स्वास्थ्य एवं
परिवार कल्याण मंत्रालय
MINISTRY OF
HEALTH AND
FAMILY WELFARE

सत्यमेव जयते

GOVERNMENT OF KARNATAKA

KARNATAKA

STATE ACTION PLAN ON CLIMATE CHANGE AND HUMAN HEALTH







National Centre for
Disease Control
Government of India

National Programme
on Climate Change
and Human Health

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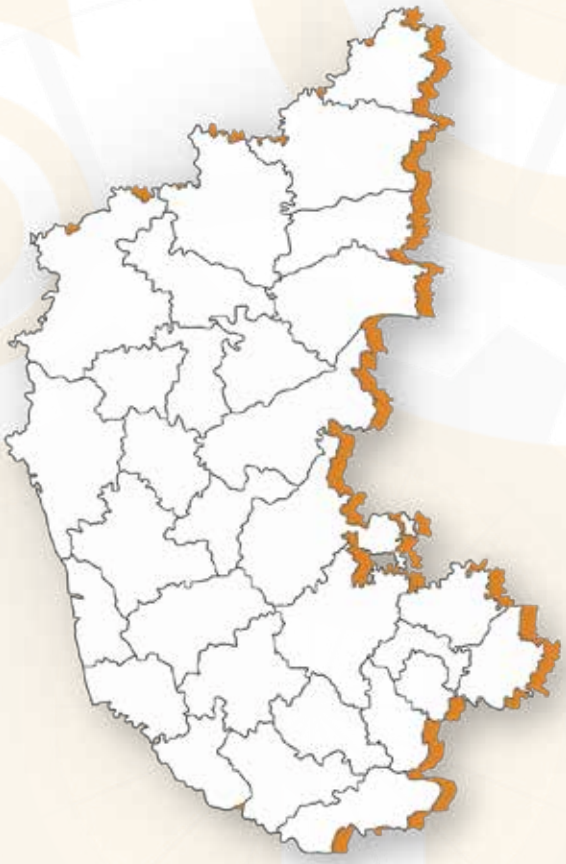
2022-27



National Centre for
Disease Control
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PART I

Climate Change and its Health Impacts

CHAPTER 1

Introduction

Climate change is the current concern of the 21st century. Health is and will be affected by the changing climate through direct impacts (heat waves, droughts, heavy storms, and sea-level rise), and indirect impacts (vector-borne and respiratory diseases, food, and water insecurity, under nutrition, and forced displacements).

Climate change is not only a problem for future generations – it is already happening. Higher mean temperatures are recorded each year, and more people are being affected by disasters, climate-sensitive diseases, and other health conditions.

Climate change exacerbates some existing health threats and creates new public health challenges. Worldwide, even when considering only a few health indicators, additional 250,000 deaths per year will occur in the next decades as a result of climate change.

The health sector has an important role to play in reducing greenhouse gas emissions that cause climate change. Investments to "greening" health care facilities – such as the use of solar panels, energy efficient equipment and waste management – must be made. Globally, only about 0.5% of multilateral climate finance has been attributed to health projects. Health care facilities also need to be safe and remain operational during and soonafter disasters.

Health is influenced by climate and weather in many ways, and for several reasons it is difficult to anticipate all the impacts. Human health plays an important role in well-being and is inextricably linked with both the environment and development. Climate change inevitably affects the basic requirements for maintaining health, clean air and water, sufficient food and adequate shelter. Climate change poses new challenges to the control of infectious diseases. As climate change affects air and water quality, it becomes necessary to focus on adapting to the health effects. Many of the major killers are highly climate sensitive with respect to temperature and rainfall, including Cholera and the diarrheal diseases, as well as diseases including malaria, dengue and other vector borne diseases. Also, the issues of shortage and seasonal changes in the availability of fresh water, regional drop in food production etc., has the potential to force population displacement with negative health impacts. The State Health department in order to extendthe benefit of the programme to the entire population has to establish the state Climate change cell.

CHAPTER 2

Karnataka Climate Change- Vulnerabilities, Challenges and Opportunities

Karnataka State Profile

Karnataka has a total geographical area of 191,791 km^2 accounting for 5.83% of the total geographical area of India. By area, it is the sixth largest state of India. It is situated on the western edge of the Deccan Peninsula, and is located approximately between 11.5° N and 18.5° N latitudes and between 74° E and 78.5° E longitudes. The state is bounded by Goa to the northwest, Maharashtra to the north, Telangana and Andhra Pradesh to the east, Tamil Nadu to the south east and Kerala to the southwest. The western part is flanked by the Arabian Sea. The southern corner of the state is seated at an angle where the Western Ghats and the Eastern Ghats converge into the Nilgiri hills. The state extends to about 760 km from north to south and about 420 km from east to west. The capital of Karnataka state is Bengaluru (Bangalore).

Figure 1: Map of Karnataka

In terms of population, Karnataka is the eighth largest state of India. As per the Census of India 2011, Karnataka had a population of 611,30,704 individuals (3,10,57,742 males and 3,00,72,962 females), comprising 5.05% of the country's population.

Karnataka comprises parts of the Deccan Plateau, the Western Ghats Mountain Range and the Coastal Plains. The state can be divided into four physiographic landforms – the

Northern Karnataka Plateau, the Central Karnataka Plateau, the Southern Karnataka Plateau and the Coastal Karnataka Region.

The Northern Karnataka Plateau covers the districts of Belagavi, Bidar, Vijayapura, Yadgir and Kalaburagi. The Central Karnataka Plateau consists of the districts of Ballari, Chikkamagaluru, Chitradurga, Davanagere, Dharwad, Gadag, Haveri, Raichur, Koppal and Shivamogga.

The Southern Karnataka Plateau includes the districts of Bengaluru Urban, Bengaluru Rural, Tumakuru, Ramanagara, Hassan, Kodagu, Kolar, Chikballapur, Mandya, Mysuru, and Chamarajanagar.

The Coastal Karnataka region starts from the Western Ghats in the west and extends till the edge of the Karnataka Plateau in the east. The coastal region includes the districts of Uttara Kannada, Udupi and Dakshina Kannada.

Climate Profile

The state of Karnataka enjoys three main types of climates—the coastal belt and adjoining areas enjoy hot with excessive monsoon rainfall typical of tropical monsoon climate; the southern part of the state experiences hot, seasonally dry tropical savanna climate, and the northern part of the state experiences hot, semiarid, tropical steppe type of climate. The summer season extends from March to May and the winter extends from January to February. The temperature in the state ranges from 23°C to 43°C in summer and 9°C to 27°C in winter. The state receives a normal annual rainfall of about 1,150 mm (ranging from 477 mm to 4,747 mm), from predominantly the southwest monsoon (about 73%). About 15% of rainfall is from the northeast monsoon and the remaining is received during the pre-monsoon season. There is a substantially high variability in spatial and temporal distribution of rainfall over the state. The annual rainfall is lowest (477 mm) in the eastern parts of Chitradurga district and highest (4,747 mm) over the Western Ghats.

In general, the mean rainfall is lower in the districts of central parts of south interior and north interior Karnataka regions, in the range of 60 to 100 mm in June, 50 to 100 mm in July, 55 to 100 mm in August, and 82 to 100 mm—in parts of Haveri, Davanagere, Chitradurga, Mysuru and Chamarajanagar districts) in September.

According to KSNDMC (2020), the quantum of annual rainfall and number of rainy days have increased in south interior Karnataka and Malnad regions. During the same period, a reduction in amount of annual rainfall and marginal increase in number of rainy days is observed in north interior Karnataka and coastal regions.

Karnataka ranks fourth among the most climate vulnerable states according to the climate vulnerability index prepared by Council for Energy Environment and Water (CEEW)[1]

Table 1: Agro-Climatic Zone of Karnataka

Sl. No.	Agro-Climatic Zone	Sl. No.	Agro-Climatic Zone
1	North-Eastern Transition Zone	6	Southern Dry Zone
2	North Eastern Dry Zone	7	Southern Transition Zone
3	Northern Dry Zone	8	Northern Transition Zone
4	Central Dry Zone	9	Hilly Zone
5	South eastern Dry Zone	10	Coastal Zone

Source: KSDMA

1 https://www.ceew.in/sites/default/files/ceew-study-on-climate-change-vulnerability-index-and-district-level-risk-assessment.pdf

Disease Vulnerability Assessment Relevant to Climate Change

Description: The importance of conducting a disease vulnerability assessment is that it allows the health department to understand the people and the regions in their jurisdiction that are more prone to adverse health impacts associated with the climate-related exposures induced by climate change. This assessment of disease vulnerability can then be used to implement targeted public health interventions to reduce the burden of public health impacts. The changing climate results in the increase in non- communicable and infectious diseases. Disease Vulnerability Assessment relevant to climate change can help health departments to assess and prevent associated adverse health impacts.

Direct & Co-Benefits

- Human health improvement and security
- Climate change Knowledge enhancement

Challenges and Opportunities

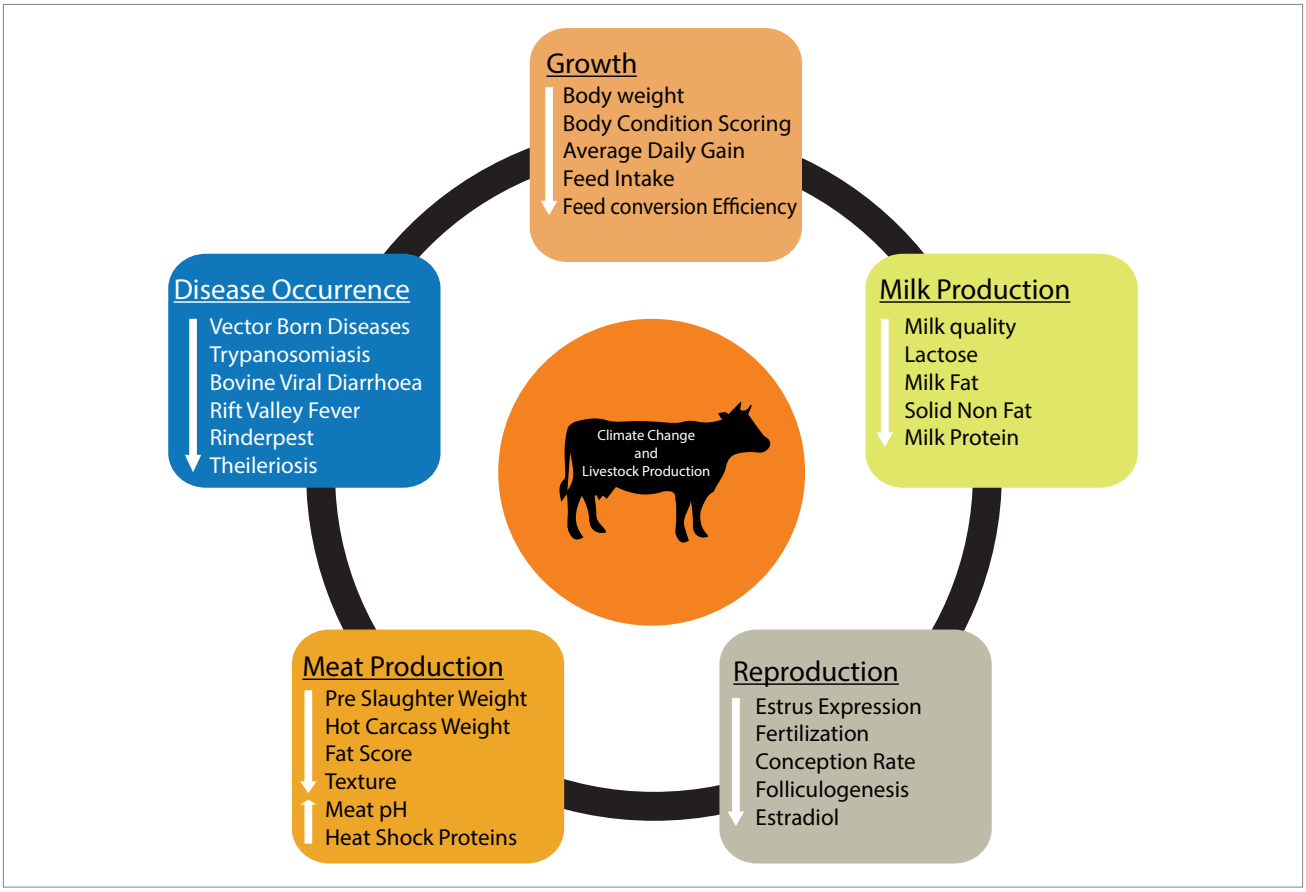
Impact of climate change on agriculture sector

Agriculture and allied activities provide employment to two-thirds of India's total workforce and contribute to nearly 20% of the country's GDP. Any change in climatic factors such as temperature and precipitation, and non-climatic factors such as changes in the soil moisture affects Indian agriculture. Kumar and Parikh (1998) show that economic impacts would be significant even after accounting for farm level adaptation. The loss in net revenue at the farm level is estimated to range between 9% and 25% for a temperature rise of 2°C to 3.5°C. Sanghi, Mendelssohn and Dinar (1998) estimated that a 2°C rise in mean temperature and 7% increase in mean precipitation would reduce net revenues by 12.3% for the country as a whole.

Impact of climate change on livestock production

Decline in feed consumption is one of the primary outcomes of heat stress in livestock exhibited to reduce the generation of metabolic heat. Apart from feed intake, feed conversion also significantly decreases on exposure to heat stress. As a consequence of all these, growth of the animal gets affected which is an economically important trait. Reduced milk production is probably one of the most deleterious impacts of climate change on livestock. Apart from observing a significant reduction in milk yield, severe alterations in milk quality variables have also been reported in livestock. Approximately 10 to 25 percent reduction in milk production may be noticed as a consequence of climate change. The variation in milk yield and quality causes economic losses which again are of concern for sustainability of the farmers in Karnataka. Figure describes the various impacts of heat stress on the reproductive ability and milk production in dairy cattle.

Increasing human population is also expected to pressurize the livestock sector as it ensures food security. However, heat stress is also reported to cause severe drop in meat quality and quantity.



Alterations in the meat pH, water holding capacity of the meat, flavor, carcass weight and hot carcass yield in animals due to environmental stress affect the meat storage and marketing thereby leading to production losses. Reproduction is another trait of high economic importance to be adversely affected by climate change. This trait is highly sensitive to both environmental and nutritional stress having severe impact on livestock farming.

