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NATIONAL ACTION PLAN FOR CLIMATE CHANGE & HUMAN HEALTH

Ministry of Health & Family Welfare

Government of India

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PREFACE

Climate sensitive illnesses are on increase due to climate change and extremes of weather either through direct or indirect impact. The United Nations Framework Convention on Climate Change (UNFCCC) and its Kyoto Protocol in 1997 refers to the legal framework for Climate change process internationally. The Conference of the Parties (COP) to the Convention meets annually to negotiate and discuss the international climate change agenda and related commitments from countries. The sustainable development Goal 13 (SDG 13) also emphasises to "take urgent action to combat climate change and its impacts."

India's first National Action Plan on Climate Change (NAPCC) was released by the then Prime Minister Manmohan Singh on June 30, 2008. It outlines existing and future policies and programs addressing climate mitigation and adaptation. The plan identifies eight core "national missions". After the 21st Conference of Parties (COP 21) under the United Nations Framework Convention on Climate Change (UNFCCC) concluded in Paris, Hon'ble Prime Minister Mr Narender Modi broadened India's response to climate change, by introducing four new missions including one for "Health" in 2014. The proposed 'Mission on Health' will address the health-related aspects of climate change through multi-pronged approach.

A National Expert Group on Climate Change & Health was constituted in July 2015 under the chairmanship of *Dr Vishwa Mohan Katoch, Former Secretary (Health Research), Government of India and DG (ICMR*) to prepare action plan, recommend strategies for adaptation, capacity building etc. The *National Centre for Disease Control (NCDC*) is the nodal agency for drafting of Action Plan under the Health Mission. The expert group (NEGCCH) had members' representation from Dte.GHS, MoHFW, MoEFCC, ICMR, DST, NDMA, CGWB, Min of Agriculture, CPCB, MoES, TERI, NEERI, which had drafted the National Action Plan on Climate Change and Human Health after detailed deliberation.

India is a diverse country in terms of geography, climatic conditions, resources and health care infrastructure etc. Owing to this diversity, each state and UT may have morbidity and mortality due to diseases which may occur as per the geographic-climatic conditions. Hence it was realised that country requires state/region specific action plan for climate change and human health (SAPCCHH). Four regional consultations for all the states and UTs were conducted by Centre for Environmental & Occupational Health, National Centre for Disease Control recently. The states and Union Territories were sensitised on effect of climate variability and change on 'occurrence and virulence of vectors' and recent change in pattern of different climate sensitive illnesses in their geographic area.

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EXECUTIVE SUMMARY

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

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

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

Initiatives undertaken by India are: a) Identification of Ministry of Environment, Forest & Climate Change (MOEF&CC) as nodal ministry; b) Formulation of National Environmental Policy 2006; c) Formulation of Prime Minister's Council on Climate Change for matters related to Climate Change. MoEFCC has developed National Action Plan on Climate Change with eight missions. Later on four new missions (including Health Mission) were identified. As a follow-up action, MoHFW constituted a National Expert Group on Climate Change & Health (NEGCCH) under the chairmanship of *Dr Vishwa Mohan Katoch, Former Secretary (Health Research), Government of India and DG (ICMR*) to prepare action plan, recommend strategies for indicators, mitigation, capacity building etc.

The Health Mission aims to reduce climate sensitive illnesses through integration with other missions under NAPCC as well as through programmes run by various ministries, The vision of NAPCCHH is: To strengthen health of citizens of India against climate sensitive illness, especially among the vulnerable like children, women and marginalized population. With a goal to reduce morbidity, mortality, injuries and health vulnerability to climate variability and extreme weathers. The NAPCCHH objectives with some initially identified key actions are:

1. To create awareness among general population (vulnerable community), health-care providers and Policy makers regarding impacts of climate change on human health.
    a. Development of IEC material
    b. Advocacy
2. To strengthen capacity of healthcare system to reduce illnesses/ diseases due to variability in climate
    a. Strengthening of Healthcare system in context of climate change
    b. Capacity building (training) for vulnerability assessment.
3. To strengthen health preparedness and response by performing situational analysis at national/ state/ district/ below district levels.
    a. Develop/ strengthen the monitoring and surveillance systems for climate sensitive diseases
    b. Develop mechanisms for EWS/ alerts and responses at state, district and below district level
4. To develop partnerships and create synchrony/ synergy with other missions and ensure that health is adequately represented in the climate change agenda in the country
    a. Develop joint action plan with other deptt./ organizations In view of their capabilities and complementarities

    b. Integrate, adopt and implement environment friendly measures suggested in other missions on climate change
5. To strengthen research capacity to fill the evidence gap on climate change impact on human health
    a. Strengthening of healthcare services based on researches on climate variables and impact on human health

Initial Inputs desired (first 2 years)

1. Establish 'Environmental Health Cell' in State Health Department,
2. Identification of State Nodal Officer- Climate Change at State Health Department
3. Notification of Task Force with representation of other health programmes (vector-borne disease, infectious diseases, nutrition etc) multi-sectors/ departments such as Disaster Management Authority, Health Information System, district unit of departments of Meteorology, Pollution Control Board, Water and Sanitation, Public Works Departments and civil societies etc.
4. Vulnerability Assessment for baseline rate for Climate Sensitive Illnesses in terms of
    a. Geography (Plain/ Mountain/ Desert/ Coastal), identify worst affected areas (districts)
    b. Risk mapping with extreme events (heat/ cold/ drought/ flood/ cyclone/other),
    c. Affected *Population* (Total, density, Vulnerable, Occupation)
    d. Contributing/ exaggerating factors for these *Climate sensitive illnesses*
    e. Healthcare Infrastructure/ facilities like PHC, CHC, District hospital, Tertiary care hospitals- Government as well as Private.
    f. Identify areas for capacity building –human resource, technical and healthcare service delivery.
5. State health adaptation plan must be prepared for extreme events (heat related illness), Air Pollution and health related issues, Vector borne diseases and Water borne illnesses
6. State health department should identify and strengthen department/ institute/ organization/ health care facilities/ other stakeholders for providing assistance for management of cases and for monitoring and surveillance for climate sensitive illnesses
7. Coordinate with premiere institute/ organisation like Centre of Excellence for developing training module/ guidelines and Inclusion of mitigation and adaptation measures in Students' Curriculum.
8. Develop, integrate and Implement media communication plan for common CSDs involving health determining sectors and communities.

Process: 2 to 5 years

1. Formulate specific implementation framework for climate sensitive diseases.
2. Contingency plans for climate sensitive illnesses - appropriate and efficient health personnel, logistics & resource allocation.
3. Capacity building and training of health care personnel on guidelines and treatment modalities against climate sensitive illnesses at district level in each state.
4. Development of early detection tools for CSDs (rapid diagnostics, surveillance) or mathematical /prediction models for preparedness of population and health care system.
5. Periodic reviews for improvements or deterioration of indicators (vulnerability, response capacity, preparedness, and environmental determinants) identified for each CSD.
6. Awareness generation- integrate IEC, engage local leaders & community, yearly "Advocacy network meeting" and health talks, specific day celebration, health melas etc.
7. With projected climate risks, adapt new technologies, building design, energy, water and sanitation provisions for new constructions of healthcare facilities, but if already existing, modify as per permissible building norms.
8. Link data on data of Climate sensitive diseases, environmental factors determining health, meteorological information, and outcomes as morbidity and mortality.
9. Risk mapping and seasonal trend for CSDs: multi-sector management approach.
10. Research and epidemiological studies / surveys on vulnerable population for climate sensitive illnesses.

Expected Output:

1. Awareness & Behaviour modification of general population for impact, illnesses, prevention and adaptive measures for climate sensitive illnesses.

2. Increase in trained healthcare personnel and equipped institutes/ organization towards achievement of climate resilient healthcare services and infrastructure at district level in each state.
3. Integrated monitoring system for collection and analysis of health related data with meteorological parameters, environmental, socio-economic and occupational factors
4. Regulation on key environmental determinants of health: air quality, water quality, food, waste management, agriculture, transport.
5. Evidence–based support to policy makers, programme planners and related stakeholders

The Monitoring & Evaluation of the implementation of NAPCCH has been stipulated with a mix of internal and external approaches. MoHFW, State DoHFW, District Health Officers and the individual health facilities will be involved in regular internal monitoring. External Monitoring will be done by an independent agency.

