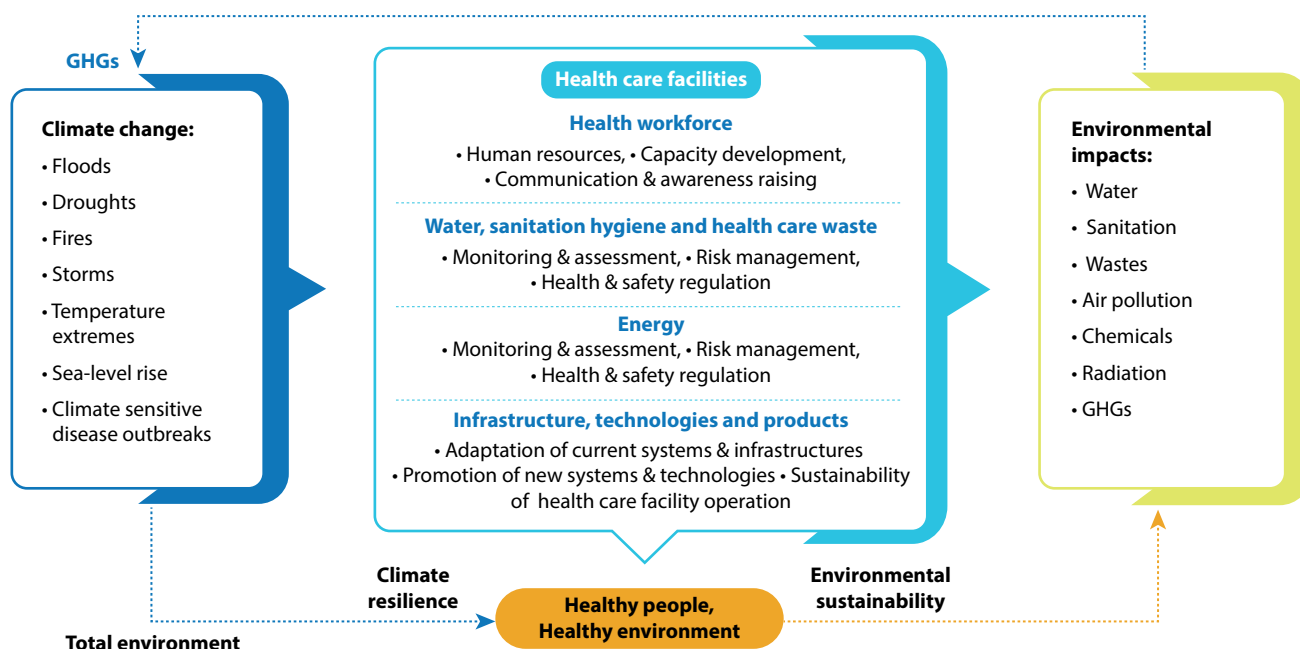


Action Plan for Green and Climate Resilient Health Care Facilities

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

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

Framework for building climate-resilient and environmentally sustainable HCF



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

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

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

- a. Energy Auditing
- b. Installation of LED lighting at Health Care Facilities
- c. Installation of Solar panels
- d. Water Conservation Measures – Rain water Harvesting

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

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

a. Energy Auditing

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

The guiding principles in this respect include:

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

b. Replacing the existing non-LED lights with LEDs

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

c. Installation of Solar panels

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

The guiding principle in this area would be:

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

d. 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 litres of water every year. This in turn can result in substantial cost savings in addition to adopting climate-smart practices.

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

- ▶ The healthcare facility would develop a strategy for the optimum usage of water.
- ▶ The HCFs would develop a plan for the conservation of water. e.g., water-efficient fixtures, dual flush mechanism, sensor-operated urinals, waterless urinals, rainwater harvesting.
- ▶ The HCFs would have a plan for wastewater treatment. e.g., sewage treatment plant and effluent treatment plant at sites of generation of contaminated grey water, like pathology.
- ▶ The HCFs would develop a programme/plan for the conservation of water.
- ▶ The HCFs would have a water management programme for the conservation of water by establishing a team, setting goals with timelines, conducting water audits, determining the cost of water, and preparing an action plan.
- ▶ The HCFs would have an ongoing educational programme for the efficient usage and conservation of water for all the stakeholders (staff, patients and visitors).
- ▶ The HCFs would have a plan to train the staff on water savings techniques.
- ▶ The HCFs would develop a wide variety of methods to communicate through IEC materials, new and/or revised operating guides and manuals.