Climate change also has an indirect impact on livestock production by influencing fodder and water availability. Reduction in crop/fodder yield and alteration in the nutritive value not only hampers the agricultural sector rather it has an equal impact on livestock. Increasing human encroachment into agricultural land is already a concern across various regions in Karnataka. Reduction in fodder yield would further aggravate the situation. Provision of ad libitum drinking water is one of the important ameliorative strategies to reduce impact of heat stress in livestock. However extreme environmental conditions over the past few years have led to the drying of several water resources across Karnataka. Thus, the animals are deprived of drinking water during harsh environments leading to severe reduction in their performance.

Over the past few years, Karnataka has experienced varying extreme climatic conditions like heavy rainfall, flood, and drought. Apart from the direct impact, these drastic variations in environment also enable the propagation and spread of various pathogenic vectors. Disease outbreaks are the immediate outcome of any natural calamity. Thus, the livestock are prone to several diseases affecting their performance. Thus, climate change has an impact on multiple aspects of livestock production thereby needing a multidisciplinary approach towards its amelioration.

Impact assessment on fisheries and oceans due to climate change

Vulnerability of coastal fisheries: According to climate change projections (Second National Communication – SNC) 2012, the daily extremes in the surface air temperature in India can intensify in the future. The special pattern of the change in the highest maximum temperature suggests warming of up to 1-2 degree centigrade towards the 2050s, which may exceed to 4.5 degree in most places towards the end of present century. Such climate change is predicted to have a range of direct and indirect impacts on marine and freshwater capture fisheries, with implications for fisheries- dependent economies, coastal communities and fisherfolk. In Karnataka, 30,713 fishermen families comprising 1,67,429 fisherfolk (Marine Fisheries Census, 2010) are dependent on fish and fishery- based industries. Climate change would impact the vulnerability of fishery-based livelihoods among coastal communities of Karnataka. Fisheries and fisherfolk in Karnataka may be impacted by several vulnerability factors such as sea level rise, thermal stratification, ocean acidification, precipitation and freshwater availability which could have implications on the productivity of marine and freshwater fish stocks. These direct physical parameters of climate change could also have indirect impacts on the fisheries sector e.g., sea level rise and intensity of storms could impact coastal communities and there could be displacement and migration of fisherfolk population. Sand mining is another crucial parameter in terms of coastal vulnerability along the coast.

Impact of climate change on fisheries and fishing communities

Destruction of coastal infrastructure

On account of sea level rise, many of the foreshore facilities such as jetty's, wharfs, harbors and other fish landing facilities along the coastline are likely to be submerged. In some cases, on account of extreme weather conditions such infrastructure could be destroyed. Hence, there is an immediate requirement to assess the vulnerability of these infrastructure and make necessary constructions at the earliest to provide sufficient number of foreshore facilities for the community. Further, on account of a large amount of sediment flow from the rivers, there is a possibility of sedimentation/deposition in the harbors/jetty areas, thereby reducing the depth. This requires continuous dredging to provide safe landing facility to the fishing boats.

Impact on islands

The Karnataka coastline has 94 islands such as Dev Bagh Island, Anjadiv Island, Kurumgad Island, Oyster Rock (Devgad Island), Sanyasi Island, Sadashivgad Island, Madlimgadh Island, Nethrani Island, Basavaraja Durga Island, Panna Island, Darya Bahadurgadh Island, St. Mary's Island, etc. Out of these, 23 islands are inhabited mostly by fishing community and farmers. Some of these islands have tremendous potential for tourism and fisheries. On account of sea level rise there is an imminent danger that these islands could be eroded or submerged over a period.

Erosion of coasts

Studies report erosion on the Karnataka coast to be due to direct wave action. In certain stretches, there is concentration of wave energy due to refraction and these areas are more vulnerable to erosion. Beaches adjacent to coast parallel rivers are also more vulnerable to erosion due to higher water tables that exist when the rivers flow full in monsoon.

Impact of climate change on forest sector

The Fifth Assessment report of the IPCC concluded that changes in climate have already caused impacts on natural and human systems on all continents in recent decades. Extinction risks are projected to increase under all RCP scenarios, with risk increasing as per the increasing magnitude of climate change. Further, medium to high emission scenarios (RCP 4.5 to RCP 8.5) pose high risk of abrupt and irreversible regional scale changes in composition, structure and functions of terrestrial ecosystems.

Forest ecosystems in India are under stress due to the high dependence of communities on forest resources in addition to growing climate extremes and climate variabilities such as high levels of warming, drought, water stress, El Nino, etc.

Impact of climate change on water sector

Fresh water availability in the hydrological cycle such as surface-water levels and groundwater recharge to aquifers is drastically changing worldwide as a result of the combined effects of anthropogenic interventions, natural variability and climate change (Rodell et al., 2018). The natural infiltration for groundwater recharge that occurs beyond a threshold level of precipitation can be negatively impacted by temporal variability of precipitation, changes in temperature, intense and fewer rainfall events, short monsoons and long dry spells. The other potential climate risks for groundwater include shifts in water table levels in unconfined aquifers, sea water intrusion to coastal aquifers and increased demand and depend on whether regions have humid or arid climate characteristics as well. In addition, elevated evapotranspiration rates result in changes in soil moisture and particularly increases the groundwater salinity. The non-climatic drivers that may impact groundwater include population growth, fooddemand, land use and vegetation change, groundwater pumping regimes, damming of rivers, and conversion of dry land agriculture to irrigation. As such, climate change poses as a potential stressor ofgroundwater resources and its effects on the availability of groundwater need to be understood and determined (Taylor et al, 2013).

CHAPTER 3

Climate Sensitive Issue/Diseases Prevalent in Karnataka

Climate change and other weather parameters have significant impact on vector borne diseases such as Malaria, Dengue, Chikungunya, Japanese Encephalitis, kala- azar, and filariasis. Karnataka has made significant progress in reducing the Malaria burden through the effective implementation of the National Vector Borne Disease Control Programme (NVBDCP). Malaria problem is currently limited to few wards & villages in Mangaluru city & Upper Krishna Project (UKP) area of Vijayapura respectively.

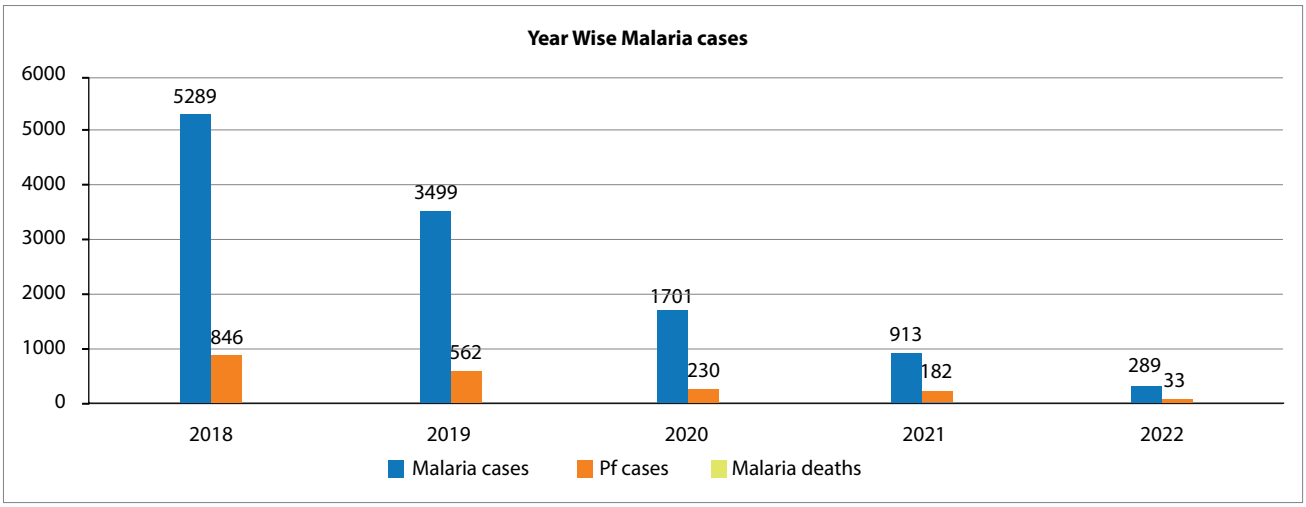
With the objective of achieving the set goal of Malaria Elimination in Karnataka by 2025, specific and focused activities are being implemented to sustain the gains achieved so far. However, the incidence of Malaria among migrants is also addressed to prevent the local transmission.

Currently the State in Category – 1 i.e., Elimination Phase and the efforts are underway to progress towards Category – 0 i.e., Prevention of Re-establishment Phase.

It is pertinent here to mention that focused actions should be implemented to ensure that the gains achieved so far in Malaria Elimination are not hampered by climate change. Intermittent rains, heavy rainfall, extended monsoon periods, and floods increase the mosquito genic conditions and vector proliferation, facilitating the disease transmission. The interplay of climatic factors influences the transmission dynamics.

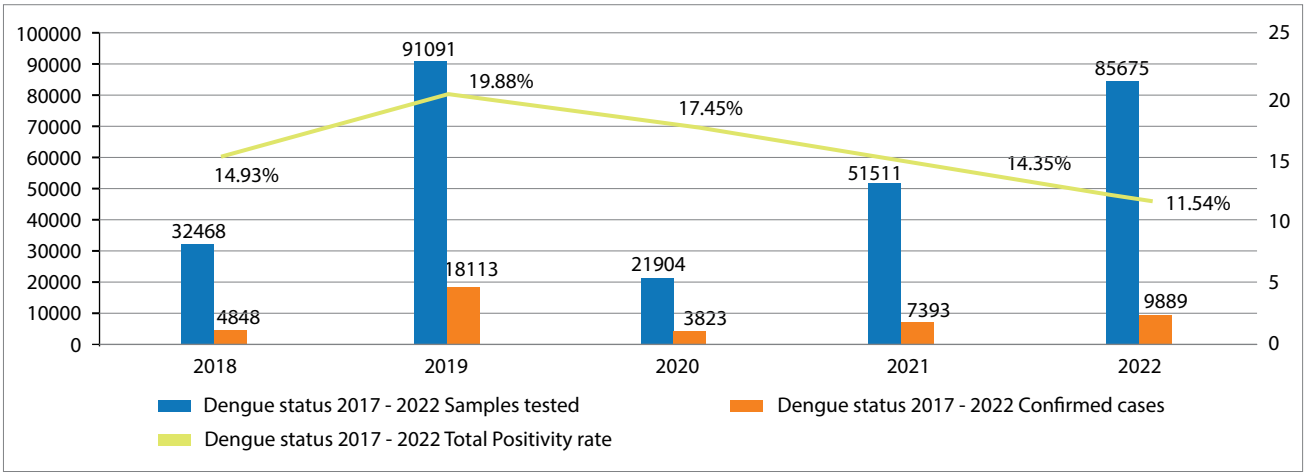
The State is progressing towards achieving the goal of Elimination of Lymphatic Filariasis by 2030. Nine filaria endemic districts in Karnataka are under various stages of Filaria Elimination.

Figure 2: Distribution of Malaria positive cases (2018-2022)



Further, the vectorial capacity of the vectors transmitting dengue/chikungunya, Japanese Encephalitis & Elephantiasis are greatly influenced by the climatic factors like rainfall pattern, temperature, humidity, etc., Hence, the activities under Climate Change & Human Health shall ensure that the gains achieved so far in prevention & control of vector borne diseases are sustained as well the set goals are achieved.

Figure 3: Distribution of Dengue positive cases (2018-2022)



Tuberculosis (TB)

Climate change affects tuberculosis through diverse pathways: changes in climatic factors like temperature, humidity, and precipitation influence host response through alterations in vitamin D distribution, ultraviolet radiation, malnutrition, and other risk factors. The rise in extreme climatic events induces population displacement resulting in a greater number of vulnerable and risk populations of tuberculosis. It creates a conducive environment for tuberculosis transmission and development of active tuberculosis and disrupts tuberculosis diagnosis and treatment services. Therefore, it stands to reason that climate change affects tuberculosis, particularly in highly vulnerable countries and areas.

With the increasing global urbanization, transportation-related emissions and increased energy consumption, air pollution has become a global problem which is also being linked to increased TB- related hospital admissions and deaths.

Air pollutants when inhaled, suppress the natural defense barriers of the respiratory tract by inhibiting macrophage action and muco-ciliary clearance, and initiating a chronic inflammatory response through the generation of inflammatory mediators and free-radicals, thereby increasing susceptibility to infections and sensitivity to allergens. Epidemiological research shows that tuberculosis is more prevalent in people exposed to air pollution, especially indoor air pollution in homes where, for example, firewood or charcoal is used to cook. Exposure to PM2.5, PM10, NO_2 and SO_2 air pollutants was found to be associated with an increased incidence of PTB.

State Performance

Year	Population in lakhs	Presumptive Examination Rate	Annualized Total TB Case Notification Rate			Treatment Success rate	
			Public	Private	Total	New cases	Re-treatment cases
2015	643	864	96	8	104	82%	64%
2016	650	865	92	9	101	84%	67%
2017	658	982	105	18	123	85%	68%
2018	668	1144	105	20	125	85%	68%
2019	676	1547	108	27	135	85%	64%
2020	704	661	69	25	94	81%	74%
2021	716	668	66	24	90	82%	76%
2022	725	1460	81	28	110	82%	74%

Year	Target for Public Sector	Number Notified by Public Sector	Percentage Achievement Public Sector	Target for Private Sector	Number Notified by Private Sector	% Achievement for Private Sector	Target for Total (Public + Private)	Number Notified by Total (Public + Private)	Percentage Achievement for Total
2015		60909			5065				
2016		60051			6070				
2017	60000	74631	124%	40000	12706	32%	100000	87337	87%
2018	60927	69904	114%	58000	13286	23%	118927	83190	70%
2019	75000	71998	96%	55000	19320	35%	130000	91318	70%
2020	80000	48722	61%	55000	17259	31%	135000	65981	49%
2021	135000	72699	54%	55000	19727	35%	80000	72713	66%
2022	65,000	59414	91%	35,000	20,720	59%	1,00,000	80389	80%

Mental Health

Climate change is leading to more frequent and extreme weather events such as floods and storms. People living through these can be exposed to potentially traumatic events such as witnessing serious injury or death. As a result, many people will experience higher levels of psychological distress and a minority may develop more serious mental health problems, such as post- traumatic stress disorder (PTSD), depression, or substance use disorders.