To address the diversity and to target the specific health issues, four regional consultations with states and Union Territories were conducted in 2017-18 by *Centre for Environmental and Occupational Health*, National Centre for Disease Control, Delhi. The aim was to sensitise states/UTs' health personnel to reassess diseases' morbidity and mortality with respect to climate variability and extremes. The states and UTs were communicated to identify the '*Nodal Person for Climate Change* from *State Health Department',* Constitution of *"State Environment Health Cell"* at State Health Ministry level and Constitution of a team of experts with representation from Ministry for Environment, Forest & Climate Change, Ministry of Drinking Water and Sanitation, Ministry of Agriculture, Ministry of Earth Sciences, ICMR branch (if in state), Disaster Management Authority, State Pollution Control Board or other stakeholders identified by state.

These regional consultations had participations from health and non-health department of states and UTs, as well as from WHO as well as research institutions. The representatives were aware of the urgency and had serious concern for the agenda of these consultations. State health teams were expected to list and prioritize climate sensitive illnesses in their state and UTs, compilation of data on morbidity and mortality, statistics related to vulnerable population, geographical factors, health care infrastructure/ facilities, or any mitigation and adaptation measures adopted by state against impact of climate change on human health. The available data of states and UT need to be linked to climate/ weather data for which the assurance was given by the representative from Regional Centre Meteorological Departments. Many states have initiated actions by identifying State Nodal Officer (Climate Change), notified experts from non-health sectors for Task Force and few states have prepared their action plan for climate change as well as adaptation plan for heat related illnesses.

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

I. INTRODUCTION

Climate change refers to a change in the state of the climate that can be identified by changes in the mean and/or the variability of its properties (usually by models or statistical tests), and that persists for an extended period, typically decades or longer [1-2,6]. Climate change may be due to natural internal processes or external force such as modulations of the solar cycles, volcanic eruptions, and persistent anthropogenic changes in the composition of the atmosphere or in land use. The Framework Convention on Climate Change (UNFCCC), in its Article 1, defines climate change as: "*a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods* [3]". The UNFCCC thus makes a distinction between climate change attributable to human activities altering the atmospheric composition, and climate variability attributable to natural causes [4,5].

Climate change is perceived to be among the greatest health risks of the 21st Century[4,5]. It affects social and environmental determinants of health like –clean air, safe drinking water, sufficient food and secure shelter. Climate change, together with other natural and human-made health stressors, influences human health and disease in numerous ways (Fig:1).

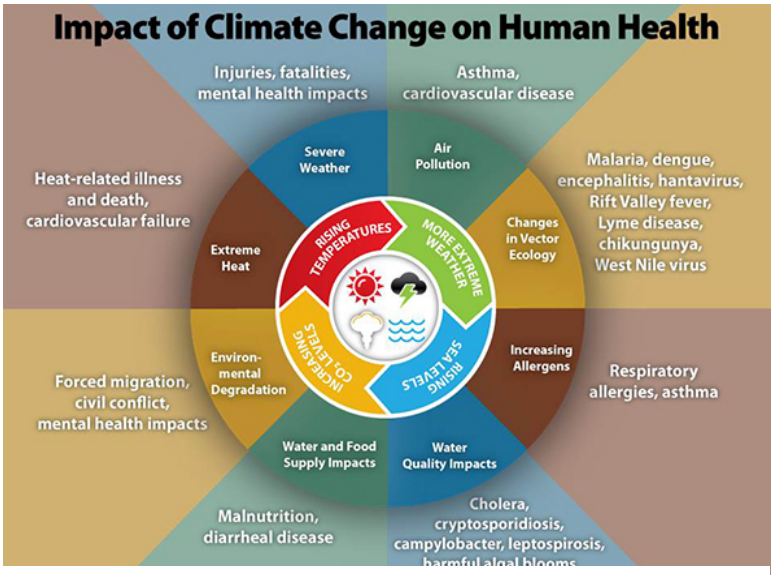


Fig:1. Likely Impacts of Climate Change on Human Health
Source: https://www.cdc.gov/climateandhealth/effects/default.htm

Climate change may have various impacts, but most commonly observed negative effects on human health are seen as rise in illnesses and deaths. The climatic variables costing lives directly are identified as increase in frequency and intensity of heat waves, increased precipitation, floods and droughts[17-18,26]. High temperature is known to increase the level of 'ground level ozone' and other 'climate altering pollutants' other than carbon dioxide, which further exacerbate cardio-respiratory and allergic diseases and certain cancers.

Beside these, there is increase in transmission and spread of infectious diseases, changes in the distribution of water-borne, food borne and vector-borne diseases and occurrence of disasters and increased probability of malnutrition. The marginalised populations among all are found to be more adversely affected due to variability and change in climatic conditions.

The World Health Organization (WHO) estimates that between 2030 and 2050, climate change is expected to cause approximately 2,50,000 additional deaths per year, resulting from malnutrition, malaria, diarrhea and heat stress. These deaths will further have financial implications which are estimated to be between US$ 2-4 billion/year by 2030[13,14,16]. Diseases such as malaria, yellow fever, dengue and cholera are all sensitive to climate change due to effect on the viability and the geographical distribution of the mosquitoes and micro-organisms, which prefer a wetter, warmer world.

India is a highly populous country, undergoing industrialisation, with large scale rural to urban migration, chaotic, unplanned urbanization, depletion of forest cover and requirement of high energy demand makes it more vulnerable to adverse impacts of climate change. As evident from various literature worldwide, the health effects may occur either due to direct or indirect causes of climate change or extremes of weather 21.

A) Direct Impacts of Change in Climate and Weather on Health:

Changes in temperature and precipitation and occurrence of heat waves, floods, droughts and fires directly impact health of people.

1. Heat-Stress and Related Impacts

The IPCC Special Report on Extreme Events (SREX)[6] has a mention 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, the health effects are seen when body temperature rises above 38°C i.e. physical functions are impaired with experience of weakness (heat exhaustion), when body temperature rises further to 40.6°C, the risk of physical and cognitive functions get impaired (heat syncope), risks of organ damage, loss of consciousness, and death increase sharply at further rise in body temperature usually above 40.6°C (heat stroke). Various factors interplay in occurrence of these morbidity and mortality majorly affecting mainly the vulnerable population especially in the vulnerable regions[21-23].

The *vulnerable population* implies the demography (extremes of age, sex, population density, pregnant women and certain occupations), Health Status (like proportion of malnourishment, suffering with infectious and/ or chronic diseases, mental or physical disability), socio-economic status (poor/ marginalised- more vulnerable), type of occupation or socio-cultural practices. The *vulnerable regions* implies 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.

Eighteen heat-waves were reported in India between 1980 and 1998, with a heat-wave in 1988 affecting ten states and causing 1,300 deaths. Heat-waves in Odisha, India during 1998 to 2000 caused an estimated more than two thousand deaths and heat-waves in 2003 in Andhra Pradesh, India, caused more than 3000 deaths. The significant correlation between mortality and high temperature and high heat index has also been documented.

2. Drought, Storms and Floods

Climate change can result in more hot days, resulting in more periods of 'drought', 'dust storms', or 'heavy rains (precipitation)', and even 'flooding'. The health gets directly affected due to injuries, hypothermia, hyperthermia, drowning and indirectly through population dislocation, crowding, poor living conditions, faeco-oral transmission of gastro-intestinal pathogens causing water and food borne illnesses, respiratory illness and other infectious diseases (e.g., leptospirosis, vector-borne disease, cholera and also mental illnesses)[48-50]. The reason primarily is due to contamination of water and sewage disposal.

3. Ozone

Ozone is a secondary pollutant, formed via sunlight-driven photochemical reactions involving precursor hydrocarbons and oxides of nitrogen. Ozone pollution is projected to increase because warmer temperatures enhance these reactions. Ozone is a powerful oxidant that has been persistently associated with damage to structure of airway or lung tissue. It contributes to more severe symptom of asthma, increase in other respiratory illnesses and deaths. High concentration of ground-level ozone accompanied with Heat waves result in higher frequency and severity of cardio-pulmonary attacks [34-36]. Similarly,

combination of high level of Ozone and dust storms or alteration of allergens or all, will result in outbreaks of asthma and allergic rhinitis.