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

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

New Buildings

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

- ▶ Installation of Rainwater Harvesting System
- ▶ Installation of alternative energy systems
- ▶ Installation of STP & ETP

Existing Infrastructure

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

Implementation Plan

1. Health Sector Preparedness for 5 Years 2022-27

Objective	Activities	Priority Districts	Identified Health facilities for 5 years for each	Timeline	Budget (in lakhs) for 5 years with 15% increasing each year					Target for 5 years 2022-27				
					2022-23	2023-24	2024-25	2025-26	2026-27	2022-23	2023-24	2024-25	2025-26	2026-27
Strengthening Healthcare System	Energy Audit	East, South	5 PHC, 1 CHC, 1 DH	February-April	Untied funds	Untied funds	28.05	32.23	37.03	20%	35%	50%	75%	100%
	Led installation	East, West South	5 PHC, 1 DH	April-May						10%	20%	50%	80%	100%
	Solar Panels installation	East, South	5 PHC, 1 CHC	May-August						5%	10%	40%	70%	100%
	Rainwater Harvesting	South	3 PHC	August-October						5%	10%	20%	50%	100%
	Retro fitting of Health care facilities	West, North	1 DH	October-December						10%	20%	50%	80%	100%

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

	Responsibilities
SNO	<ul style="list-style-type: none"> • Finalization of IEC material and dissemination Plan • Organize training sessions for the district-level officers and trainers • Identify health facilities for priority implementation based on disaster and health facility vulnerability • Identify relevant state level nodal agencies and collaborate with them for assessment of health facilities for implementation of measures • Facilitate and monitor necessary assessments at the health facility level

	Responsibilities
	<ul style="list-style-type: none"> Facilitate implementation of structural and functional measures at the health facility level Monitor the implementation of the activities Support districts to identify sources of funding Advocate for reduction in source of greenhouse gas emissions
DNO	<ul style="list-style-type: none"> Conduct training for block health officers, medical officers, with relevant training manuals Support conduction for the following assessment at the health facility level <ul style="list-style-type: none"> Energy audit Water audit Disaster-vulnerability assessment Support the following functional measures at the health facility level <ul style="list-style-type: none"> Water committee Sustainable procurement committee Operational measures to make health facilities function during the 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
Block health officer	<ul style="list-style-type: none"> Ensure training of medical officers Organize PRI sensitization workshop Coordinate with other agencies for assessment and implementation of identified structural and functional measures
Medical officer	<ul style="list-style-type: none"> Conduct health facility assessment <ul style="list-style-type: none"> Energy audit Water audit Disaster-vulnerability assessment Lead following functional measures <ul style="list-style-type: none"> Water committee Sustainable procurement committee Operational measures to make health facility functioning during disasters or power cut Support community level IEC activities Identify local funding opportunities: e.g. CSR initiative, NGO funding
Panchayati Raj Institution	<ul style="list-style-type: none"> Support retrofitting and new health facilities with local funding source and community involvement

2. Awareness Generation

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

3. 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.

PART III

Budget



CHAPTER 11

Budget

Sl. No.	Activities	Indicator	Budget (in lakhs) for 5 years with 15% increase every year					Target for five years 2022-27				
			Year 1	Year 2	Year 3	Year 4	Year 5	Year 1	Year 2	Year 3	Year 4	Year 5
Programme Management												
1.	Taskforce meeting to draft health sector plan for heat and air pollution	% State Task Force Quarterly Meetings conducted in a year						25%	50%	75%	100%	100%
		% Districts conducted quarterly District Task Force Meetings in a year	1.0	1.15	1.32	1.51	1.73	20%	40%	60%	80%	100%
2.	Sensitization workshop/meeting of the state programme Officers and District level Health Officers		0.45	0.51	0.58	0.66	0.75	50%	75%	100%	100%	100%
General Awareness												
3.	Development of IEC material, campaigns, Innovative IEC/BCC Strategies	% of Districts implemented IEC campaign on all climate sensitive issues						50%	100%	100%	100%	100%
		% Districts included climate sensitive issues in the VHSNCs	0.65	0.74	0.85	0.97	1.11	50%	100%	100%	100%	100%