Extreme weather events can also have impacts on some of the social and economic determinants of mental health by leading to unemployment, homelessness, or food and water insecurity. This can, in turn, also detrimentally affect mental health.

Table 2: Status of Mental Health Diseases as reported by Mental Health Programme, Karnataka

Sl. No.	Year	Severe Mental Disorders	Common Mental Disorders	Alcohol, Substance Abuse	Other Psychiatric Disorders	Suicide Attempt Cases	Epilepsy
1	2019-2020	193717	352880	96301	20667	22983	275328
2	2020-2021	384106	701761	192155	40900	45851	544942
3	2021-2022	764816	1396498	383304	81784	91503	1080381

Sl. No.	Year	Developmental Disorders	Behavioural Disorders	Emotional Disorders	Dementia	Others	TOTAL
1	2019-2020	28065	6709	8523	6786	24683	1036642
2	2020-2021	55384	13415	17019	13560	49358	2058451
3	2021-2022	110749	26822	34037	27111	98468	4095473

Air Borne and Cardio-Respiratory Illnesses

Climate change influences various illnesses caused by pathogens and transmitted through the air including respiratory tract infections like asthma, rhino-sinusitis, chronic obstructive pulmonary diseases (COPD), respiratory viral diseases (Avian Influenza) & circulatory collapse posing danger to cardiac patients. Environmental factors influence the efficacy of airborne disease transmission; the most evident environmental conditions are temperature and relative humidity. The cited reasons are poor air quality, high ozone, dust storms, extreme heat, desertification, alteration of allergens, change in timing and duration of survival and transmission cycle of respiratory virus, alteration in bird migration. Further the other contributory factors are demographic factors (age, sex, immunity status, pregnant women, prevailing endemic illnesses etc) low socio-economic status, overcrowding, poor hygienic conditions, accessibilities to health care facilities, population with tuberculosis, immune- compromised level, or mentally or physically challenged people.

Waterborne & Foodborne diseases

Caused by the ingestion of contaminated water containing pathogenic bacteria or viruses; includes cholera, typhoid, hepatitis, dysentery and others caused from micro- organisms such as Vibrio vulnificus and Vibrio cholera, E.coli, Campylobacter, Salmonella, Cryptosporidium, Giardia, Yersinia, Legionella are some climate-dependent infectious diseases. The increase in temperature is seen to be associated with increased survival and abundance of micro-organisms. The decreased precipitation and drought result in decrease availability of safe water, reuse of wastewater, contamination of water sources, transmission from vertebrate to human or human to human etc. Flooding cause contamination of water source as well as disruption of sewage disposal system, further contributors are population displacement, overcrowding, poor sanitation and hygiene, subsequent faeco-oral contamination and spread of pathogens etc.

Sl. No.	Year	Acute Diarrhoeal Disease (including acute gastroenteritis)	Bacillary Dysentery	Viral Hepatitis	Enteric Fever	Acute Respiratory Infection (ARI)/Influenza Like Illness (ILI)	Pneumonia
1	2018	1003769	140067	24431	306922	3209351	51105
2	2019	1029002	127918	53461	336936	3151167	48693
3	2020	581306	79546	27279	135562	1441596	22322
4	2021	334389	48162	9167	73721	829241	10165
5	2022	122189	44866	1822	74947	374216	20276

Source: IDSP.

Drought, Storms and Floods

Climate change can result in more hot days, more periods of drought and dust storms, more periods of heavy rains (precipitation), and consequent flooding. These may adversely affect health directly through drowning, injuries, hypothermia, hyperthermia, 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., leptospirosis, vector-borne disease, cholera and also mental illnesses. The reason primarily is due to contamination of water, disruption of water purification and sewage disposal.

Health Impacts of floods are immediate deaths and injuries, Non-specific increases in mortality. It contributes to infectious diseases such as leptospirosis, hepatitis, diarrheal, respiratory, and vector- borne diseases. Floods are exposure to toxic substances, mental health effects and indirect effects of increased demands on health systems.

Heat-Stress and Related Illness

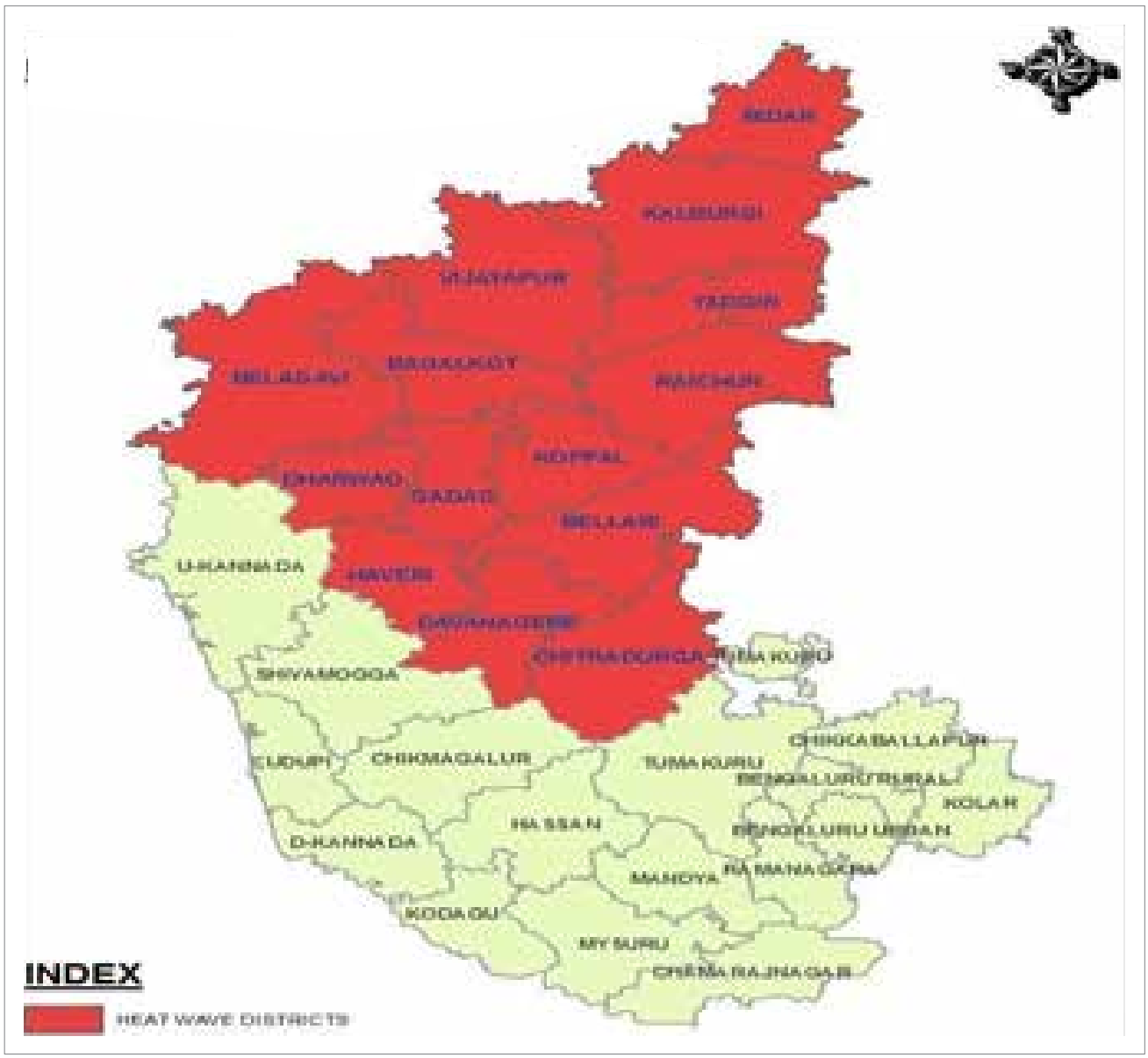
The IPCC Special Report on Extreme Events (SREX) has mentioned that there has been an overall decrease in the number of cold days and nights, and an overall increase in the number of warm days and nights, at the global scale. If there has been an increase in daily maximum temperatures, resulting in increase in number of heat-related illnesses. As per the basic processes of human thermoregulation, If the body temperature rises above 38°C (heat exhaustion), physical and cognitive functions are impaired; above 40.6°C (heat stroke), risks of organ damage, loss of consciousness, and death increase sharply. The factors which interplay in occurrence of these morbidity and mortality majorly are vulnerable population and vulnerable regions.

The vulnerable population implies the demography (extremes of age, sex, population density, and pregnant women), Health Status (proportion of malnourished, population with infectious and chronic diseases, mentally or physically disabled people), socio-economic status (poor/marginalized- more vulnerable), type of occupation or socio-cultural practices. The vulnerable regions imply unplanned urban housing, proportion of slums, drought risk zones, water- stressed zones, food-insecure zones and remote rural areas.

Numerous studies have reported increase in temperature-related morbidity (hospital admissions or emergency presentations), events due to cardiovascular, respiratory, and kidney diseases. These impacts have been related to the duration and intensity of heat. Health risks during heat extremes are greater in people who are physically active.

Karnataka, even though reported less mortality due to heat wave, certain parts of North Interior Karnataka remain vulnerable to heat wave as many of these are bordering districts of Telangana and Andhra Pradesh.

Figure 4: Karnataka districts likely to be affected by heat wave



CHAPTER 4
Vision, Goal and Objectives

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

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

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

Specific Objectives

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

Objective 2: To strengthen the 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 state, district and Local Self Government level.

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 state.

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

CHAPTER 5
Organisational Structure

ORGANISATIONAL STRUCTURE

NATIONAL LEVEL

Key Nodal Agency
Head, NPCCHH
(NCDC, MoHFW)

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

STATE LEVEL

Key Nodal Point
(SNO-NPCCHH)

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

DISTRICT LEVEL

Key Nodal Point
(DNO-NPCCHH)

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

A. State Level - Governing Body - Environmental Health

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

Hon'ble Minister (Health)	Chairperson
Principal Secretary Health	Vice Chairperson
Director of Health Services	Member Secretary
Mission Director, NHM	Member
Director, Medical Education	Member
Regional Director, H&FW	Member

B. State Level Task Force - Environmental Health

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

Principal Secretary Health	Chairperson
Director of Health Services	Vice Chairperson
Public Health Expert from State Health Department	Nodal Officer
Director, ICMR institute/centre	Member
Director, Meteorological department of State	Member
Chairperson, Pollution Control Board	Member
Chairperson, State Disaster Management Authority	Member
State Surveillance Officers	Member
Environmental Engineer/Scientist from MOEFCC	Member
Secretary, Agricultural Department	Member
Secretary, State Groundwater Board	Member

Roles and Responsibilities of the State/UT Environmental Health Cell

- Preparation and Implementation of State Action Plan for Climate Change and Human Health
- Conduct Vulnerability assessment and risk mapping for commonly occurring climate sensitive illnesses in the state/UT.
- Assessment of needs for health care professionals (like training, capacity building) and organise training, workshop and meetings.
- Maintain State and District level data on physical, financial, epidemiological profile for climate sensitive illnesses.

- Ensure convergence with NHM activities and other related programs in the State/District
- Monitor programme, Review meetings and Field observations.
- Timely issue of warning/alerts to health professionals and related stakeholders as well as general public through campaign or using mass media (Electronic or printed)
- Social mobilization against preventive measures through involvement of women's self-help groups, community leaders, NGOs etc.
- Advocacy and public awareness through media (Street Plays, folk methods, wall paintings, hoardings etc.)
- Conduction of operational research and evaluation studies for the Climate change and its impact on human health.

C. District Level

- District level nodal officers were identified and given complete charge for coordination and implementation of NPCCHH programme at district level. Deputy District medical officers who are in charge of NPCDCS programme is given the full charge as DNOs. (Details Annexed).
- District Environmental Health Cells were constituted in all the districts under the Chairpersonship of District Medical Officer. All the district programme officers and consultants of concerned and allied programmes are the members this cell and their roles and responsibilities are as below.
- Roles and Responsibilities of the District Environmental Health Cell:
  - Preparation and Implementation of District Action Plan for Climate Change and Human Health
  - Conduct Vulnerability assessment and risk mapping for commonly occurring climate sensitive illnesses in the district
  - Maintain and update district database of illnesses identified in the district
  - Assess needs for health care professionals and conduct sub-district/CHC level training/workshop and meetings for capacity building
  - Ensure appointment of contractual staff and engage them in the assigned task of data management under the NAPCCHH Maintain District level data on physical, financial, epidemiological.

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

Define Ambient (Outdoor) Air Pollution and Household (Indoor) Air Pollution

Outdoor air is often referred to as ambient air. The common sources of outdoor air pollution are emissions caused by combustion processes from motor vehicles, solid fuel burning and industries. Other pollution sources include smoke from bushfires, windblown dust, and biogenic emissions from vegetation (pollen and mould spores).

Just like outdoor air pollution, indoor air pollution can pose a risk to health. As we spend more time in our homes, it is important that the air is as clean as possible. Indoor air pollution can come from sources outside the home, such as emissions from transport or smoke from neighboring wood heaters, and from other sources within homes.

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

Prominent causes of Ambient Air Pollution in Karnataka:

1. Pollution by Automobiles
2. Industrial Emission

Prominent causes of Household Air Pollution in Karnataka:

1. Use of biomass, kerosene as fuel for cooking
2. Burning of waste, cow dung, coal

Other factors contributing to increase/decrease of Ambient/Household air pollution in the polluted cities:

1. Diesel Generators
2. Incomplete combustion

Health consequences of air pollution

Exposure to high levels of air pollution can cause a variety of adverse health outcomes. It increases the risk of respiratory infections, heart diseases and lung cancer. Both short- and long-term exposure to air pollutants have been associated with health impacts. More severe impacts affect people who are already ill. Children, the elderly and poor people are more susceptible. The most health-harmful pollutants closely associated with excessive premature mortality – are fine PM2.5 particles that penetrate deep into lung passageways.