4. Air pollution

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, countries can reduce the burden of disease from stroke, heart disease, lung cancer, and both chronic and acute respiratory diseases, including asthma [29,30].

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 affect 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[41-43].

5. Ultraviolet Radiation

The IPCC AR5 mention few studies which states that ultraviolet radiation (UVR) are linked to higher incidence of few skin carcinoma for every 1°C increment in average temperatures[36]. However, exposure to the sun also has beneficial effects on synthesis of vitamin D, with important consequences for health. Accordingly the balance of gains and losses due to increased UV exposures vary with location, intensity of exposure, and other factors (such as diet) that influence vitamin D levels.

The excess of exposure to solar *ultraviolet radiation (UVR)* even within the ambient environmental range may results in sunburn, photo-ageing, cataracts, immune suppression and skin melanomas[37]. UVR induced immune-suppression may influence occurrence of various infectious diseases as well as affect vaccine efficacy. There is evidence to support a relationship between sunburn during childhood and adolescence and skin cancer in adulthood. The World Health Organization (WHO) has argued that school sun protection

programmes should be emphasised, because a sizeable portion of lifetime sun exposure occurs during childhood and adolescence. Similarly, personal exposure studies among outdoor workers found that individuals engaged in road construction, horticulture, roofing and other outdoor occupations received ~20 - 26% of the total daily ambient solar UV radiation levels.

B) Indirect Impacts of Climate and Weather on Health:

Indirect impacts are due to ecological disruptions, rising sea level, changing temperatures and precipitation patterns which leads to crop failures, shifting patterns of disease' vectors, water-borne disease, vector-borne disease. Climate dependant diseases particularly affecting the vulnerable populations include the following:

1. **Air-Borne and Cardio-Respiratory Illnesses**: Climate change influences various illnesses 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. 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[37-39].

2. **Vector-borne diseases (VBD)**: Climate change and other weather parameters have significant impact on vector borne diseases such as Malaria, Dengue, Chikungunya, Japanese Encephalitis, kala-azar, and filariasis. The known parameters are temperature, humidity, wind, rainfall, flood and drought, affecting 'distribution of vector' and 'effectiveness of transmission of pathogen' through vectors. The temperature affects: vectors' survival, population growth, feeding behaviour, susceptibility to pathogen, incubation period, seasonality of vector activity as well as pathogen transmission. The roles of rainfall on vectors are: increase in breeding sites due to increase in surface water, increase vegetation and expansion of vertebrate hosts, flooding bring vertebrate host close to human population[41-43].

Other factors affecting VBDs are population growth, population displacement, socio-economic status, changes in residential pattern, changes in land use, water projects,

agricultural practices, housing projects, international travel, resistance of diseases vectors and pathogens, accessibility to health care and diagnostic facilities.

3. **Waterborne & Foodborne diseases** such as 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-dependant infectious diseases. The increase in temperature is seen to be associated with increased survival and abundance of micro-organisms[44,46]. 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 .

4. **Malnutrition** and consequent disorders, like retarded child growth and development have been identified as one of the health threat by the Working Group-II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. Climate change result in food insecurity, namely, food availability, food accessibility, food utilization, and food system stability. Drought occurrence diminishes crop yield, dietary diversity, supply chain disrupted, increase in market prices, also reduction in animal and aquatic products are being experienced. These factors reduce overall food consumption, and may therefore lead to macro as well as micronutrient deficiencies.

   For India, a proactive approach is critical as nearly half of children (48%) aged less than five are chronically malnourished, more than half of women (55%) and almost one-quarter of men (24%) are anaemic (NFHS-3). The health of the vulnerable population is further threatened by the changing climate. For instance, in Gujarat, during a drought in the year 2000, diets were found to be deficient in energy and several vitamins. In this population, serious effects of drought on anthropometric indices may have been prevented by public-health measures[48,49].

There are certain **positive effects of climate change** too, like modest reductions in cold-related morbidity and mortality, geographical shifts in food production, and reduced capacity of disease-carrying vectors due to exceeding of thermal thresholds. These positive effects will however be increasingly outweighed, worldwide, by the magnitude and severity of the negative effects of climate change.

II. *STEPS TO REDUCE IMPACTS OF CLIMATE CHANGE*

The United Nations Framework Convention on Climate Change (UNFCCC) came into force on 21st March 1994. The “Rio Convention”, was adopted out of three conventions identified at “Rio Earth Summit” in 1992. Today, this convention known as “Convention of Parties” has 197 countries. Industrialized nations agree under the Convention to support climate change activities in developing countries by providing financial support for action on climate change. This was followed by first Conference of Parties (COP1) that took place in Berlin in 1995.

Another milestone was *Kyoto protocol, which* was adopted in Kyoto, Japan, on 11th December 1997. The Parties agreed-for were made bound for ‘targets’ for reducing emission. The Kyoto Protocol places a heavier burden on developed nations under the principle of "*common but differentiated responsibilities*", owing to high level of GHG emissions by developed nations by their industrial activity for approximately 150 years. The detailed rules for the implementation of the Protocol were adopted at COP-7 in Marrakesh, Morocco, in 2001, and are referred to as the "Marrakesh Accords." Its first commitment period started in 2008 and ended in 2012.

The *Cancun Agreement* came up in 2010 at COP-16 in Cancun, where Governments decided to establish a “*Green Climate Fund*”. The fund will support projects, programmes, policies and other activities in developing country using thematic funding windows. The objective was to enhance action on adaptation, international cooperation and coherent consideration of matters relating to adaptation under the Convention.

At COP17, *Durban Platform*, Enhanced Action drafted, where governments clearly recognized the need to draw up the blueprint for a fresh universal, legal agreement to deal with climate change beyond 2020, where all will play their part to the best of their ability and all will be able to reap the benefits of success together. The Durban outcome recognized, in its spirit and intention that smart government policy, smart business investment, and the demands of an informed citizenry, all motivated by an understanding of mutual self-interest, must go hand in hand in pursuit of the common goal.

At COP 21 in Paris, Parties to the UNFCCC reached a historic agreement to combat climate change and to accelerate and intensify the actions and investments needed for a sustainable low carbon future. The Paris Agreement requires all Parties to put forward their best efforts

through “Nationally Determined Contributions” (NDCs) and to strengthen these efforts in the years ahead.

India has undertaken many initiatives in pursuance to the obligation implied by UNFCCC like: a) Identification of Ministry of Environment, Forest & Climate Change (MOEF&CC) as nodal ministry for matters related to Climate Change; b) Formulation of National Environmental Policy 2006; c) Formulation of Prime Minister’s Council on Climate Change to advice proactive measures, facilitate inter-ministerial coordination and guide policy in relevant areas.

The hon’ble Prime Minister of India office had released a National Action Plan on Climate Change in June 2008. NAPCC addresses the urgent and critical concerns of the country through enhancement of the current and planned programmes presented in the Technology Document. It identifies measures that promote our development objectives along with yielding co-benefits for addressing climate change effectively. It outlines a number of steps to simultaneously advance India’s development and climate change related objectives of adaptation and mitigation. The NAPCC identified eight national missions initially:

1. National Mission on Sustainable habitat
2. National Mission for Sustaining the Himalayan Ecosystem
3. National Mission for Sustainable Agriculture
4. National Solar Mission
5. National Mission for Enhanced Energy Efficiency
6. National Water Mission
7. National Mission on Strategic Knowledge for Climate Change
8. National Mission for “Green India”

The reconstituted Prime Minister Council on Climate Change (PMCCC) reviewed the progress of eight national missions on 19th January 2015 and suggested formulation of four new missions on Climate Change viz.

1. Health Mission
2. National Mission on “Waste to Energy Generation”
3. National Mission on India’s Coastal areas
4. National Wind Mission

In this background, the proposed 'Health Mission' was undertaken by Ministry of Health & Family Welfare, Government of India under the umbrella of 'National Action Plan on Climate Change' by MoEFCC. As a follow-up action, MoHFW constituted a National Expert Group on Climate Change & Health (NEGCCH) under the chairmanship of *Dr Vishwa Mohan Katoch, Former Secretary (Health Research), Government of India and DG (ICMR*) to prepare action plan, recommend strategies for adaptation and response plan for diseases occurring due to climate variability and change.