Sl. No.	Activities	Indicator	Budget (in lakhs) for 5 years with 15% increase every year					Target for five years 2022-27				
			Year 1	Year 2	Year 3	Year 4	Year 5	Year 1	Year 2	Year 3	Year 4	Year 5
Capacity Building												
4	Orientation/ Training / capacity Building of healthcare staffs	% of Districts completed TOT						100%	100%	100%	100%	100%
		% of Medical Officers trained in Districts						50%	80%	100%	100%	100%
		% of health workers and ASHA/AWW trained on NPCCHH in District	1.60	1.84	2.11	2.42	2.78	30%	50%	70%	100%	100%
		% of targeted sensitization trainings planned for vulnerable population in district (PRI Training)						50% of district having trained 10% of pop	80% of district having trained 30% of pop	80% of district having trained 50% of pop	100% of district having trained 80% of pop	100% of district having trained 100% of pop
Strengthening of the Health System												
5.	Adoption of Green/ Environment Friendly Measures in Health facilities	<i>Energy Audit:</i> % of healthcare facilities per district per year that have conducted energy audit			1.80	2.07	2.38	20% of district covering 20% of health care facilities	35% of district covering 35% of health care facilities	50% of district covering 50% of health care facilities	75% of district covering 75% of health care facilities	100% of district covering 100% of health care facilities
		<i>LED lighting:</i> % of health care facilities per year that installed solar panel	Untied funds	Untied funds	4.0	4.60	5.29	10% of district covering 10% of health care facilities	20% of district covering 20% of health care facilities	50% of district covering 50% of health care facilities	80% of district covering 80% of health care facilities	100% of district covering 100% of health care facilities
		<i>Solar Panel:</i> % of health care facilities per district per year that installed solar panel			25.0	28.7	33.0	20% of district covering 5% of health care facilities	35% of district covering 10% of health care facilities	50% of district covering 40% of health care facilities	80% of district covering 70% of health care facilities	100% of district covering 100% of health care facilities
		<i>Rain water harvesting:</i> % of health care facilities per district per year that installed rain water harvesting system			10.0	11.5	13.2	10% of district covering 5% of health care facilities	30% of district covering 10% of health care facilities	50% of district covering 20% of health care facilities	80% of district covering 50% of health care facilities	100% of district covering 100% of health care facilities

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



Annexures

Annexure 1: Organisational Framework


GOVERNMENT OF SIKKIM
HEALTH AND FAMILY WELFARE DEPARTMENT
TASHILING SECRETARIAT, GANGTOK,
737101.

No: 184/Health & F.W/2019 Date: 11/12/2019

NOTIFICATION

Whereas, in compliance to the directives of the Ministry of Health and Family Welfare, Government of India, the State Government has deemed it expedient to establish the Organizational Structure in the State to strengthen the Health System so as to make it Climate Change Resilient in the State of Sikkim;

Now therefore, with a view to achieve the above objectives, the State Government is hereby pleased to establish the Organizational Structure in the State for drafting and implementing the State Specific Action Plan for Climate Change and Human Health (SAPCCHH), consisting of the following, namely:-

1. GOVERNING BODY:

(1) Composition:

(i) Hon'ble Minister, Health and Family Welfare Department: Chairman
(ii) Principal Secretary, Health and Family Welfare Department: Vice-Chairman
(iii) Director General Health Services/Principal Director Health Services: Member
(iv) Mission Director, National Health Mission: Member
(v) Director Health Services (Medical Education): Member
(vi) Regional Director, Ministry of Health and Family Welfare, Government of India: Member
(vii) State Nodal Officer (Climate Change): Member Secretary

(2) The meeting of the Governing Body shall be held once in a year.

2. STATE LEVEL TASK FORCE:

(1) Composition:

(i) Principal Director/Mission Director, National Health Mission: Chairman.
(ii) Director, State Pollution Control Board: Member.
(iii) Director, State Meteorology Department: Member.
(iv) Director, Science and Technology Department: Member
(v) Director, Agriculture Department: Member.
(vi) Director, Animal Husbandry and Veterinary Services Department: Member.
(vii) Chief Engineer, Public Health and Engineering Department: Member.
(viii) Director/Additional Director, State Disaster Management Authority: Member.
(ix) President, Voluntary Health Association (Sikkim): Member.
(x) State Program Officer (Integrated Disease Surveillance Programme/ National Vector Borne Disease Control Programme): Member.
(xi) State Program Officer Non Communicable Diseases: Member.
(xii) An Officer representing State Information Education Communication Bureau: Member.
(xiii) State Nodal Officer (Climate Change): Member Secretary.

The terms of reference of the State Level Task Force shall be as under, namely:-

The State Level Task Force shall,-

- (i) frame the State Specific Action Plan for Climate Change and Human Health (SAPCCHH) as per the guidance of the National Centre for Disease Control, Government of India;
- (ii) review the current programmes and policies in the State in relation to health and other sectors with respect to climate change;
- (iii) formulate adaptation strategy for each of the illnesses/ diseases sensitive to climate variability or change;
- (iv) ensure the implementation of the State Specific Action Plan for Climate Change and Human Health (SAPCCHH).