Air Pollution and Climate Change

Air pollution and climate change affect each other through complex interactions in the atmosphere. Air pollution is intricately linked with climate change because both problems come largely from the same sources, such as emissions from burning fossil fuels. Both are threats to people's health and the environment worldwide.

Climate change affects air quality, which in turn can lead to adverse health outcomes. Disruptions to weather patterns influence our air quality by increasing and distributing air pollutants, such as ground- level ozone, fine particulates, wildfire smoke, and dust. Changes to weather seasons also impact the production, distribution, and severity of airborne allergens.

Air pollution exposure is associated with oxidative stress and inflammation in human cells, which may lay a foundation for chronic diseases and cancer. In 2013, the International Agency for Research on Cancer of the World Health Organization (WHO) classified air pollution as a human carcinogen.

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

Names of Cities identified under National Clean Air Program (NCAP) in the Karnataka

Bengaluru, Devanagare, Gulburga, Dhakshin Kannada and Hubli Dharwad.

1. Awareness Generation

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

Table 3: Sensitisation workshops

Various levels of Training	Topics	Timeline
Sensitization workshops for State Level officers	Introduction Air pollution its impact Role and responsibilities of state and regional level officers	October-November
Sensitization workshops for District Level officers	Introduction Air pollution its impact Role and responsibilities of District level officers	December
Panchayati Raj Institute Workshops	Prevention measures of Air pollution Role and responsibilities of PRI	January

Table 4: IEC Plan for next five years

Sl. No.	Indicator Statement	Indicator	Target 2022-23	Target 2023-24	Target 2024-25	Target 2025-26	Target 2026-27
1	IEC campaigns	Percentage of Districts implemented IEC campaign on heat related illnesses	50%	100%	100%	100%	100%
2	PRI and VHNC sensitization	Percentage of Districts included climate sensitive issues in the VHSNCs	25%	50%	75%	100%	100%
3	Community participation	Sensitization of rural population for Air pollution	Pilot study in one district	5 districts	50 %	75 %	100%

IEC activities for Air pollution

- At least 1-2 Wall Poster disseminated in all healthcare facilities.
- Social Media – active circulation of audio-video clips and poster slideshow in prominent social media handles.
- Radio jingles during March to July in high priority districts
- Sensitization workshops for district , state and regional level officers
- Community participation through meetings, heat related illness education in school and panchayati raj institutes

Public Health Advisories

Health advisories (bit.ly/NPCCHHPrg) are issued to alert population of potential harmful impact of impending environmental phenomena like cold wave/frost, heat wave and elevated air pollution. Advisories are issued at central level and forwarded to Districts through State/UTs for public dissemination.

Table 5: Observation of the environment-health days

Day	Activities
World Environmental Day Clean air for blue skies	• IEC Campaigns • Workshops for district Nodal officers on Air pollution and its impact on health and strategies to reduce to impact of air pollution

2. Capacity Building

Capacity building efforts include developing the technical skills and institutional capability in developing countries and economies in transition to enable them to participate in all aspects of adaptation to, mitigation of, and research on climate change. Trainings, workshops, and meetings are very important to sensitise and update target groups on air pollution and its health impacts and various health adaptation mechanisms.

Some of the priority groups/human resource working in health sector and other departments are targeted to be trained on the health problems of air pollution, such as:

- District nodal officers-CC
- Designated nodal officers related to surveillance in the context of air pollution
- Medical Officers
- Other health professionals like nursing officers, pharmacists, and community health care workers such as ANMs, ASHAs, MPWs, etc. Human resource from other departments like Panchayati Raj Institution.

Table 6: Training Calendar

Type of Training	Participants	Content of Training	Timeline
State Level ToT	State Level officers, Regional level officers, District level officers	Air pollution its impact and Surveillance	August
District Level Training	District level supervisors, THO	Air pollution its impact and Surveillance	September

Type of Training	Participants	Content of Training	Timeline
Medical Officer Training	Medical officers	Air pollution its impact and Surveillance	October
Paramedical staff training	MPW, ANM, LHV, etc	Air pollution its impact and Surveillance	November
Panchayat Raj Institute training	PRI members	Awareness generation	December

ARI Surveillance Activity at State Level

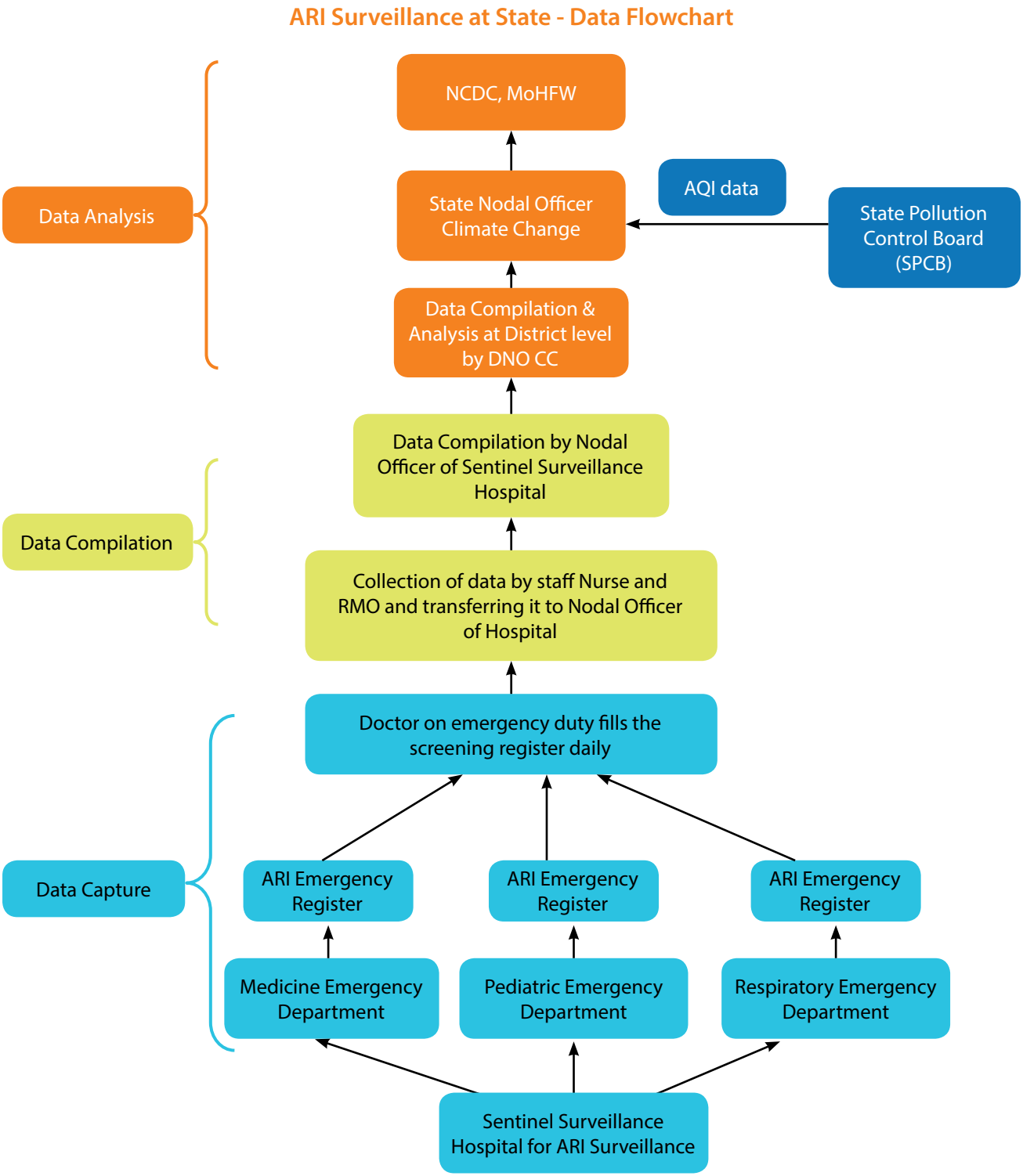


Table 7: Details of Sentinel hospitals identified for ARI surveillance activity

Name of District	Name of City	Name of Hospital	Public or Private	Name of Nodal person	Contact information
Bangalore Urban	Bangalore	Indira Gandhi Institute of Child Health	Public	Dr. Maaz Ahmed	9902478708
	Bangalore	K C General Hospital	Public	Dr. K.G. Suresh	9986121101
Davanagere	Davangere	CG Hopital Davangere	Public	Dr. Hemanth	9901727860
Kalburgi	Kalburgi	GIMS Klaburagi	Public	Dr. S.N. Mani Devi Karampudi	7996109104
Dakshina Kannada	Mangalore	Wenlock Hospital	Public	Dr. Vijay Kumar	9448216867
Hubli - Dharwad	Dharwad	District Hospital, Dharwad	Public	Dr. Kiran Kulkarni	7411886637

Roles and responsibility of a few key members of task force

	Responsibilities
SNO	• 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 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 • 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
DNO	• Ensure IEC dissemination to community level • Facilitate community level IEC activities • Conduct training for Block health officers, Medical officer, Sentinel hospital nodal officers with relevant training manuals • Conduct training of vulnerable groups: police officers, outdoor works, women, children

	Responsibilities
	• 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 analyzed monthly report to SNO, NPCCHH, Hq 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	• 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, Hq
Block health officer	• Conduct community level IEC activities • Ensure training of medical officers • Organize PRI sensitization workshop and training for vulnerable groups
Medical officer	• Conduct health facility-based IEC activities • Support community level IEC activities • Be aware of AQI levels and health impact of air pollution • Ensure necessary health facility preparedness in early diagnosis and management of cases
Panchayati Raj Institutions	• Conduct community level IEC activities

Public Health Intervention

- Strengthen surveillance and monitor programme for Hospital admission as well as outpatient for respiratory illnesses, influenza and allergic cases.
- Enhance vaccination programs and Vaccination Campaign for vaccine-preventable air borne and respiratory diseases.
- Ensure availability of logistics, equipment and other treatment modalities including drugs at all level of health care.
- Ensure & provide logistic support and adequate supplies for case management at all levels of health care and also under 'Emergency response Plan' in case of any disaster where air borne illnesses may occur as an outbreak.
- Monitor health outcomes with early warning system related to extreme weather events/high risk seasons with other organisation/stakeholders.
- Capacity building and increasing awareness for individuals, communities, health care workers through involvement of various media as well as campaigns and training workshops.
- Develop Standard treatment guidelines for allergen management based on exposure forecasts – air quality, allergens, dust, etc.

Other sector's Intervention

1. Department of Forest, Ecology and Environment Department, GoK

- Ensure that State and District Pollution Control bodies set standards for industry-specific emission and effluent, monitor levels of pollutants and enforce penalties.
- Enforce stricter air quality standards for pollution.
- Strict implementation of Environment Impact Assessments (EIA) to minimize the adverse impact of industrial activities on the environment.
- Effective implementation of 'National Green Tribunal' directives on trash burning/waste disposal from different sources.
- Take strict measures for unregulated sectors (such as brick kilns, trashburning, stone crushing) which contributes to ambient air pollution.
- To promote environment awareness and carry out action-based programme for protection and improvement of environment in schools through NGC (National Green Corps).
- Increase in the awareness by conducting activities such as organizing seminars, workshops, campaigns, street plays, tree plantations, debate, painting, drawing competitions and other environment related activities to school children and general public are usually carried out by KSPCB in collaboration with NGO's/Trusts/Eco-clubs and other organizations through the year.
- The Central Pollution Control Board (CPCB) has developed a Comprehensive Environmental Pollution Index (CEPI) scores of the critically polluted industrial clusters/areas to consider the projects for environmental clearance and to improve the quality of environment in these areas.

2. Department of Public Instruction

- Regular screening of school children for early detection diseases, which can be attributed to the existing air pollution
- Inclusion of harmful health effects of environmental pollution (Ambient Air Pollution AAP and Household Air Pollution HAP) in the school curriculum, including current policies and mitigation practices that are designed to reduce air pollution.
- Improving indoor air quality of educational institutions nationwide.
- Improve walk ability and access to educational institutions by non- motorised transport, thus minimizing the air pollution in the school surroundings.
- Sensitize students and teachers on using the Air Quality Index in planning outdoor school activities

3. Agriculture Department, GoK

- Policy in place to promote multiple uses of crop residues and prevent their on-farm burning.

4. Rural Development and Panchayat Raj Department

- Include health promotion (like clean air) guidelines as part of "Nirmal Gram Puraskar"/Model Villages evaluation criteria/create alternate awards with specific criteria based on air pollution.
- Under integrated rural development, develop and implement micro level planning policies/schemes with Panchayati Raj Institutions to address the social determinants of health for reducing the hazards of air pollution (lack of education, unemployment, poverty, poor housing conditions, etc.)

5. Urban Development Department, GoK and Karnataka Pollution Control Board

- Formulate/revise urban transport policy which reduces vehicular pollution (Include Health Promoting city guidelines in the "100 Smart Cities").
- Develop and implement policies to reduce indoor air pollution (like disincentivizing diesel gensets and promoting clean cooking fuels thus 'making available clean and making clean available').
- Enforcement of ban on burning garbage or biomass (especially duringwinter months).
- Help cities develop air pollution alerts and emergency plans based on the Air Quality Index or KSPCB continuous air monitoring data.

6. Karnataka Renewable Energy Development Ltd

- Develop policies for truly clean chulhas (cook stoves) and to support further research and development.
- Research and development of other non-conventional/renewable sources of energy and programmes relating thereto, including locally generated power to supply cooking appliances.
- Support and strengthen Integrated Rural Energy Programme (IREP) with emphasis on indoor air pollution.
- Develop State Policy on clean Biofuels (biogas, ethanol, etc) and set up State Biofuels Development Board for strengthening the existing institutional mechanism and overall coordination. Strengthening the existing institutional mechanism and overall coordination of State Biofuels Development Board.
- Create a state consensus action plan for replacing biomass fuels with alternative clean fuels.