National Centre for Diseases Control (NCDC) was identified as the nodal agency for 'Health Mission' by Ministry of Health & Family Welfare, Government of India. An expert group was constituted with members' representation from DteGHS, MoHFW, MoEFCC, ICMR, DST, NDMA, CGWB, Min of Agriculture, CPCB, Ministry of Earth Sciences, TERI, NEERI etc.

III. INDIA's STRATEGIC FRAMEWORK FOR ADAPTATION OF HUMAN HEALTH AGAINST CLIMATE CHANAGE

India's Health and Family Welfare System derives strength from several institutes and infrastructures of the GOI, multi-lateral institutes, and NGOs including the National Institute of Malaria Research; Indian Institute of Tropical Meteorology, India Meteorological Department, Director General of Health Services, Indian Council of Medical Research, National Centre for Disease Control and many others.

Measures that would help address the imminent challenges would include *development of an integrated early health warning system*, *state specific emergency response plan*, along with increased capacity to provide health care to the most vulnerable and the marginalized populations.

Therefore a fundamental area of intervention would include strengthening of local monitoring of appropriate climate and disease variables. This would be directed at building temporally and spatially *disease specific database*. A strong surveillance would help develop effective prevention strategies, aid epidemiological understanding and predictive computations. Improvements in information infrastructure that are innovative and that promote interdisciplinary collaborations have been identified as areas that require strengthening in India (Bush et al. 2011).

The linkage of health with environmental and climate change determinants is well recognized. Consequently, coordination and synergies with other Ministries becomes crucial to yield health benefits. To facilitate joint action and Inter-Ministerial cooperation, it is imperative to develop feedback mechanisms of health trends to related Ministries and agencies to enable health statistics to leapfrog.

Health sector in preparedness for climate change needs urgent, serious, and multifaceted action, which should include:

1. Strengthen/ develop coordination for health related early warning and surveillance systems in specific areas (e.g. heat waves, floods, air pollution, ultraviolet radiation, vector borne, water-borne and infectious diseases) through an integrated disease surveillance system.

2. Feedback mechanisms to other ministries responsible for several ecological determinants of health particularly- air, water, food, fuel and human resource.

3. Development of risk maps for climate sensitive diseases for each geographical area.

4. Strengthening/ developing response action based on innovative or new strategies or technological approaches to increase access, early health care advice/ referral and health tracking system incorporating *Aadhaar* card number to assist surveillance and generate trends.

5. Undertake case studies and research and pilot test new approaches aimed at building health resilience in climatically sensitive locations.

The proposed 'Health Mission' will take a multi-pronged approach to address the health-related aspects of climate change through the strategies listed in the National Action Plan for Climate Change and Human Health (NAPCCHH). The Health Missions seeks coordination with other missions identified under the umbrella of National Action Plan for Climate change (NAPCC) listed earlier in this document. The targets achieved by other national missions launched under the NAPCC will also scale down the morbidity and mortality of various types of illnesses.

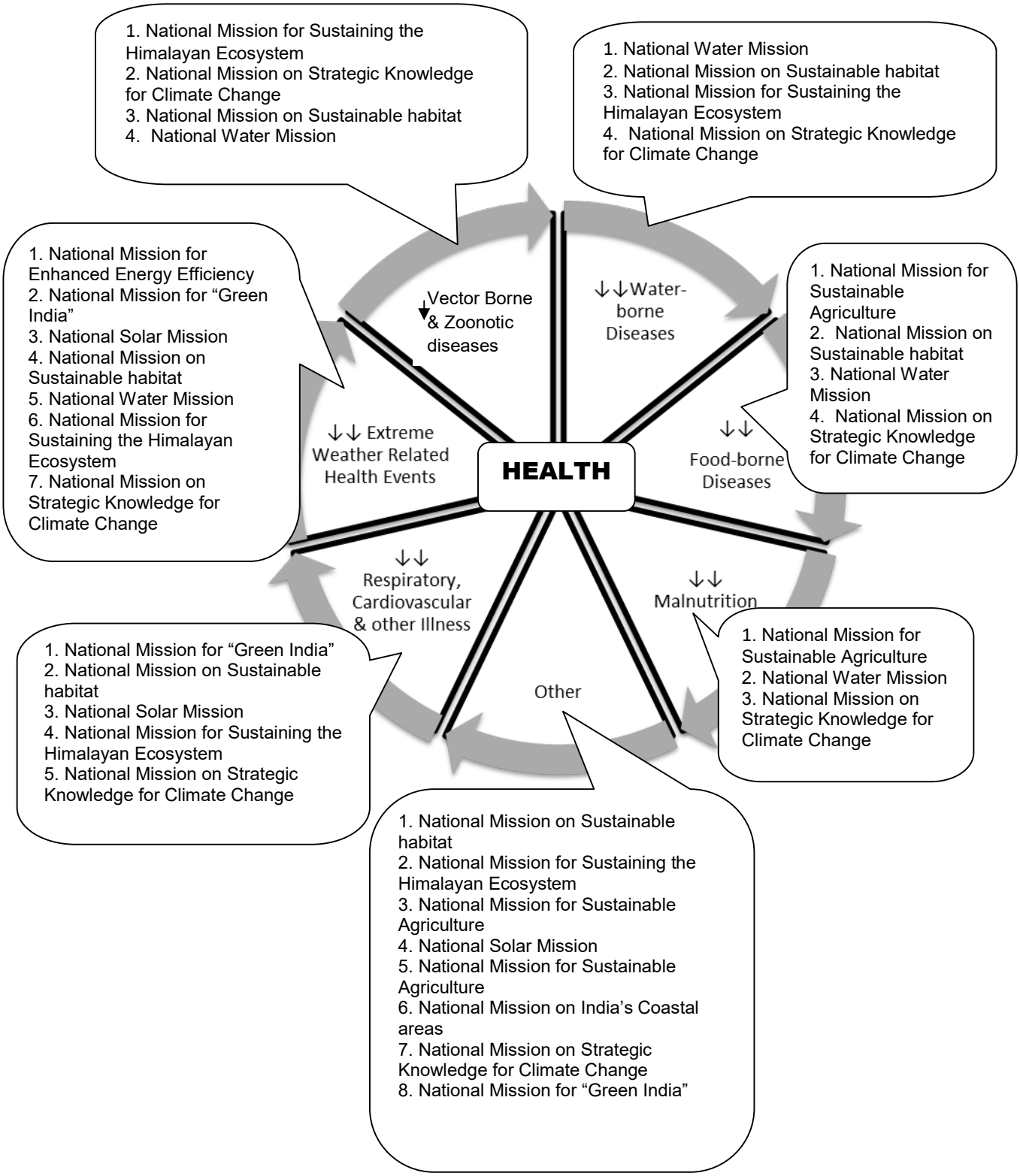
IV: INTEGRATION OF HEALTH MISSION WITH OTHER MINISTRIES AND MISSIONS ON CLIMATE CHANGE

The frequency and magnitude of occurrence of “morbidity and mortality”, “acute and chronic” “communicable” or “Non-Communicable” illnesses depends on socioeconomic status, residence, occupation, level of nourishment, underlying illness, availability of safe drinking water, sanitation facilities, overcrowding, pollution, extreme weather, chemical exposures, agricultural practices, governance (local, state and national level), access to health facilities, trained/ skilled health manpower, laboratory support, and religious practices etc.

The strengthening of the National Programmes under various ministries will raise the level of health of people through direct or indirect impacts by reducing risk factors. To name the beneficial national programmes/ schemes are: Namami Gange Programme, Mid Day Meal Programme, Integrated Child Development Schemes, Indira Gandhi Matritva Sahyog Yojna, Deen Dayal Upadhyaya Gram Jyoti Yojna, Atal Mission for Rejuvenation and Urban Transformation, Gramin Bhandaran Yojna, Jawaharlal Nehru National Urban Renewal Mission, Livestock Insurance Scheme, National Urban Livelihood Mission, Smart Cities Mission, National Vector Borne Disease Control Programme, *National Programme for Prevention and Control of Diabetes, Cardiovascular diseases, Cancer and Stroke*, *National Mental Health Programme*, *National Iodine Deficiency Disorder Control Programme*, *Revised National TB Control Programme (RNTCP)*, *National Programme for Control and Treatment of Occupational Disease*, *National Programme for the Health Care for the Elderly*, *National Programme for Prevention and Control of Deafness* and *Universal Immunization Programme*.