3. DISTRICT LEVEL TASK FORCE:

(1) Composition:

- (i) District Collector: Chairman.
- (ii) District Forest Officer, Forest and Environment Department: Member.
- (iii) Joint Director, Agriculture Department: Member.
- (iv) Joint Director, Animal Husbandry and Veterinary Services Department: Member.
- (v) Divisional Engineer, Public Health Engineering Department: Member.
- (vi) Chief Medical Officer, Health and Family Welfare Department: Member.
- (vii) District Reproductive and Child Health Officer: Member.
- (viii) State Nodal Officer Climate Change and Human Health: Member.
- (ix) District Nodal Officer Climate Change: Member Secretary.

(2) Terms of Reference:

The terms of reference of the District Level Task Force shall be as under, namely:-

The District Level Task Force shall,-

- (i) frame the District Specific Action Plan for Climate Change and Human Health
- (ii) ensure the implementation of the District Specific Action Plan for Climate Change and Human Health (DAPCCHH).

4. STATE ENVIRONMENT HEALTH CELL:

(1) Composition:

- (i) State Nodal Officer (Climate Change)
- (ii) Medical Officer (Public Health)
- (iii) Assistant Director (P.M.E)
- (iv) Statistical Inspector
- (v) Data Entry Operator

(2) Terms of Reference:

The terms of reference of the Environment Health Cell shall be as under namely:-

The Environment Health Cell shall,-

- (i) assist the state Level Task Force;

5. DISTRICT ENVIRONMENT HEALTH CELL

(69)

(1) Composition:

- (i) District Nodal Officer (Climate Change)
- (ii) Deputy Director, Sanitation
- (iii) District Health Education Officer
- (iv) Non Medical Leprosy Officer
- (v) Data Entry Operator

(2) Terms of Reference:

The terms of reference of the District Environment Health Cell shall be as under namely:-

The District Environment Health Cell shall,-


- (i) assist the District Level Task Force;
- (ii) expedite the activities related to Climate Change.

By order and in the name of the Governor.





Sd/-
(K. Sreenivasulu) (I.A.S)
Principal Secretary,
Health and Family Welfare Department,
Government of Sikkim.
[File No.110/ADHS/2019]

Copy for information to:-


01. All concerned above
02. Principal Private Secretary to the Hon'ble Minister, H & FW Department.
03. Principal Private Secretary to the Chief Secretary, Govt. of Sikkim
04. Joint Secretary, Confidential, Home Department for publication in the Gazette.
05. Joint Director, I.T. Department for uploading in the official website.
06. File
07. Guard File


Additional Director
HC, HS & FW Deptt.
Govt. of Sikkim, Gangtok
State Nodal Officer,
Climate Change & Human Health,
Health and Family Welfare Department

Annexure 2: Posters Distributed to the Districts (English & Local Language)

AIR POLLUTION IS MAJOR RISK TO HEALTH
IT CAUSES RESPIRATORY
TRACT INFECTION, LUNG DISEASES
CARDIOVASCULAR DISEASES & STROKE.



AQI - AIR QUALITY INDEX
CHECK THE DAILY AQI BEFORE PLANNING YOUR DAY

WEBSITES TO CHECK AQI
CPCB (http://app.cpcbcr.com/AQI_India) or mapan-safar: <http://safar.tropment.res.in/>

Design by: STECB

HEALTH & FAMILY WELFARE DEPARTMENT, GOVERNMENT OF SIKKIM



मानिसहरू जो वायु प्रदूषण को उच्चतम जोखिम मा हुने गर्छन्



वृद्ध
मानिसहरू



५ वर्ष देखि
मुनिका
बच्चाहरू



गर्भवती
महिलाहरू



श्वासप्रश्वास
बिमारका
रोगीहरू



हृदयरोगीहरू



स्वास्थ्य तथा परिवार कल्याण विभाग, सिक्किम सरकार

Design By: STECB

Annexure 3: Public Health Advisories on Air Pollution



Government of India

National Programme on Climate Change and human Health
MoHFW

ADVISORY ON AIR POLLUTION AND HEALTH



What is Air Pollution?