7. Karnataka State Industrial and infrastructure development corporation limited (KSIIDC) and Food, Civil Supplies and Consumer Affairs Department

- Expand new initiatives to increase the availability of LPG and other cleaner fuels to the rural & tribal areas
- Expand the piped natural gas network to reach out to a larger population
- Better target LPG subsidies to poorer households

8. Energy Department, GoK

- Promote the development of more efficient cooking devices
- Evaluate the potential for electric cooking appliances to substitute for biomass and LPG

9. Karnataka State Road Transport Corporation

- Ensure effective implementation of New Motor Vehicles Act
- Ensure proper engine checks for vehicles to assess pollution levels

10. Department of Information and Public Relations

- Develop hard hitting, high impact and cost-effective media plans, strategies and conduct activities for awareness generation on harmful effects of air pollution and options for their mitigation.
- Ensure enforcement of relevant provisions in the Cable Television Networks Act to regulate advertisements of tobacco etc.

- Involvement of Songs & Drama division; Department of Field Publicity to promote health promotion activity for air pollution and its impact on respiratory and NCD risk factors.
- Develop policies to ensure that media houses allocate free airtime for health promotion messages as a corporate social responsibility activity

11. Department of Information technology, Biotechnology and Science and technology, GoK)

- Use of mobile phones to encourage healthy choices and warn people about air pollution (both AAP and HAP, using Air Quality Index)
- Establish Telemedicine linkages between different levels of health care

12. Department of Labor, GoK

- Ensure regular health check- ups for early screening of pollution related diseases.
- Frame guidelines and conduct workshops for health promoting workplaces, (like guidelines on indoor air quality), Strengthen the capacity of ESI Hospitals to cater to the growing burden of respiratory diseases and NCDs.
- Showcase and support companies which employ workplace policies that can reduce vehicular travel such as telecommuting, or placing the workplace in sites that are accessible through public transportation (ex.Metro) or non-motorised transport.

13. Women and Child Development Department, GoK

- Advocate through Self Help Groups and Mahila Mandals for protection of women and children from significant exposure to smoke from biomass while inside the house.
- Awareness raising can be done to improve household ventilation to reduce smoke inhalation from lighting (ex. kerosene) or cooking fuel.

14. Finance Department, GoK

Analysis of the economic and financial implications of the health and other impacts of air pollution.

15. Department of Law, GoK

- Support enforcement on bans of burning trash for heating or as a way of disposal.

CHAPTER 7

Health Action Plan on Heat Related Illnesses

Heat-related illnesses (HRI) encompass a spectrum of disorders from heat syncope, muscle cramps, and heat exhaustion to a life-threatening emergency such as heat stroke. These illnesses arise when there is a disruption in the regulation of the body's temperature because heat input from the environment and body metabolism is increased from the skin via radiation, evaporation, and convection.

In India, a heat wave is considered if the maximum temperature of a station reaches at least 40°C or more for plains, 37°C or more for coastal stations and at least 30°C or more for hilly regions. 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 ≥45°C
- *Severe Heat Wave:* When actual maximum temperature ≥47°C

To declare a heat wave, the above criteria should be met in 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 types 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

Heat Vulnerable districts of Karnataka

1. Bidar
2. Kalburgi
3. Yadgir
4. Vijayapur
5. Bagalkot
6. Davanagar

7. Chaitradurga
8. Belagavi
9. Raichur
10. Koppal
11. Dharwad
12. Gadog
13. Bellavi
14. Haveri

Heat Wave Action Plan in Karnataka

The Heat-Wave Action plan provides a framework for implementation, coordination and evaluation of extreme heat response activities in districts and cities in state that reduces the negative impact of extreme heat. The heat action plan's primary objective is to alert those populations at risk of heat-related illness in places where extreme heat conditions either exist or are imminent, and to take appropriate precautions, which are at high risk.

Figure 5: Heatwave prone districts of Karnataka

Health Adaptation Plan

The heat-wave action plan is intended to mobilize individuals and communities to help protect their neighbours, friends, relatives, and themselves against avoidable health problems during spells of very hot weather. Broadcast media and alerting agencies may also find this plan useful. Severe and extended heat-waves can also cause disruption to general, social and economic services.

Types of Heat Related Illnesses

Clinical Entity	Age Range	Setting	Cardinal Symptoms	Cardinal/Important Signs	Pertinent Negative Findings
Heat rash/ prickly heat/ Miliaria	All, but frequently children	Hot environment; +/- insulating clothing or swaddling (wrap in tight clothes)	**ITCHY RASH** with **SMALL RED BUMPS** at pores in the skin. As seen in the setting of heat exposure; bumps can sometimes be filled with clear or white fluid	**DIFFUSED RED COLOUR SKIN OR VESICULAR RASH**, itching of the skin without visible eruption	**NOT FOCALLY DISTRIBUTED** like a contact dermatitis
Heat cramps	All	Hot environment, **TYPICALLY WITH EXERTION**, +/- insulating clothing	**PAINFUL SPASMS** of large and frequently used muscle groups	Uncomfortable appearance, may have **DIFFICULTY FULLY EXTENDING AFFECTED LIMBS/ JOINTS**	No contaminated wounds/tetanus exposure; no seizure activity
Heat exhaustion	All	Hot environment; +/- exertion; +/- insulating clothing or swaddling (wrap 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 headedness followed by a **BRIEF LOSS OF CONSCIOUSNESS**	Brief, generalized loss of consciousness in hot setting, short period of disorientation, if any	**NO SEIZURE ACTIVITY**, no loss of bowel or bladder continence, no focal weakness, no difficulties in food swallowing
Heat Stroke	All	Hot environment; +/- exertion; +/- insulating clothing or swaddling (wrap in a tight clothes)	Severe overheating; profound weakness; **DISORIENTATION, NOT FULLY ALERT, CONVULSION, OR OTHER ALTERED MENTAL STATUS**	Flushed, **DRY SKIN** (not always), **CORE TEMP** ≥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

Early warning system and inter-agency emergency response plan:

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

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

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

1. Awareness Generation

A. Information, Education Communication (IEC) Activities

Target population

- Vulnerable districts/hotspots: District like Bidar, Raichur, Yadgiri, Balgalkote, Kalburgi.
- Vulnerable groups (Primarily Children, women, older adults, traffic police, outdoor workers/vendors).

Table 8: Annual IEC dissemination plan for heat related illnesses and their health impact under NPCCHH

IEC type	Material	Timeline	Mechanism
Advisory	Instructions with Do's and Don't	Seasonal	By email to DNO for further dissemination to health facilities
Early warning	Bulletins/advisory by IMD sent by NPCCHH	Seasonal	• Health department/other government website/ application
Posters	• Posters on heat and health impacts (English & Kannada)	Seasonal, as needed	• Printing of copies for state-level dissemination at health facilities, public places/buildings • By email to DNO for printing at district level and dissemination to health facilities, schools and other public/government buildings
Wall painting	Using available material	Planned during August-September	• In schools and selected colleges In health facilities
Hoardings	• Posters (above)	Seasonal, as needed	• At district, Taluk and Village levels.
Audio-Visual	• Audio Jingle • Video messages • Video message	Seasonal, as needed	• In schools and selected colleges. • In bus stops, railway stations and health facilities
Bus painting	Using available material	Seasonally as needed	With KSRTC and Corporation city Bus service
Social medial	All above material + Relevant activity updates	Seasonal, as needed	• Facebook and Twitter handle of state NPCCHH, NHM • WhatsApp groups (State DNO, Health facility group) • Interviews of Television and Radio both private and public

Table 9: IEC dissemination targets for next five years

Sl. No.	Indicator Statement	Indicator	Target 2022-23	Target 2023-24	Target 2024-25	Target 2025-26	Target 2026-27
1	IEC campaigns	Percentage of Districts implemented IEC campaign on heat related illnesses	50%	100%	100%	100%	100%
2	PRI and VHNC sensitization	Percentage of Districts included climate sensitive issues in the VHSNCs	25%	50%	75%	100%	100%
3	Community participation	Sensitization of rural population for HRI	Pilot study in one district	5 districts	50 %	75 %	100%

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 the districts through the state for public dissemination. District should ensure timely dissemination of health advisories.

Observance of important environment-health days

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

2. Capacity Building Activities

- Clinical management training of HRI for all Physician, district nodal officer and district epidemiologist
- Training for Surveillance of HRI and their reporting for district nodal officer, RMO outreach and district epidemiologist.
- Medical officer training for HRI Clinical management and Surveillance for HRI at district level.

Training material

Guidelines

a. National Programme on Climate Change and Human Health

Training modules

b. State-District level training modules

c. Medical officer training

d. Para medical officers & Health care workers

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

i. State-Level/District-Level Supporting Training institutes

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

ii. Annual training plan for Extreme Weather Events and Health under NPCCHH

Training Programme for	Trainer	Topics	Timeline
District level (DNO-CC, trainers)	State Level Trainers SNO-CC, Consultant	• Climate change and impact of extreme weather events in India • Formation of disaster management committees and plans • Health facility vulnerability, resilient measures and disaster preparedness • Disaster response in coordination with state/district disaster management authority • Post-disaster health impact assessment and response	February
Health facility level (MO of DH/CHC/PHC)	District Level Trainers DNO-CC	• Health facility disaster vulnerability assessment • Disaster management committee and plan • Climate resiliency measures (structural/functional) • Health facility preparedness for EWE/disaster response • Post-disaster surveillance and damage assessment	February
Community Health care workers (MPH, ASHA, ANM etc)	District Level Trainers, MO	• Climate change and health impact of extreme weather events • Disaster planning and response	February-March
Panchayati Raj Institutions	District level trainers, MO, Health care workers	• Climate change and health impact of extreme weather events • Disaster planning and response with community participation	February-April

3. Strengthening Health Sector Preparedness

i. Early warning

Dissemination of early warnings for Cold wave, Flood, Cyclone etc. to health facility level and community level

ii. Surveillance

a. Post-disaster health impact assessment

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

iii. Health Facility Preparedness

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

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

c. Formalize disaster management plan and committee

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

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

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

g. Establish Sustainable procurement committee

4. Surveillance Activities

The daily reporting of heat stroke diseases is started from 1 march to 31st July of every year. Every district is collecting information from their health facilities as per case definition.

- Daily monitoring of health-related illness from Joint Director of Health Services
- Report shared with NCDC , CEOH division New Delhi.
- Guidelines to all health facilities & district and municipal authorities on management of heat related illnesses – Establish heat stroke treatment room.
- Efforts to develop Heat Action Plan
- Coordination with IMD to develop EWS
- IEC for public
- District Level Death Investigation Committee

It should be three-member committee to confirm Heat Stroke Deaths.

This Committee will comprise of:

1. District Civil Surgeon
2. District Surveillance Officer
3. Experts – Physician/Paediatrician either from GMC or Public health department.

Every suspected death should be investigated & confirmed by District Committee within 3 days of the death.

5. Roles and Responsibilities

	Responsibilities
SNO	• Disseminate early warnings to district level • Finalization of IEC material and dissemination Plan • Formalize intersectoral coordination for disaster planning, management and response with SDMA/IMD and other response departments • Organize training of district level officers • Facilitate assessment and implement of climate resilient measures in health facilities • Review implementation of IEC, training and surveillance activities at all levels • Evaluate and update relevant section of SAPCCHH with support from State Task Force • Create organizational support and strengthen Environmental Health cell to implement NPCCHH vision, Goal and Objectives • Organize sensitization workshops for other stakeholders and line departments • Collaborate with academic institute/s for support in updating SAPCCHH, Surveillance activity monitoring, training of health care professionals, vulnerability assessment and applied research • Submit reports of activities on EWE and health under NPCCHH
DNO	• Disseminate early warning to 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

	Responsibilities
	• 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 • 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	• 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	• 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	• Conduct community level IEC activities • Community involvement in planning and demonstration of measure taken before-during-after an EWE

CHAPTER 8

Health Action Plan on Extreme Weather Event-Related Health Issues

A hazard is defined as any process, phenomenon or human activity that may cause loss of life, injury or other health impacts, property damage, social and economic disruption or environmental degradation; while risk is a measure of the expected losses (deaths, injuries, property, economic activity etc.) due to a hazard of a particular magnitude occurring in a given area over a specific time period.

Floods, droughts, cyclones, earthquakes and landslides have been a recurrent phenomenon in the history of the Indian sub-continent. About 60% of the landmass is prone to earthquakes of various intensities; over 40 million hectares is prone to floods; about 8% of the total area is prone to cyclones and 68% of the area is susceptible to drought.

However, whether the hazard constitutes a disaster or not depends on the risk or potential for losses involved in the affected area. According to the Disaster Management Act, 2005, a disaster is defined as "a catastrophe, mishap, calamity or grave occurrence in any area, arising from natural or manmade causes, or by accident or negligence which results in substantial loss of life or human suffering or damage to, and destruction of property, or damage to, or degradation of environment and is of such a nature or magnitude as to be beyond the coping capacity of the community of the affected area."

India has been experiencing an increasing number of climate change related natural disasters, resulting in extensive loss of lives, livelihoods, the environment and economy. During Kerala floods of 2018, almost 5.4 million people were affected while Cyclone Fani in Orissa affected almost 16.5 million people. These two disasters led to a total loss and damages of almost 5 billion USD.

Different disasters can be linked with different health implications, which are summarized in Table.

Table 10: Health implications associated with different types of climate change related disasters

Primary	Secondary	
Heavy Rainfall	• Floods • Flash floods • Urban floods	Injuries, water borne diseases, vector borne diseases, death, drowning, hypothermia, and animal bites Indirect (infected wounds, complications of injury, poisoning, poor mental health, communicable diseases, and starvation)
	• Landslides/slope failures	High mortality and few injuries: trauma and suffocation by entrapment
Dry spells/Low Rainfall	• Drought	Nutrition-related, Dust-related and airborne, migration-related
	• Desertification	
	• Forest fire	

Primary	Secondary	
Oceanic storms	• Cyclones	Trauma, Drowning, Injuries, gastroenteritis, vector-borne disease and acute respiratory illness
Winds	• Dust storms/Sandstorms	Respiratory problems, eye problems
	• Thunderstorms	Injuries, Thunderstorm asthma
	• Air Pollution	Respiratory Disorders, Cardiovascular Disorders, Ophthalmic Disorders
Temperature extremes	• Heat wave	Dehydration, Heat cramps, Heat stroke; accelerated respiratory disease & cardiovascular disease
	• Cold wave	Heart attacks, Injuries, frost nip and frost bite, Hypothermia, immersion foot, influenza, Norovirus, Asthma, Sore throats
	• Fires (urban, rural, industrial)	Burns, Mortality, wheezing, coughing, sore eyes, respiratory issues, heat induced illnesses, Carbon Monoxide poisoning
Lightening	• Lightening disaster	Mortality, Injury, Burn, Disability

General Disaster Profile

Floods

North-west Karnataka districts are experiencing floods due to excess rainwater released from Maharashtra and also experience heavy rainfall once every 4 to 5 years. This is projected to worsen under climate change even in the short-term. During the period from 3rd to 10th August 2019, the State received 224 mm of rainfall with an overall departure of (+) 279 % which is the highest for Karnataka in the last 118 years for the corresponding period. Some districts received rainfall more than 700% departure from normal during the period.