The MoHFW seeks to coordinate & collaborate with other Ministries, departments & NGOs/CBOs. These Ministries & Departments are: *Ministry of Environment, forest & Climate Change*, *Ministry of Information & Broadcasting*, *Ministry of Human Resource Development*, *Indian Council of Medical Research, Ministry of Agriculture*, *Medical Council of India*, *Ministry of Drinking Water and Sanitation, Min. of New & Renewable Energy, National Disaster Management Authority*, *Ministry of Women and Child Development, Indian Institute of Tropical Meteorology, Indian Institute of Tropical Meteorology, Department of Space*, *Department of Science & Technology*, *Council of Scientific & Industrial Research, Ministry of Home Affairs*, *Defence Research & Development Organization*, *Indian Council of Agricultural research*, *National Institute of Malaria Research*, *Food Safety and Standards Authority of India*, *Department of Health Research*, *National Environmental Engineering Research Institute*, *Community Based Organizations*, *Public Health Foundation of India* etc.

The possible health impacts of other missions under NAPCC are foreseen as follows:



V: NAPCCHH: VISION, GOAL & OBJECTIVES

Vision: Strengthening of healthcare services for all the citizens of India esp vulnerable like children, women and marginalized population against climate sensitive illnesses.

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

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

Specific Objectives

Objective 1:

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

Objective 2:

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

Objective 3:

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

Objective 4:

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

Objective 5:

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

VI. NAPCCHH: ACTIVITY MATRIX

S. No.	Key Actions	Activity			Indicators
		Short term (First two years)	**Medium Term** (up to five years)	**Long Term** (up to fifteen years)	
1.	**To create awareness among general population (vulnerable community), health-care providers and Policy makers regarding impacts of climate change on human health**				
	Development of IEC material on health impacts of Climate variability & change	-Identify *nodal agency* to undertake communication needs assessment for the target groups - Develop *Communication Plan* & Tools -Develop *IEC materials* in Hindi, English and other vernacular languages. - Dissemination of IEC: mass media and inter-personal communication - Training & Sensitization of Health Care Providers	-Develop integrated IEC strategy -Explore inter-sectoral / inter-ministerial / civil society / NGOs for collaboration -Integrate health impacts of climate change into school and College curricula - Periodic Impact assessment of communication activities and monitor dissemination and utilization of IEC material -Explore additional sources of funding	-Determine whether the target population is covered/ informed timely -Commissioning of impact studies -Follow up 'Evaluation' of awareness activities -Actively pursue partnerships with other agencies	- Number of states and UTs developed & translated IEC on H*ealth impacts of* E*xtreme weather event like 'Heat'* in local language - Number of states and UTs developed & translated IEC on H*ealth impacts of* Air Pollution in local language - Number of states and UTs developed & translated IEC on H*ealth impacts of* climate change on vector borne illnesses in local language - Number of states and UTs developed & translated IEC on H*ealth impacts of* climate change on water borne illnesses in local language - Number of states and UTs developed & translated IEC on H*ealth impacts of* climate change on food borne illnesses in local language - Number of states and UTs developed & translated IEC on H*ealth impacts* of climate change on zoonotic diseases in local language
	Advocacy on health impacts of Climate variability & change	- Advocacy forum to conduct and support workshops and meetings. - Evidence based Information to legislators and decision makers on issues of climate change and impact on health	Provide evidence/ information for decision-makers to assess existing policies, practices and systems Involve community-based organizations (CBOs) for dissemination of information.	Expand the span of coalitions to strengthen and support favourable legislatures/ policies	- Number of states/ UTs notified Advocacy forum. -Number of sensitisation workshops / meetings conducted with healthcare personnel on issue of climate change and impact on health. - Number of workshop/ campaign conducted on issue of climate change and impact on health with community-based organizations (CBOs)
	Nodal Department/ Ministry: MOHFW / Dte.GHS / NCDC Suggested Supportive Department/ Ministry: Min. I &B / CHEB/ DAVP / MoEF&CC / ICMR / DHR/ Min of Drinking Water and Sanitation / MHA/ Min of Agriculture/ ICAR & DARE NDMA/ MoWCD Min. of HRD FSSAI				

S. No.	Key Actions	Activity			Indicators
		Short term (First two years)	**Medium Term** (up to five years)	**Long Term** (up to fifteen years)	
2.	**To strengthen capacity of healthcare system to reduce illnesses/ diseases due to variability in climate**				
	Strengthening of health care system in context of climate change	-Establish 'Environment Health Cell' at Health deptt. - Depute State Nodal Officer – Climate change as focal point - Notify Task Force with multiple stakeholders and review existing Indian Public Health Standards and appropriate suggestions - State to form climate sensitive health Programme Implementation Plan (PIP)	Implement/ adapt/ modify Monitoring, Supervision and Evaluation tool for climate sensitive diseases -Coordinate with other agencies (municipalities, PRIs) for efficient and effective implementation of proposed activities at state and below level. - Phased Implementation of the recommendations of Task Force.	- Share appropriate technology like reduction in carbon footprint at healthcare facilities - Continue Phased Implementation of recommendations of Task Force.	- Number of States/ UT with 'Environment Health Cell' at Health deptt - Number of States/ UT deputed State Nodal Officer (CC) at Health Department - Number of States/ UT which have notified Task Force -Number of meetings conducted with other stakeholders like municipalities, other department PRI
	Capacity building for vulnerability assessment at various levels and liaison with centre	-Identify agency/ institute/ Organizations/ Centers of Excellence for developing guidelines, capacity building, supporting implementation, monitoring, supervision. - Enlist (customized as per states' vulnerabilities) i) Technical committees/ working groups to support the focal point, ii) skilled staff, (iii) logistics, (iv) funds	- As per priority list, State to prepare guideline/ action plan and upload the same on its website for ready reference. -Develop training modules, organize training - Conduct meeting / Workshops/ Training on CC&HH for health care personnel - Sensitize and orient private health care providers	- Extend and expand trainings to reach health care staff till village level. - Conduct workshops/ structured training in new treatment/ management technologies at regional or local level - Disseminate reports and good practices;	- Number of States/ UTs enlisted agency/ institute/ Organizations in their state for development of guidelines related to climate sensitive illnesses. - Number of states/ UTs enlisted experts for Technical committees/ working groups to support Nodal Officer and Task Force for climate Change. - Number of states/ UTs conducted vulnerability assessment for commonly occurring Climate sensitive illnesses in the state. - Number of States/ UTs conducted Training Need assessment in view of climate sensitive illnesses. - Number of States/ UTs made assessment in terms of required logistics and funds thereof.
	Nodal Department/ Ministry: MOHFW / Dte.GHS / NCDC Suggested Supportive Department/ Ministry: ICMR /Min. of Drinking Water and Sanitation / MHA/ DHR/ ICMR/ Min. of Agriculture/ ICAR & DARE/ DRDO / NDMA/ MWCD/ MoEF&CC				