Air pollution is the contamination of indoor or outdoor air by a range of gasses and solid particles that modify natural characteristics of air we breathe. Key health harmful pollutants include particulate matter (PM_{2.5} and PM₁₀), carbon monoxide (CO), ozone (O₃), black carbon (BC), sulfur dioxide and nitrogen oxides (Nox). Air pollution is often not visible to the naked eye as the sizes of the pollutants are smaller than the human eye can detect.

What are major sources of Air Pollution?

Ambient (outdoor) air pollution is caused by factors such as vehicular exhaust, road dust, construction dust, burning of garbage, burning of agricultural crop residues, industrial emissions, fossil fuel fired thermal power plants and brick kilns, burning of biomass in households, burning of firecrackers etc.

Household air pollution is caused by burning biomass such as wood, coal, dung, kerosene in chulhas or fireplaces for cooking and heating purposes. Indoor air pollution is caused by burning mosquito coils, incense sticks, cigarettes, bidis, use of sprays, solvents, and fumes from chemicals used in building interiors etc.

Air Quality

Air Quality Index (AQI) is a tool based on ambient concentration values of air pollutants and is categorized as Good, Satisfactory, Moderately polluted, Poor, Very Poor, and Severe. Worsening of Air Quality Index especially when in range of 'poor to severe' in an area may result in increase in morbidity and mortality among the exposed people.

www.mohfw.nic.in



@MoHFW INDIA

www.nodc.gov.in



@Director, NCDC

Air Quality Index (AQI)# (Pollution Level)	Possible Health Consequences	Advice for	
		General Population	Vulnerable Population*
Good (0-50)	Low risk	No special precautions	No special precautions
Satisfactory (51-100)	Minor breathing discomfort in vulnerable population*	No special precautions	Do less prolonged or strenuous outdoor physical exertion
Moderate (101-200)	Breathing or other health related discomfort in vulnerable population*	Do less prolonged or strenuous outdoor physical exertion	Avoid prolonged or strenuous outdoor physical exertion
Poor (201-300)	<ul style="list-style-type: none"> Breathing discomfort in healthy People on prolonged exposure Breathing or other health related discomfort in vulnerable population* on short exposure 	Avoid outdoor physical exertion	Avoid outdoor physical activities
Very Poor (301-400)	<ul style="list-style-type: none"> Respiratory illness in healthy People on prolonged exposure Pronounced respiratory or other illnesses in vulnerable population* on short exposure 	Avoid outdoor physical activities, especially during morning and late evening hours	Remain indoors and keep activity levels low
Severe (401-500)	<ul style="list-style-type: none"> Respiratory illness in healthy People on prolonged exposure Serious respiratory or other illnesses in vulnerable population* on short exposure 	Avoid outdoor physical activities	Remain indoors and keep activity levels low

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

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

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

Health consequences of Air pollution



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

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

Vulnerable Population

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

- 1. Age group:** Individuals who are under five aged children and in old age.
- 2. Pregnant Women:** Exposure during pregnancy may have consequences for child in womb.
- 3. Predisposed health or medical conditions:** Those with pre-existing illnesses of respiratory and cardiovascular system etc. are at high risk.
- 4. Low socio-economic conditions:** Those with poor nutritional status and those living in conditions of poor housing, using fossil fuels for cooking, heating and lighting purposes have high risk.
- 5. Occupational group:** Those with possibility of prolonged exposures such as traffic policemen, traffic volunteers, construction workers, road sweepers, rickshaw pullers, auto-rickshaw drivers, roadside vendors, and others working outdoors in polluted settings are at high risk. Women burning biomass for cooking, and sweeping dust are vulnerable on account of their household work.

Recommendations for State Health Department

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

B. Strengthening of Healthcare services

1. Surveillance and Monitoring:

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

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

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

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

- f. Promote clean air by controlling waste incineration, use of diesel generators, use of vehicles non-compliant to vehicle emission standards
- xv. Sharing of this document plan with NPCCHH programme division at NCDC at email: npcchh@gmail.com

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

▶ General Population:

Reduce risk from exposure to air pollutants by followings:

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

▶ Vulnerable Population — additional measures

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

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

▶ Optional choice:

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

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

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

► **Air Pollution and COVID-19**

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

For further information, please visit:

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

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

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

<http://cpcb.nic.in/cpcb/AQI-new.php>

<http://envfor.nic.in/content/download-green-good-deed-audio-visual-creatives>

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



Annexure 4: Public Health Advisories on Heat



National Programme
on Climate Change
and Human Health

Do's

Stay hydrated

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

Stay covered

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

Stay indoors as much as possible

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

Vulnerable population include

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

Don'ts

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