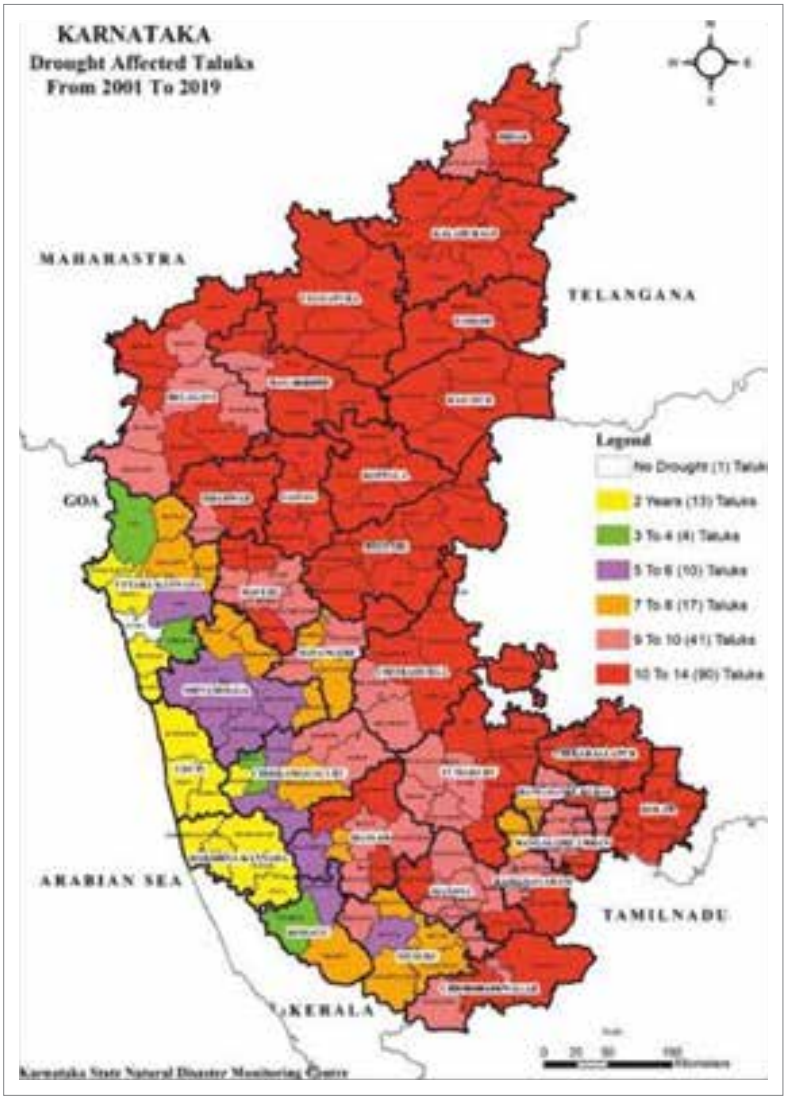
Drought

Nearly 68 per cent of the cultivable area in the state is vulnerable to drought.

Earthquake

As per the revised earthquake hazard mapping, 22.13% of the total geographical area is under moderate earthquake damage risk zone & remaining area of the state is under low

Figure 6: Drought affected Talukas in Karnataka (from 2001 to 2019)



Source: KSDMA

damage risk zone. The state of Karnataka has reported more than 500 earthquake tremors in the last three decades with most of them having low magnitude. It is found that the weak zones around the northern Karnataka bordering Maharashtra could cause heavy damages in future. The areas of the southern part of Karnataka are also not free from frequent tremors. The Karnataka state is categorized as moderate to low seismic risk zone.

Regional Issues

- Prolonged periods of increase in temperature has been seen in many areas.
- Rainfall peak events have increased. Coastline erosion has also been observed but more data is needed in this context.
- The temperature and sea level are constantly rising, affecting the ecosystems significantly. This in turn affects the sea catch and thus the nutrition of coastal population.
- Wind speed changes affect the spread of infectious agents causing the diseases.
- Increase in the cases of vector borne diseases in the past few years like malaria, dengue, chikungunya etc.
- Morbidity data for many diseases is missing, while hospital-based mortality data is present.
- Even non-communicable diseases incidence and severity is affected in the event of disasters due to hindrances in the supply chain of medicines.
- There is also an increase in injuries and violence against the vulnerable populations' post- disasters.
- Occupational health of industrial workers is affected due to changing temperatures,making them take longer and more frequent breaks during the day and at the same time increasing the hours of late-nightshifts.
- Accessibility to health care facilities and health workers is also decreased due to extreme weather events.
- Due to effect of disasters on animals, predators come in close contact with humans, causing loss of life.

Health Adaptation Plan for Disaster Management

I. Awareness Generation

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

A. IEC Campaign

a) Under the programme, awareness generation amongst all the relevant stakeholders including the common population, vulnerable communities, healthcare providers, and policymakers around the impacts of disaster events.

b) The districts are aimed to create awareness through Information, Education, and Communication Activities (IEC) through the development of locally and culturally more acceptable messages in

posters, audio, videos, organising public health events, and issuing advisories related to disaster management. The content for the IEC for disaster management will be provided by the State NPCCHH division. The role of the districts is to utilize these materials, translate the required material, and disseminate them at all levels.

c) Sensitization of the health professionals/communities on emerging climate-sensitive health impacts and diseases.

Observance of important environment-health days

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

1. Capacity Building

To strengthen the capacity of the healthcare system for disaster management

Training on disaster management is as follows:

Table 11: NPCCHH Training Plan at District Level

Training Programme	Trainer	Participants	Training Content
Medical Officers (3 Days)	DNO	MO (DH, CHC, PHC)	Extreme Weather events and Disaster Management
Community Health Care Workers (2 Days)	MO	Community Health Workers (MPHW, ASHA)	
Blocks (1 Day)	MO, MLHP	Village headman & 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	• Disseminate early warnings to the 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 implementation of climate-resilient measures in health facilities • Review implementation of IEC, training, and surveillance activities at all levels • Evaluate and update relevant sections of SAPCCHH with support from State Task Force • Create organizational support and strengthen the Environmental Health cell to implement NPCCHH vision, goal, and objectives • Organize sensitization workshops for other stakeholders and line departments • Collaborate with academic institute/s for support in updating SAPCCHH, surveillance activity monitoring, training of health care professionals, vulnerability assessment, and applied research • Submit reports of activities on EWE and health under NPCCHH
DNO	• Disseminate early warning to block and health facility level • Ensure IEC dissemination to the community level and facilitate community-level IEC activities • Organize training for block health officers and MO • Formalize intersectoral coordination for disaster planning, management, and response with SDMA/IMD and other response departments • Liaison with other departments for combined IEC campaigns, coordinated response and information sharing of health indicators for targeted action • Identification and communication of evacuation routes & relief camps • Support planning and management of health care services in relief camps • Provide necessary IEC on health and sanitation in relief camps training for block health officers, and medical officers with relevant training manuals • Conduct sensitization of vulnerable groups: police officers, outdoor workers, women, children, etc. • Organize IEC campaigns at the district level on the observance of important environment-health days • Facilitate disaster vulnerability assessments in health facilities and maintain records of such assessments and health facility damage due to EWE • Update DAPCCHH with support from District Task Force • Submit reports of activities on EWE and health under NPCCHH
Block Health Officer	• Conduct community-level IEC activities • Ensure training of medical officers • Organize PRI sensitization workshops and training for vulnerable groups • Facilitate disaster vulnerability assessments in health facilities and maintain records of such assessments and health facility damage due to EWE

	Responsibilities
Medical Officer	• Conduct health facility-based IEC activities • Support community-level IEC activities • Preparation of Disaster Management Plans and hospital safety plan • Assessment of health facilities in the context of climate change- extreme weather events • Identifying structural changes/retrofitting measures at the facility level to equip the healthcare facility • Ensuring routine monitoring and maintenance of support functions (Water quality, waste management) • Health facility preparedness for seasonal events
Panchayati Raj Institutions	• Conduct community-level IEC activities • Community involvement in planning and demonstration of measures taken before-during-after an EWE

CHAPTER 9

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

Weather variables: temperature, rainfall, humidity, floods, drought, wind, day light duration etc.

- Change in Vector population due to change in growth, survival, feeding habits, seasonality, breeding sites, resistance etc.
- Change in interaction of vector& pathogen due to change in susceptibility, Incubation period, or transmission
- Change in demography, migration, land –usage practices, water projects, agricultural practices etc.

Public health infrastructure and access to it.

Public Health Intervention

- Strengthen active and passive surveillance in priority districts.
- Strengthen sentinel hospitals for management of malaria and dengue.
- Identify programmatic gaps and filling them.
- Develop a model for forecasting of disease trend.
- Inter-sectoral collaboration for vector control
- Providing equipment and other related logistics for entomological surveillance
- Elimination and reduction of vector breeding sites.
- Encourage research on new safe and effective control measures
- Intersectoral collaboration strengthening
- To include for new treatments and diagnostic methods to education
- Outreach interventions as well as field interventions such as vector control
- Modifications to the built environment to help reduce the human health impact of infectious diseases.

Intervention by Community & Individual

1. Eliminate/control small and man made vector breeding sites Enhance community participation
2. House protection by using screening windows, doors and fencing the garden etc.
3. Use self-protection measures like protective clothing etc.

Adaptation measures for malaria and dengue

- Strengthen National Programs for control of vector borne diseases (NVBDCP)
- Strengthen surveillance for **malaria and dengue**
- Raise awareness among general population by mass media and campaign mode
- Ensure 'Environmental Health Impact Assessment' of new development projects
- Early warning system for malaria and dengue
- Enforce legislation and regulations of malaria and dengue

Health Adaptation Plan

1. Awareness Generation

a. Information, Education Communication (IEC) Activities

i. Target population

- **Areas identified** in under section a (above)
- **Vulnerable groups** (Primarily children, pregnant women, older adults, immunocompromised, outdoor workers/vendors)

ii. Annual IEC dissemination plan for Vector-borne diseases in context of climate change under NPCCHH, Karnataka

IEC type	Material	Timeline	Mechanism
Posters	• Posters on VBD and climate change (English/Hindi) bit.ly/NPCCHHIEC • May update posters made by state NVBDC • Posters on VBD and climate change (Delhii) (Annexure 6)	• After extreme weather events i.e. floods, cyclone, and other natural disaster i.e. earthquake/tsunami • Collaborate with NVBDCP	• Collaborate with NVBDCP
Wall painting	Using available material	Painted in June-July, Seasonally as needed	• In schools and selected colleges • In health facilities
Hoardings	• Posters in Delhii (above)	June-July, Seasonally as needed	• To be planned with hotspot Municipalities and District
Audio-Visual	• 3 Audio Jingles • Audio Jingle • 2 Video messages (Hindi, English) • Video message	June-July, Seasonally, as needed in case of extreme weather events	• Plan according to PIP guidelines 11 and in coordination with NVBDCP
Bus painting	• Using available material	Painted in June-July, Seasonally as needed	• With DTC and Corporation city Bus service

IEC type	Material	Timeline	Mechanism
Digital display	• Available GIF • Above mentioned video messages	June-July, Seasonally as needed	• Display in health facilities Public digital display boards in major cities
Social medial	All above material + Relevant activity update	June-July, Seasonally, as needed in case of extreme weather events	• Facebook and Twitter handle of state NPCCHH, NHM • WhatsApp groups (State DNO, Health facility group)

b. Observance of important environment-health days

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

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

2. Capacity Building Activities

i. Training material

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

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

Other training resources: NPCCHHchannelhttps://bit.ly/NPCCHHyt

- Training on climate change and its impact on VBD burden

ii. State-Level/District-Level Supporting Training institutes

State Institute of Health & Family Welfare: Contact person designation: SNO Karnataka

Training on Vector-borne diseases may be expanded to include other climate sensitive health issues specifically extreme weather events.

iii. Annual training plan for vector-borne diseases in context of climate change under NPCCHH, Karnataka

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

3. Strengthening Health Sector Preparedness

Integrate weather parameters with VBD surveillance under NVBDC at District level

- Monitor VBD with weather paramerts
- Initiate surveillance based on predicted expansion of vectors to pick up emerging foci with support form State Programme Officers (SPO) and District malaria Officers (DMO) should

i. Surveillance training: included under capacity building section

ii. VBD prevention and control measures

- Planning of indoor residual spray a month before peak of malaria cases based on historical data
- Management of new foci of transmission in the same way as other endemic areas.
- Epidemic preparedness especially after extreme weather events or natural disasters

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

Sl. No.	Department/Agency	Area of Collaboration	Specifics
1	NVBDCP, Karnataka	Overall guidance and policy formulation	• Guide and the state governments in resurgence and containment of any VBD
2	State Nodal Officer, Climate Change	To support the state govt. in control of VBDs particularly in climate sensitive states	• Oversee vector control measures • Oversee health sector preparedness • Oversee VBD surveillance, control in post-disaster situations in community and relief camps • Train DNO, DMO • Sensitization workshops to increase awareness on climate change and its impact on VBD
3	India Meteorological Department	To provide meteorological data as and when required	To help the state govt. in collaboration with any research institute, in analysis of relationship between climatic factors and a particular VBD so as to forewarn the impending outbreaks.
4	NGO at state and district level for reach to community	Heath education at community level	Conduct workshops for IEC activities for different level of staff in the identified areas in consultation with the state govts
5	State Programme Officer	Overall planning and execution of surveillance and intervention measures to control VBDs	Supervise and guide the DMOs in control of VBDs
6	State Entomologist	To provide guidance in vector control.	Generate data on fortnightly fluctuations in density of vector species so as to guide the state government in choosing appropriate time of IRS activities. To generate data on susceptibility status of disease vectors forusing appropriate insecticide forIRS/larvicide for vector control
7	Chief Medical Officer/ District Malaria Officer/Disease Surveillance officer	Execution of task assigned by the SPO	Supervise and guide surveillance and intervention measures for control of VBDs in the district
8	Media	To be vigilant for report of any upsurge/outbreak of any VBD	Impart health education to masses through print and audiovisuals means

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

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

Roles and responsibilities

State Climate Change & Human Health Cell

1. Prepare advisory and disseminate to district level.
2. Coordinate with other National health programmes like IDSP & NVBDCP for surveillance activities.