S. No.	Key Actions	Activity			Indicators
		Short term (First two years)	**Medium Term** (up to five years)	**Long Term** (up to fifteen years)	
3.	**To strengthen health preparedness and response by performing situational analysis at national/ state/ district/ below district levels**.				
	Develop/ strengthen the monitoring and surveillance systems for climate sensitive diseases	- Develop / strengthen surveillance for each CSD -"*Standardize information* Prepare Guidelines, reporting forms for CSDs. - Train all concerned personnel on surveillance system (data collection, collation and analysis) - Integrate relevant non-health data in the health surveillance system - Initiate Sentinel & real-time surveillance for illnesses due to Air Pollution, Heat etc	- Build an interdisciplinary platform i.e. link health databases with real-time monitoring of weather, climate, geospatial, and exposure data so as to accurately forecast health illness/ event - Develop/ modify mechanism and indicators to monitor trend of CSDs. - Conduct Joint Review Missions / Central Internal Evaluations and feedback mechanisms.	Update monitoring and surveillance system as per new evidences Evaluate inter-disciplinary platform and upgrade as per evolving technologies. Identify gaps for research	- Number of states and UT conducted training for Concerned personnel on surveillance system - Number of states and UT integrated relevant meteorological data in the surveillance system of Climate sensitive illnesses. - Number of states/ UT initiated Real Time surveillance for Climate sensitive illnesses (Illnesses due to Air Pollution, Heat Exposure, Vector borne and Water borne illnesses) - Number of states/ UTs initiated Sentinel surveillance for illnesses due to Air Pollution, Heat etc
	Develop mechanisms for EWS/ alerts and responses at state, district and below district level	Constitute multi-stakeholder working group for development of early warning system for each CSD - Design and integrate public health response plan with Meteorology Dept, NDMA, EMR	-Review monitoring and surveillance system of CSDs -Develop thresholds/ prediction models for health events or CSDs. -States to develop communication plan and dissemination systems to warn people and communities	Evaluation and modifications for the appropriateness of the plans' for -Thresholds of action -Interventions to maximize response effectiveness for the relevant community or region.	- Number of States and UTs constituted working group for development of mechanism for EWS/ alerts -Number of states and UTs developed mechanism to integrate public health response plan with related stakeholders - Number of states and UTs developed communication plan and dissemination systems to warn people and communities
	Nodal Department/ Ministry: MOHFW / Dte.GHS / NCDC Suggested Supportive Department/ Ministry: MoEF&CC / ICMR / DHR/ Ministry of Drinking Water and Sanitation / MHA/ Ministry of Agriculture/ ICAR & DARE NDMA/ Min. of HRD/ ICMR / DRDO / NDMA/ MWCD				

S. No.	Key Actions	Activity			Indicators
		Short term (First two years)	**Medium Term** (up to five years)	**Long Term** (up to fifteen years)	
4.	**To develop partnerships and create synchrony/ synergy with other missions and ensure that health is adequately represented in the climate change agenda in the country**				
	Develop joint action plan with other deptt./ organizations In view of their capabilities and complementarities	-Enlist, map and analyse services by all possible stakeholders in the state as per their role in Climate Resilient Health Services -Identify or assess aspects/ areas underserved in management of CSDs - Develop affordable and acceptable tools for risk reduction and Environmental Health Impact Assessment - Establish *Corporate Social Responsibility* / *Accountability* in terms of finances for implementing measures for prevention/ reduction/ treatment of CSDs	- Broaden Stakeholders' network and partnership and reassess service areas to be served for climate related health risk reduction and Environmental Health Impact Assessment. - Evaluate Corporate Social Responsibility (CSR) under laws for Health strategies, Policies and measures for promotion of health - Meeting/ Consultation with local governing body for reassessment of roles and services and appropriate resource allocation and for limiting duplication of actions	- Reassess tools for risk reduction and Environmental Health Impact assessment. - Share best management practices which are affordable and acceptable in social/ traditional context locally - Evidence based support to decision makers for addressing gaps in climate resilient healthcare services	- Number of states and UTs enlisted stakeholders for CRHS - Number of states and UTs conducted stakeholders' mapping -Number of states and UTs analysed stakeholders' services and identified underserved aspects/ areas related to CSDs - Number of states and UTs developed tool for Environmental Health Impact Assessment for commonly occurring CSDs. - Number of states and UTs which have Involved corporate sector in management of CSDs.
	Integrate, adopt and implement environment friendly measures suggested in other missions on climate change	- Increase plantation in and around building to make it 'Green' - Incorporate measures in building design for making it climate resilient - Use technologies which reduce harmful chemicals emission & carbon foot-print - Use of energy-efficient equipments and services	- Expand measures to make healthcare sector 'Green'. - Replicate the successful 'model of building design' for new healthcare facilities - Explore and support technologies, equipments and services which are energy efficient and reduce harmful chemicals emission & carbon foot-print	Assess and document reduction of climate risk in climate resilient building design for replication in other states and UTs	- Number of states and UTs initiated 'Greening Effort' in their healthcare sector -Number of states and UTs ensured use of energy efficient equipments and technologies in healthcare sector -Number of states and UTs which have successfully built the 'prototype of healthcare building' which has incorporated measures to make it withstand climate disasters
	Nodal Department/ Ministry: MOHFW / Dte.GHS / NCDC Suggested Supportive Department/ Ministry: ICMR /DHR/ ICAR/DARE/ DRDO / NDMA / MoEF&CC / IMD /Min of Space/ NGOs / CBOs / Min. of New & Renewable Energy				

S. No.	Key Actions	Activity			Indicators
		Short term (First two years)	**Medium Term** (up to five years)	**Long Term** (up to fifteen years)	
5.	**To strengthen research capacity to fill the evidence gap on climate change impact on human health.**				
	Strengthening of healthcare services based on researches on climate variables and impact on human health	- Create database of professionals, researchers and institutions engaged in studies of impact of weather and climate on health - Create a platform for 'data-repository' of various researches on climate and health effects - Scenario-building (initiation of study, data sources, mechanism used, apportionment of risk factor, methodology, assumptions, model used, confidence interval) for establishing relation of climate variables and health impacts. - Identify best practices in implementation of measures to combat the effect of climate change	- Development of models mathematical or other types for early warning alerts for CSDs. -Develop / adapt techniques for modelling or use other research advances by transitioning them into operational products and decision support tools - Reassess health data esp CSDs using modelling techniques - Inform Policy-makers about 'scenario' of health-related statistics with focus on CSDs. - Conduct seminars, workshops, conferences on best practices of measures to combat effect of climate change on human health.	- Develop and validate models, enhance research on the effectiveness of CSDs management. - Evaluate and improve the effectiveness of modelling technique. - Evidence based information to Policy-makers - Conduct seminars, workshops, conferences on best practices of measures to combat effect of climate change on human health.	-Number of states and UTs with database of professionals, researchers and institutions engaged in studies of impact of weather and climate on health - Number of states and UTs which have created a platform for 'data-repository' of various researches on climate and health effects - Number of states and UTs which have listed 'Best Practices' of measures to combat effect of climate change - Number of states and UTs conducted at least two seminars in a year on CSDs and related aspects including 'best practices'.
	Nodal Department/ Ministry: MOHFW / Dte.GHS / NCDC Suggested Supportive Department/ Ministry: NDMA / IMD/ DOS / Dept. of Science & Technology / ICMR/DHR / ICAR/DARE/ DRDO/ CSIR				

As per the available evidences, it is known that change or variation in climate at any geographic location may affect the pattern of morbidity and mortality among the dwelling population. The commonly identified illnesses may be grouped as i) Extreme events (heat related illness), ii) Air Pollution and health related issues, iii) Vector borne diseases and iv) Water borne illnesses v) Malnutrition and vi) Various NCDs.

To protect health of people, it is necessary that health department of all states must consider the climate change as an emerging threat in causation of most of the illnesses and hence must undertake measures to adequately address this issue.

Initial Inputs/ activities desired (first 2 years)

1. Establish 'Environmental Health Cell' in State Health Department,
2. Identification of State Nodal Officer- Climate Change at State Health Department
3. Notification of Task Force with representation of other health programmes (vector-borne disease, infectious diseases, nutrition etc) multi-sectors/ departments such as Disaster Management Authority, Health Information System, district unit of departments of Meteorology, Pollution Control Board, Water and Sanitation, Public Works Departments and civil societies etc.
4. Vulnerability Assessment for baseline rate for Climate Sensitive Illnesses in terms of
   a. Geography (Plain/ Mountain/ Desert/ Coastal), identify worst affected areas (districts)
   b. Risk mapping with extreme events (heat/ cold/ drought/ flood/ cyclone/other),
   c. Affected *Population* (Total, density, Vulnerable, Occupation)
   d. Contributing/ exaggerating factors for these *Climate sensitive illnesses*
   e. Healthcare Infrastructure/ facilities like PHC, CHC, District hospital, Tertiary care hospitals- Government as well as Private.
   f. Identify areas for capacity building –human resource, technical and healthcare service delivery.
5. State health adaptation plan must be prepared for extreme events (heat related illness), Air Pollution and health related issues, Vector borne diseases and Water borne illnesses
6. State health department should identify and strengthen department/ institute/ organization/ health care facilities/ other stakeholders for providing assistance for management of cases and for monitoring and surveillance for climate sensitive illnesses
7. Coordinate with premiere institute/ organisation like Centre of Excellence for developing training module/ guidelines and Inclusion of mitigation and adaptation measures in Students' Curriculum.