3. Coordinate with multisectoral task force members in developing State Action plan for Vector borne diseases.
4. Capacity building of DNO-CC and MOs in coordination with IDSP & NVBDCP.
5. IEC and awareness generation & dissemination planning in coordination with IDSP & NVBDCP.

District Climate Change & Human Health Cell

1. Disseminate advisory received from state level to block and health facility level
2. Coordinate with other National health programmes at district level like IDSP & NVBDCP for surveillance activities.
3. Coordinate with multisectoral task force members in developing State Action plan for Vector borne diseases.
4. Capacity building of MOs, LTs and other staff in coordination with IDSP & NVBDCP.
5. IEC and awareness generation & dissemination planning in coordination with IDSP & NVBDCP.

Block level

1. Disseminate advisory received from district level to health facility level
2. Capacity building of MOs, paramedical staff, Health care workers, CHOs and other departments.
3. Surveillance and Reporting.
4. IEC and awareness generation.

Health Facility level

1. Reporting of VBDs.
2. IEC and awareness generation.
3. Capacity building of frontline health care workers.
4. Hospital level preparedness.

Frontline Health Care Worker

1. Generate awareness among community.
2. Reporting and timely referral of suspected cases to nearest health facility.

CHAPTER 10

Action Plan for Green and Climate Resilient Health Care Facilities

Greening of Health Sector; DH/CHC/PHC as per IPHC guidelines

Description: Greening of health sector will help in our physical and mental health, as well as offsetting some of the carbon emissions creating in the local area that would otherwise contribute to climate change. Green spaces and other nature-based solutions offer innovative approaches to increase the quality of environment enhance local resilience and promote sustainable lifestyles, improving both the health and the well-being.

Direct & Co-Benefits

- Human health improvement and security.

I. Green (Environmentally friendly and sustainable measures) and Climate Resilient Infrastructure

Initial activities considered on adoption of Green and Climate Resilient healthcare facilities infrastructures are as following:

Energy Auditing of the Healthcare Facilities for Energy Efficiency level in the HCFs(Carbon Emissions Reduction Measures from health sector)

- The Healthcare Facilities is one of the major contributors to energy consumption and greenhouse gases (GHG) emissions. The fundamental goal of energy management is to produce goods and provide services with the least cost and least environmental effect.
- The scope of the activity would be the identification of energy saving schemes in the facility along with the cost-benefit analysis. The study would cover field measurements and data analysis to identify saving possibilities in the utilities.
- All the level of healthcare facilities (PHC and above) will be considered for conducting the energy audit.

Replacement of existing (non-LED) lighting with LED in Healthcare Facilities (Energy Efficiency Measures to reduce carbon emissions HCFs)

- LEDs use one-third of the energy consumed by fluorescents, and their lifespan isfive years longer. By making the switch to LEDs, hospitals and health systems can minimize maintenance costs, improve quality of lighting, and reduce emissions.

- So, in order to reduce the carbon emission Healthcare facilities (PHC and above)to preferably utilize LED in Healthcare Facilities.

Installation of Solar Panels in Healthcare Facilities

- Health-care facilities can significantly cut greenhouse gas emissions and energy costs over time by using alternative forms of clean and renewable energy – such as solar energy.
- For hospitals, alternative energy means an initial investment with potential savings later on. For regions that have no access to electricity, alternative energy sources can fuel primary health-care facilities in even the most remote areas.
- Finally, alternative sources of energy give health facilities an advantage in terms of disaster preparedness, since alternative energy sources are less vulnerable to disruption than traditional fossil fuel systems.

Install Rainwater Harvesting System in Healthcare Facilities

- Rainwater harvesting (RWH) is promoted as a climate change adaptation measure to relieve urban water supply and drainage pressures. Rainwater harvesting for health care facilities has the potential to save thousands of litres of mains water every year. This turn can result in substantial cost savings and of course contribute to alleviating storm water run-off.

Retrofitting Healthcare Facility Infrastructure (Climate/Disaster resilient) in Districts as per IPHS guidelines

- A climate resilient healthcare system is one that ensures an adaptive frame work that helps it respond adequately and appropriately in the event of an acute climatic event.
- Health care facilities need to take effective measures to withstand the impacts of increasing extreme weather events and other climate-related hazards such as higher temperatures, increasing precipitation over longer periods of time (causing increased flooding), intense but short-lived rainfall (causing flash flooding), decreasing precipitation (affecting places where rainwater harvesting contributes to the water supply systems of health care facilities), and higher winds and storms.

Human Resource and Infrastructure

Description: Human Resource is required for Setting up of State and District Environment Cell, Public Health manager, Epidemiologist, Training and Environmental Health Consultants, and Data Manager and Data Analysts.

Direct & Co-Benefits

- Human health improvement and security
- Monitoring and Evaluation of the Programme.

Capacity Building

Capacity Building of Medical Officers, Health Workers and Programme Officers under NPCCHH (National Program on Climate change and Human Health)

Description: Increasing awareness of the linkages between climate and health is fundamental to taking protective actions against climate related health risks. Trainings of Medical Officers, Health Workers and

Programme Officers under NPCCHH will strengthen the capacity of healthcare system to reduce illnesses/ diseases due to variability in climate. This will lead to strengthening of Healthcare system in context of climate change and also build capacity in context of vulnerability against climate sensitive illnesses at district level in the state.

Direct & Co-Benefits

- Human health improvement and security

IEC/BCC activities

Description: Integrating IEC activities will help in awareness generation; development of IECin local language will help to explain local people the impact of climate change on human health, and to make a communication plan for dissemination of health-related alerts/education materials for target or general population.

Direct & Co-Benefits

- Climate change Knowledge enhancement
- Skill development on climate change

II. Monitoring and Evaluation

Description: Monitoring and Evaluation, will be carried out with the help of climate change cell State and District level, which will be helpful in identifying and addressing the gaps for better implementation of the programme.

Direct & Co-Benefits

- Identifying and addressing the gaps
- Programme strengthening

The Karnataka State Action Plan for Climate Change and Human Health comprises of all the necessary components and activities under various headings, shall be implemented timely to achievethe goals & objectives of the programme. The outcome shall benefit the vulnerable/target group and community at large. The same shall be sustained in the larger interest of Public Health.

Thus, with climate change increasing the risk of severe impacts on health care facilities and placing complex, multifaceted and unpredictable demands on health systems, all new investments in the health sector should contribute to building resilience to climate change.

Activity plan

The Karnataka State Action Plan for Climate Change and Human Health comprises of all the necessary components and activities under various headings, shall be implemented timely to achieve the goals & objectives of the programme. Theoutcome shall benefit the vulnerable/target group and community at large. The same shall be sustained in the larger interest of Public Health.

Thus, with climate change increasing the risk of severe impacts on health care facilities and placing complex, multifaceted and unpredictable demands on health systems, all new investments in the health sector should contribute to building resilience to climate change.

Green & Climate Resilient Healthcare Infrastructure

Output	Activities	Unit Cost	Target				
			2022-23	2023-24	2024-25	2025-26	2026-27
Green Measures in Healthcare Facilities	Energy auditing in Healthcare Facilities	@Rs. 10,000 for PHC @ Rs. 30,000 for CHC @ Rs. 1,00,000 for DH	100% of the districts in which 20% of health care facilities done energy audit	100% of districts in which 35% of health care facilities done energy audit	100% of districts in which 50 % of health care facilities done energy audit	100% of districts in which 75% of health care facilities done energy audit	100% of districts in which 100 % of health care facilities done energy audit
	Replace existing lighting (Non- LED) with LED	@Rs. 25000 for PHC @Rs. 75000 for CHC @Rs. 2,00,000 for DH	100% of the districts in which 10% of health care facilities have replaced existing lighting facility with LED	100% of districts in which 30% of health care facilities have replaced existing lighting facility with LED	100% of districts in which 50% of health care facilities have replaced existing lighting facility with LED	100 % of districts in which 75% of health care facilities have replaced existing lighting facility with LED	100% of districts in which 100% of health care facilities have replaced existing lighting facility with LED
	Installation of Solar Panels	@ Rs. 2,00,000 for PHC @Rs. 5,00,000 for CHC @Rs. 10,00,000 for DH	20% of the districts in which 5% of health care facilities have installed solar panel	35% of districts in which 20% of health care facilities have installed solar panel	50% of districts in which 50% of health care facilities have installed solar panel	75% of districts in which 75% of health care facilities have installed solar panel	100% of districts in which 100% of health care facilities have installed solar panel
	Install Rainwater Harvesting System	@Rs. 1,00,000 for PHC @Rs. 2,00,000 for CHC @Rs. 3,00,000 for DH	100% of the districts in which 5% of health care facilities installed rain water harvesting system	100% of districts in which 30% of health care facilities installed rain water harvesting system	100% of districts in which 50% of health care facilities installed rain water harvesting system	100% of districts in which 75 of health care facilities installed rain water harvesting system	100% of districts in which 100% of health care facilities installed rain water harvesting system
Climate Resilient Healthcare facilities infrastructure	Retrofitting Healthcare Facility Infrastructure (Climate/ Disaster resilient) in Districts as per IPHS guidelines.	@5,00,000 per Healthcare facility	10% Districts with at least one climate resilient healthcare facility complying IPHS guideline	20% Districts with at least two climate resilient healthcare facility complying IPHS guideline	50% Districts with at least five climate resilient healthcare facility complying IPHS guideline	75% Districts with at least ten climate resilient healthcare facility complying IPHS guideline	100% Districts with at least ten climate resilient healthcare facility complying IPHS guideline

By this short term and long-term activities, the state plans to promote green hospitals utilizing natural resources in an energy efficient manner. Main focus is to reduce energy consumption and reduce CO_2 emission. Optimum use of solar energy, maximizing day light and optimizing artificial lighting requirement with low energy LED lighting and task lights, maximizing cross ventilations, maintaining indoor gardens, safe handling and disposal of hospital wastes, waste recycling and purchasing products which are environmentally friendly and safe, incorporating measures in building design for making it climate resilient, promoting technologies which reduce harmful chemicals emission and carbon foot-print and more use of energy-efficient equipment and services.

Table 12: Targets for next 5 year

Objective	Activities	Priority districts	Identified Health facilities for 5 years for each	Target for 5 years 2022-27				
				2022-23	2023-24	2024-25	2025-26	2026-27
Strengthening Healthcare System	Energy Audit	All districts	1PHC, 1CHC, 1DH	20%	35%	50%	75%	100%
				10%	20%	50%	80%	100%
	Led installation		1PHC, 1CHC, 1DH	10%	20%	50%	80%	100%
	Solar Panels installation		1PHC, 1CHC, 1DH	5%	10%	40%	70%	100%
	Rainwater Harvesting		1PHC, 1CHC, 1DH	5%	10%	20%	50%	100%
	Retrofitting of Health care facilities		1PHC, 1CHC, 1DH	10%	20%	50%	80%	100%

Capacity Building

Health workers have a key role in building climate resilience and environmental sustainability of HCFs. Health care workers are the main actors in ensuring that interventions are effective for their own roles and activities, as well as for other components of the framework. Because building climate resilience and environmental sustainability are relatively new approaches for health workers, building awareness, training and empowering health workers are key requirements for the successful implementation of interventions.

Annual training plan for Climate resilience Hospitals, Karnataka

Training Programme for	Trainer	Topics	Timeline
District level (DNO- CC, trainers)	State Level Trainers SNO-CC, Consultant	• Role *Training on green and climate-resilient health care facilities in* terms of climate impact • Assessments required for implementation • Coordination with supporting agencies	September
Health facility level (MO of DH/CHC/PHC)	District Level Trainers DNO-CC	• Role *Training on green and climate-resilient health care facilities in* terms of climate impact • Assessments required for implementation • Coordination with supporting agencies	September-October

Training Programme for	Trainer	Topics	Timeline
Community Health care workers (MPW, ASHA, ANM etc.)	District Level Trainers, MO	• Role *Training on green and climate-resilient health care facilities* in terms of climate impact	October-November
Panchayati Raj Institutions	District level trainers, MO, Health care workers	• Role *Training on green and climate-resilient health* care facilities in terms of climate impact • Assembling support for implementation	December

Roles and Responsibilities

	Responsibilities
SNO	• Disseminate early warnings to the district level • Finalization of IEC material and dissemination plan • Organize training sessions for district level officers and trainers • Identify health facilities for priority implementation based on disaster and health facility vulnerability • Identify relevant state and district level nodal agencies and collaborate with them for assessment of health facilities for implementation of measures • Facilitate and monitor necessary assessments at health facility level • Facilitate implementation of structural and functional measures at health facility level • Submit report of activities on heat-health under NPCCHH • Advocate for reduction in source of greenhouse gas emissions
DNO	• Conduct training for block health officers, medical officers, with relevant training manuals • Support conduction for following assessment at health facility level ▪ Energy audit ▪ Water audit ▪ Disaster-vulnerability assessment • Support following functional measures at health facility level ▪ Water committee ▪ Sustainable procurement committee ▪ Operational measures to make health facility functioning during disasters or power cut • Coordinate with other agencies for assessment and implementation of identified structural and functional measures • Update DAPCCHH with support from District Task Force • Submit report of activities on heat-health under NPCCHH
Block Health Officer	• Ensure training of medical officers • Organize PRI sensitization workshop • Coordinate with other agencies for assessment and implementation of identified structural and functional measures

	Responsibilities

Medical Officer	• Conduct health facility assessment
	  ▪ Energy audit
	  ▪ Water audit
	  ▪ Disaster-vulnerability assessment
	• Lead following functional measures
	  ▪ Water committee
	  ▪ Sustainable procurement committee
	  ▪ Operational measures to make health facility functioning during disasters or power cut
	• Support community level IEC activities
	• Identify local funding opportunities: e.g. CSR initiative, NGO funding

Panchayati Raj Institution	• Support retrofitting and new health facilities with local funding source and community involvement

PART III

Budget

CHAPTER 11
Budget

Climate change and Human Health implementation requires funds for activities such as Green & Climate Resilient Healthcare Infrastructure, human resource, programme activities, Capacity Building, documentation, communication, awareness, research, monitoring & evaluation, health system strengthening, etc. at the State, District, Taluk, PHC, Sub center and Village level.