8. Develop, integrate and Implement media communication plan for common CSDs involving health determining sectors and communities.

Process: 2 to 5 years

1. Formulate specific implementation framework for climate sensitive diseases.
2. Contingency plans for climate sensitive illnesses - appropriate and efficient health personnel, logistics & resource allocation.
3. Capacity building and training of health care personnel on guidelines and treatment modalities against climate sensitive illnesses at district level in each state.
4. Development of early detection tools for CSDs (rapid diagnostics, surveillance) or mathematical /prediction models for preparedness of population and health care system.
5. Periodic reviews for improvements or deterioration of indicators (vulnerability, response capacity, preparedness, and environmental determinants) identified for each CSD.
6. Awareness generation- integrate IEC, engage local leaders & community, yearly “Advocacy network meeting” and health talks, specific day celebration, health melas etc.
7. With projected climate risks, adapt new technologies, building design, energy, water and sanitation provisions for new constructions of healthcare facilities, but if already existing, modify as per permissible building norms.
8. Link data on data of Climate sensitive diseases, environmental factors determining health, meteorological information, and outcomes as morbidity and mortality.
9. Risk mapping and seasonal trend for CSDs: multi-sector management approach.
10. Research and epidemiological studies / surveys on vulnerable population for climate sensitive illnesses.

Expected Output:

1. Awareness & Behaviour modification of general population for impact, illnesses, prevention and adaptive measures for climate sensitive illnesses.
2. Increase in trained healthcare personnel and equipped institutes/ organization towards achievement of climate resilient healthcare services and infrastructure at district level in each state.
3. Integrated monitoring system for collection and analysis of health related data with meteorological parameters, environmental, socio-economic and occupational factors
4. Regulation on key environmental determinants of health: air quality, water quality, food, waste management, agriculture, transport.
5. Evidence–based support to policy makers, programme planners and related stakeholders

VIII. CLIMATE RESILIENT HEALTH SYSTEM: STAKEHOLDERS's INTERVENTION

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

The existing efforts in public health preparedness, disaster risk reduction, and programs for communicable and non-communicable diseases may be inadequate, ineffective or unsustainable, if they are not climate resilient. It requires vulnerability re-assessment and should take into account both current climate variability and projected future impact of climate change on disease burden and hence management. The overview of roles and activities for health as well as non-health departments are listed below as guide for group of Climate Sensitive Diseases. States and UTs have to make micro-plan as per their vulnerabilities and geo-climatic conditions.

A. Human Health vs Extreme weather events

States and UTs may have recorded raised morbidity and mortality due to effect of extreme weather conditions viz frequent and severe episodes of heat waves, floods, droughts and fires as a direct impact of climate variability and affecting population at large.

Vulnerability factors: Demography especially people at extremes of age (>65yrs, children), Health status, Socioeconomic status, Occupation, working place and working conditions, unplanned urban housing, overcrowding, remote area, Drought/ flood prone area, water scarcity zone

Role of Health Sector **(State Nodal Officer and Task Force)**

1. Develop/ adapt health micro-plans for extreme weather events based on meteorology warnings and change in trend of illnesses in recent years.
2. Map vulnerable population based on demography, land cover, water bodies, potential exposure, available resources health insurance coverage, and burden of chronic illnesses in the community.

3. Develop or translate IEC in local language, and make a communication plan for dissemination of health related alerts/ education materials for target or general population.
4. Build capacity of health care personnel to detect and treat illnesses associated with extreme weather events
5. Issue health advisory to healthcare personnel based on IMD seasonal prediction or warning
6. Ensure health related Real-time Surveillance and Monitoring System in case of extreme event
7. Explore collaborative mechanisms (e.g. memoranda of understanding) with other departments, stakeholders, such as meteorological, pollution control board etc for sharing data and for coordinating efforts to manage health risks.
8. Ensure Inter-sectoral convergence and coordination for improving architecture, design, energy efficient cooling and heating system at health facility, increase in plantation i.e. Climate Resilient Green Building Design.
9. Reassess 'Occupational Health standards' for various types of Occupation.
10. Ensure strict implementation of legislative/ regulatory actions as per Occupational Health Standards.

Coordination with other sectors in reducing illnesses due to Extreme Weather Events

SNO-CC and the Task Force should explore collaborative mechanism (e.g. memoranda of understanding) for regular sharing data and for coordinating efforts to manage health risks. The suggested sectors are listed below, however the list may be expanded or modified as per the need of the state /UT.

Meteorological Department

- Accurate and timely forecast for extreme weather
- Communication of 'alert' to state health departments, vulnerable groups/ agencies

Water Board

- Management and supply of safe and adequate water to all in the state.
- support & promote water conservation methods like rain water harvesting.

Municipalities

- Develop and promote building design and other infrastructure codes supporting 'Green building' and use of energy efficient and natural ways of lighting and cooling
- Undertake actions like: planting trees, ensure non-burning of garbage, supply of safe water and maintaining sanitation.
- build cool shades at public places, cool corridors for pedestrians

Ministry of Environment, Forest Climate Change

- Develop/ encourage projects to decrease the '*Urban Heat Island effect'*.

- Ensure green coverage in the cities through checking deforestation, urban planning and increasing plantation.

Ministry of Education

- Sensitise students towards health impact of extreme events and disseminate health ministry approved prevention and first-aid measures.
- Train teachers on first aid measures for all possible extreme events (as per state's vulnerability)
- During extreme events: keep a check on outdoor activities and close teaching institutes in case of issue of alert from Government.

Ministry of Transport

- Provision of safe and improved Public transport like air conditioned buses, local trains and other transport at affordable rates.

Media & NGOs

-Disseminate success stories, methods and measures to promote community awareness on preventive measures and first aid to reduce health impacts of extreme weather.

B. Water borne & Food borne diseases

Illnesses due to contaminated water and food are usually seen following flood, drought, religious or other mass gatherings. SNO-CC and the related stakeholders must undertake suitable measures to keep a check on morbidity and mortality due to water and food borne illnesses.

Vulnerability: Availability of safe water supply to all, sanitation facilities in general and in urban slums and remote rural areas, personal hygiene, political willingness, Socio-economic status, cultural beliefs, natural disasters, demographic changes, accessibility to health care.

Role of Health Sector **(State Nodal Officer and Task Force)**

1. Develop/ adapt health micro-plan for water and food borne illnesses (case management, resources required like logistics, drugs, vaccines, laboratories' role)
2. Map vulnerabilities: population at risk, geo-climatic conditions, recent trend of climate variability (flood, drought), change in population demography (migration), available resources, healthcare infrastructure, laboratories, burden of chronic illnesses in the community etc
3. Build capacity of health care personnel to detect and treat water and food borne illnesses
4. Strengthen/ Develop real-time surveillance, evaluation and monitoring system for water and food borne illnesses, enhance this surveillance during high risk period
5. Issue advisory to healthcare personnel, laboratories and related stakeholders
6. Develop or translate IEC in local language, and make a communication plan for dissemination of health related alerts/ education materials.

7. Ensure adequate supplies (vaccines and medications) for cases management with other required logistic as identified to the affected region
8. Improve access to health care facilities by vulnerable population, especially those in remote areas.
9. Coordinate with related stakeholders like Municipalities to keep a check and strengthen surveillance of food handling units, local vendors, water supply etc.
10. Explore collaborative mechanisms (e.g. memoranda of understanding) with other departments, stakeholders for sharing of data and for coordinating efforts to manage health risks.

Coordination with other sectors in reducing water and Food borne illnesses

Department of Water & Sanitation

- Ensure minimum household safe water supply
- Reuse treated waste-water for non-household use
- Encourage water saving technologies like low-flow toilets & Showers, rain water harvesting etc

Municipalities and other Local regulating bodies

- Ensure safe water supply and good sanitation to check transmission of infective agents
- Regulate street vendors, food handling units for quality food

Ministry of Agriculture

- Develop/ encourage programs for efficient use of irrigation water.
- Promotion of climate resilient crops among farmers

FSSAI and other food regulatory body

- Check food items for various types of contamination or adulteration
- Disseminate appropriate information for reducing food borne illnesses

C. Air Borne, Cardio-pulmonary & Respiratory Allergic Diseases

Climate variability and frequent change in weather and extreme events affects have been linked to increase in illnesses of lungs and cardio-vascular system.