1. Under Green (Environmentally friendly and sustainable measures) and Climate Resilient infrastructure the following activities will be carried out. The Details of Planning and Budget is attached as Annexure 1 and 2.
   - Energy Auditing of the Healthcare Facilities for Energy Efficiency level in the HCFs (Carbon Emissions Reduction Measures from health sector)
   - Replacement of existing (non-LED) lighting with LED in Healthcare Facilities (Energy Efficiency Measures to reduce carbon emissions HCFs)
   - Installation of Solar Panels in Healthcare Facilities
   - Install Rainwater Harvesting System in Healthcare Facilities
   - Retrofitting Healthcare Facility Infrastructure (Climate/Disaster resilient) in Districts as per IPHS guidelines.
2. Under Human Resource and Infrastructure the following activities will be carried out. The Details of Planning and Budget is attached as Annexure 3.
   - Human Resource for Setting up State and District Level Environment Cell
   - Setting up of Office (Recurring)
3. Under Capacity Building, IEC & BCC the following activities will be carried out. The Details of Planning and Budget is attached as Annexure 4.
   - Capacity Building of Medical Officers, Health Workers and Programme Officers under NPCCHH (National Program on Climate change and Human Health)
   - Capacity Building of ASHA at village/ward level.
4. Monitoring and Evaluation, will be carried out with the help of climate change cell State and District level, which will be helpful in identifying and addressing the gaps for better implementation of the programme. The Details are attached as Annexure 5.
5. The statement of consolidated budget proposed for the FY 2023 to 2030 (7 Years) is as per Annexure 6.

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Annexures

Annexure 1: Green & Climate Resilient Healthcare Infrastructure Plan

Output	Activities	Unit Rate	Target						
			2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30
Green Measures in Healthcare Facilities	Energy auditing in Healthcare Facilities	@Rs. 10,000 for PHC @Rs. 30,000 for CHC @ Rs. 1,00,000 for TH and DH	100% of the districts in which 15% of health care facilities done energy audit	100% of districts in which 30% of health care facilities done energy audit	100% of districts in which 45 % of health care facilities done energy audit	100% of districts in which 60% of health care facilities done energy audit	100% of districts in which 75 % of health care facilities done energy audit	100% of districts in which 90 % of health care facilities done energy audit	100% of districts in which 100 % of health care facilities done energy audit
	Replace existing lighting (Non-LED) with LED	@Rs. 25000 for PHC @ Rs. 75000 for CHC @Rs. 2,00,000 for TH and DH	100% of the districts in which 15% of health care facilities done energy audit	100% of districts in which 30% of health care facilities done energy audit	100% of districts in which 45 % of health care facilities done energy audit	100% of districts in which 60% of health care facilities done energy audit	100% of districts in which 75 % of health care facilities done energy audit	100% of districts in which 90 % of health care facilities done energy audit	100% of districts in which 100 % of health care facilities done energy audit
	Installation of Solar Panels	@ Rs. 2,00,000 for PHC @Rs. 5,00,000 for CHC @Rs. 10,00,000 for DH	100% of the districts in which 15% of health care facilities done energy audit	100% of districts in which 30% of health care facilities done energy audit	100% of districts in which 45 % of health care facilities done energy audit	100% of districts in which 60% of health care facilities done energy audit	100% of districts in which 75 % of health care facilities done energy audit	100% of districts in which 90 % of health care facilities done energy audit	100% of districts in which 100 % of health care facilities done energy audit
	Install Rainwater Harvesting System	@Rs. 1,00,000 for PHC"@ Rs. 2,00,000 for CHC@Rs. 3,00,000 for DH	100% of the districts in which 15% of health care facilities done energy audit	100% of districts in which 30% of health care facilities done energy audit	100% of districts in which 45 % of health care facilities done energy audit	100% of districts in which 60% of health care facilities done energy audit	100% of districts in which 75 % of health care facilities done energy audit	100% of districts in which 90 % of health care facilities done energy audit	100% of districts in which 100 % of health care facilities done energy audit

Output	Activities	Unit Rate	Target						
			2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30
Climate Resilient Healthcare facilities infrastructure	Retrofitting Healthcare Facility Infrastructure (Climate/ Disaster resilient) in Districts as per IPHS guidelines.	@5,00,000 per Healthcare facility	100% of the districts in which 15% of health care facilities done energy audit	100% of districts in which 30% of health care facilities done energy audit	100% of districts in which 45% of health care facilities done energy audit	100% of districts in which 60% of health care facilities done energy audit	100% of districts in which 75% of health care facilities done energy audit	100% of districts in which 90% of health care facilities done energy audit	100% of districts in which 100% of health care facilities done energy audit

Annexure 2: Green & Climate Resilient Healthcare Infrastructure Budget

Output	Activities	Unit Rate	2023-24		2024-25		2025-26		2026-27		2027-28		2028-29		2029-30	
			100% of the districts in which 15% of health care facilities done energy audit		100% of districts in which 30% of health care facilities done energy audit		100% of districts in which 45 % of health care facilities done energy audit		100% of districts in which 60% of health care facilities done energy audit		100% of districts in which 75 % of health care facilities done energy audit		100% of districts in which 90 % of health care facilities done energy audit		100% of districts in which 100 % of health care facilities done energy audit	
			Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount
Green Measures in Healthcare Facilities	**Energy auditing in Healthcare Facilities**	@ Rs. 10,000 for PHC	380	3800000	380	3800000	380	3800000	380	3800000	380	3800000	380	3800000	254	2540000
		@ Rs. 30,000 for CHC	31	930000	31	930000	31	930000	31	930000	31	930000	31	930000	20	600000
		@ Rs. 1,00,000 for TH and DH	30	3000000	30	3000000	30	3000000	30	3000000	30	3000000	30	3000000	17	1700000
		Total	441	7730000	441	7730000	441	7730000	441	7730000	441	7730000	441	7730000	291	4840000
	Replace existing lighting (Non- LED) with LED	@ Rs. 25000 for PHC	380	9500000	380	9500000	380	9500000	380	9500000	380	9500000	380	9500000	254	6350000
		@ Rs. 75000 for CHC	31	2325000	31	2325000	31	2325000	31	2325000	31	2325000	31	2325000	20	1500000
		@ Rs. 2,00,000 for TH and DH	30	6000000	30	6000000	30	6000000	30	6000000	30	6000000	30	6000000	17	3400000
		Total	441	17825000	441	17825000	441	17825000	441	17825000	441	17825000	441	17825000	291	11250000
	Installation of Solar Panels	@ Rs. 2,00,000 for PHC	380	76000000	380	76000000	380	76000000	380	76000000	380	76000000	380	76000000	254	50800000
		@ Rs. 5,00,000 for CHC	31	15500000	31	15500000	31	15500000	31	15500000	31	15500000	31	15500000	20	10000000
		@Rs. 10,00,000 for TH and DH	30	30000000	30	30000000	30	30000000	30	30000000	30	30000000	30	30000000	17	17000000
		Total	441	121500000	441	121500000	441	121500000	441	121500000	441	121500000	441	121500000	291	77800000
	Install Rainwater Harvesting System	@Rs. 1,00,000 for PHC	380	38000000	380	38000000	380	38000000	380	38000000	380	38000000	380	38000000	254	25400000
		@Rs. 2,00,000 for CHC	31	6200000	31	6200000	31	6200000	31	6200000	31	6200000	31	6200000	20	4000000
		@Rs. 3,00,000 for TH and DH	30	9000000	30	9000000	30	9000000	30	9000000	30	9000000	30	9000000	17	5100000
		Total	441	53200000	441	53200000	441	53200000	441	53200000	441	53200000	441	53200000	291	34500000
Climate Resilient Healthcare facilities infrastructure	**Retrofitting Healthcare Facility Infrastructure (Climate/Disaster resilient) in Districts as per IPHS guidelines**	@Rs. 5,00,000 per Healthcare facility	441	220500000	441	220500000	441	220500000	441	220500000	441	220500000	441	220500000	291	145500000
		Total Public Health Care Institutions	2205	420755000	2205	420755000	2205	420755000	2205	420755000	2205	420755000	2205	420755000	1455	273890000

Annexure 3: Human Resource and Infrastructure Details with Budget

Sl. No.	Item/Activity	No. of units	Cost per unit (Rs)	No. of Months	Total (Rs)	Remarks
I	**Setting up of Office (Non-Recurring)**					
1	Computers and Periperals	1	100000	1	100000	1 computer for state level (Secretarial assistance cum Data Entry Operator)
2	Laptops	4	80000	1	320000	For 2 consultants (Training Consultant+ Consultant- Environmental Health) at state level and one epidemiologist and Data Manager & Analyst
3	Laptops for districts	64	80000	1	5120000	2 laptops for 2 consultants in each of 30 districts (Dist. Level- Consultant- Environmental Health+ Data Manager & Analyst)
4	Printer/Xerox/scanner	1	200000	1	200000	One printer for state
4	Printer/Xerox/scanner	32	35000	1	1120000	One printer each for state and 31 districts and BBMP
5	Chairs	330	8000	1	2640000	10 chairs for state and 10 each for 31 districts and BBMP
6	Tables (State)	6	15000	1	90000	6 tables for state
7	Tables (Districts)	96	15000	1	1440000	3 tables for each of 31 districts and BBMP
8	Cupboards/Almairahs	99	30000	1	2970000	3 cupboards for state and 3 each for 31 districts and BBMP
Total I					**14000000**	
II	**Setting up of Office (Recurring)**					
1	Internet facility	33	1500	12	594000	Internet facility each for state, 31 districts and BBMP
2	Telephone	33	1000	12	396000	Telephone facility each for state, 31 districts and BBMP
3	Stationery	33	15000	12	5940000	Stationery each forstate, 31 districts and BBMP
4	Miscellaneous	33	10000	12	3960000	Miscellaneous expenses each for state, 31 districts and BBMP
Total II					**10890000**	
III	**Human Resource for Setting up State and District Environment Cell**					
1	State Level Environmental cell Nodal officer	1	0	12	0	This position will be a Regular Government Doctor from the Dept. of H&FW
2	State Level Epidemiologist	1	75000	12	900000	Salary for Epidemiologist State level@75000*12 months = 900000

Sl. No.	Item/Activity	No. of units	Cost per unit (Rs)	No. of Months	Total (Rs)	Remarks
3	Training Consultant	1	50000	12	600000	Salary for Training consultant State level@50000*12 months = 600000
4	Consultant-Evironmental Health	1	50000	12	600000	Salary for Environmental health consultant @50000*12 months = 600000
5	Data Manager & Analyst	1	35000	12	420000	Salary for Data Manager State level @35000*12 months = 420000
6	Data Entry Operator	1	18000	12	216000	Salary for Data Entry Operator State level @18000*12 months = 216000
7	Group D	1	12000	12	144000	Salary for Group D State level @12000*12 months = 144000
8	Consultant-Environmental Health	32	35000	12	13440000	Salary for Environmental health consultant at Districts@35000*12 months* 31 dist and BBMP= 7140000
9	Data Manager & Analyst	32	30000	12	11520000	Salary for Data Manager @30000*12 months*31 dist and BBMP =10800000
Total III					**27840000**	
Grand Total I+II+III					**52730000**	

Annexure 4: Capacity Building, IEC & BCC

Sl. No.	Item/Activity	No. of units	Cost per unit	No. of Months	Total	Remarks
Capacity Building						
1	State Level Workshop (Action plan dissemination)	8	100000	1	800000	32 DHO/32 DVBDCO
2	TOT State Level	2	100000	1	200000	2 days TOT for 32 DVBDCO and 32 Epidemiologists
3	District level Orientation training	320	65000	1	20800000	One day orientation for THOs/ MOs/Health Staff/ASHA
Total I					**21800000**	
IEC						
1	Radio bytes and Jingles	33	50000	1	1650000	State level and District Level activity
2	Television Ads	33	100000	1	3300000	State level and District Level activity
3	Posters/banners/Flip Charts	33	200000	1	6600000	State level and District Level activity
Total II					**11550000**	
Grand Total I+II					**33350000**	

Annexure 5: Monitoring and Evaluation Details

Sl. No.	Item/Activity	No. of units	Cost per unit	No. of Months	Total	Remarks
Monitoring and Evaluation						
1	Baseline Internal Evaluation	1			1000000	Lump sum Rs. 10 lakhs which includes travel, accommodation, report writing, TA/DA, Printing (questionnaires and final evaluation report) and meetings.
Total					**1000000**	

Annexure 6: NPCCHH Consolidated Budget Details - 2023 to 2030

Sl. No.	Particulars	Year wise Budget Details							Grand Total
		2023-2024	2024-2025	2025-2026	2026-2027	2027-2028	2028-2029	2029-2030	
1	Green & Climate Resilient Healthcare Infrastructure	42,07,55,000	42,07,55,000	42,07,55,000	42,07,55,000	42,07,55,000	42,07,55,000	27,38,90,000	2,79,84,20,000
2	Human Resource and Infrastructure	5,27,30,000	4,01,22,000	4,15,83,600	4,31,18,280	4,47,29,694	4,64,21,679	4,81,98,263	31,69,03,515
3	Capacity Building, IEC & BCC	3,33,50,000	3,33,50,000	3,33,50,000	3,33,50,000	3,33,50,000	3,33,50,000	3,33,50,000	23,34,50,000
4	Monitoring and Evaluation	10,00,000	10,00,000	10,00,000	10,00,000	10,00,000	10,00,000	10,00,000	70,00,000
Total		**50,78,35,000**	**49,52,27,000**	**49,66,88,600**	**49,82,23,280**	**49,98,34,694**	**50,15,26,679**	**35,64,38,263**	**3,35,57,73,515**