Vulnerability: Change in timing, survival, transmission & duration of certain microbes (like Influenza virus), Interaction of air pollution, pollen and weather, Proportion of population-malnourished, extremes of age, underlying illnesses, pregnant females, Commonest type of occupation, urban slums and remote rural areas, Socio-economic status, accessibility to health care

Role of Health Sector **(State Nodal Officer and Task Force)**

1. Develop/ adapt health micro-plan for 'Air borne, Cardio-pulmonary and Respiratory diseases (case management, resources required like logistics, drugs, vaccines, and laboratories' role).

2. Map vulnerabilities: population at risk, geo-climatic conditions, seasonal variation, exposure to pollens or allergens by change in types of crops or flower plants, change in population demography, migration (in & out), available resources, healthcare infrastructure, laboratories, burden of chronic illnesses in the community
3. Strengthen/ Initiate Sentinel surveillance, real-time surveillance, evaluation and monitoring system for respiratory and cardio-vascular illnesses, hospital admission as well as Outpatient attendance in relation to weather and air quality parameters.
4. Enhance vaccination programs and 'Vaccination Campaign' for vaccine-preventable air borne and respiratory diseases
5. Develop or translate IEC in local language, and make a communication plan for dissemination of health related alerts/ education materials.
6. Capacity building and increasing awareness for individuals, communities, health care workers through involvement of various media as well as campaigns and training workshops.
7. Develop Standard treatment guidelines for allergen management based on exposure forecasts – air quality, allergens, dust, etc.
8. Ensure adequate logistic support, including equipments and other treatment modalities and 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
9. Inter-sectoral and stakeholders' coordination to monitor health outcomes with early warning system related to extreme weather events/ Air Quality Index/ ground level Ozone etc.

***Coordination with other sectors for reducing* respiratory and cardio-vascular illnesses**

(Adapted from MoHFW's Steering Committee Report on Air Pollution & Health Related issues 2015)

Ministry of Environment, Forests and Climate Change

- Ensure that Central and State Pollution Control bodies set standards for industry-specific emission and effluent, monitor levels of pollutants and enforce penalties.
- Enforce strict air quality standards for pollution
- Strict implementation of Environment Impact Assessments (EIA) to minimize the adverse impact of industrial activities on the environment
- Effective implementation of 'National Green Tribunal' directives on trash burning/ waste disposal from different sources
- Take strict measures for unregulated sectors (such as brick kilns, trash burning, stone crushing) which contributes to ambient air pollution

Ministry of Human Resource Development

- Regular screening of school children for early detection of diseases, this can be attributed to the existing air pollution

- Inclusion of harmful health effects of environmental pollution (AAP and HAP) in the school curriculum, including current policies and mitigation practices that are designed to reduce air pollution

- Improve indoor air quality of educational institutions nationwide

- Improve walkability 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

Ministry of Agriculture

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

Ministry of Rural Development

- 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.)

Ministry of Urban Development

- 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 during winter months)

-Help cities develop air pollution alerts and emergency plans based on the Air Quality Index or CPCB continuous air monitoring data

Ministry of New & Renewable Energy

- Develop policies for truly clean cookstoves and support research and development.

- Research and development of other non-conventional/renewable sources of energy and programmes relating thereto, including locally generated power to supply cooking appliances;

- Support and strengthen Integrated Rural Energy Programme (IREP) with emphasis on indoor air pollution

- Develop National Policy on clean Biofuels (biogas, ethanol, etc) and set up National Biofuels Development Board for strengthening the existing institutional mechanism and overall coordination.

- Create a national consensus action plan for replacing biomass fuels with alternative clean fuels

Ministry of Petroleum & Natural Gas

- 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

Ministry of Power

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

Ministry of Road Transport and Highways

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

Ministry of Information and Broadcasting

- 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

Ministry of Communications & Information Technology

- 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

Ministry of Labour and Employment

- Regular health check- ups for early screening of pollution related diseases.
- Frame guidelines and conduct workshops for health promoting workplaces, (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 (eg. Metro) or non-motorised transport.

Ministry of Women and Child Development

- 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

Ministry of Finance

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

Ministry of Law and Justice

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

D. Vector-borne and Zoonotic diseases

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

Vulnerability: Weather variables: temperature, rainfall, humidity, floods, drought, wind, daylight duration etc., Change in Vector / animal population due to change in growth, survival, feeding habits, seasonality, breeding sites, resistance etc, Change in interaction of vector/ animal & pathogen due to change in susceptibility, Incubation period, or transmission, Change in demography, migration, land-usage practices, water projects, agricultural practices and Public health infrastructure and access to it.

Role of Health Sector **(State Nodal Officer and Task Force)**

1. Programme Officer for National Programs for control of vector borne diseases (NVBDCP) & various zoonotic diseases must consider climate variability as an important factor for assessment of morbidity and mortality statistics and develop/ adapt health micro-plan based on recent VBD & Zoonotic diseases trend
2. Map vulnerabilities: population at risk, geo-climatic conditions, seasonal variation, change in population demography, migration (in & out), available resources, healthcare infrastructure, laboratories, etc.
3. Strengthen/ Develop active and passive surveillance and establish sentinel sites for vector borne & Zoonotic diseases.
4. Capacity building and increasing awareness for individuals, communities, health care workers through involvement of various media as well as campaigns and training workshops.
5. Develop or translate IEC on effects of climate change on VBDs & zoonotic diseases in local language, and make a communication plan for dissemination of health related alerts/ education materials.
6. Ensure adequate logistic support, including equipments and other treatment modalities and supplies for case management at all levels of health care and also under ‘Emergency response Plan’ in case of any disaster or an outbreak
7. Vaccination of animals and animal handlers for vaccine preventable diseases.

8. ‘Environmental Health Impact Assessment’ of new development projects
9. Early warning system for vector borne and zoonotic diseases.
10. Enforce legislation and regulations of vector borne and zoonotic diseases

Coordination with other sectors for reducing VBDs & Zoonotic diseases

(As per the suggested sectors in the NVBDCP)

- Inter-sectoral collaboration for vector control
- Providing equipments and other related logistics for control of vectors
- Elimination and reduction of vector breeding sites.
- Encourage research on new safe and effective control measures

Intervention by veterinary task force

- Prevention and control of animal diseases and zoonoses
- Vaccination of animals & control on population of stray animals
- Safe destruction of carcasses and other material of animal origin
- The care of ‘food animals’, including collection, feeding, sheltering, slaughtering etc

Intervention by Community & Individual

- Eliminate/ control small & manmade vector breeding sites
- Make barriers for human dwellings to keep stray animals away from human dwellings by fencing the residential areas especially if in approximation to forests etc.
- House protection by using screening windows, doors and fencing the garden etc.
- Use self protection measures like protective clothing etc,

E. Nutrition related diseases

Climate variability and extremes of weather events affect food quantity and quality through reducing production, poor storage, pathogen infestation, disrupted supply chain, hike in market price.

Vulnerability: Changes in food like availability, accessibility, utilization, system stability, crop failure/ yield decline. Indirect effects are due to reduction in animal/ aquatic population, agricultural yield

Role of Health Sector **(State Nodal Officer and Task Force)**

1. Develop/ adapt health micro-plan for reducing nutritional deficiency disorders
2. Map vulnerabilities based on seasonal nutritional screening (Vit A, Anaemia) in children, pregnant & lactating females high risk communities
3. Capacity building and increasing awareness for individuals, communities, health care workers through involvement of various media as well as campaigns and training workshops.
4. Strengthen/ Develop active and passive surveillance for nutritional deficiency diseases

5. Strengthening surveillance & control programs for diseases like malaria, schistosomiasis, parasitic infections
6. Scale up integrated food security, nutrition and health programmes in vulnerable zones for at risk populations
7. Strengthen maternal & child health services and promote implementation of IMNCI programme.
8. Expand & promote fortified food consumption in the vulnerable population
9. Develop or translate IEC, communication plan and mass media strategy for behaviour change of vulnerable population.
10. Capacity building and increasing awareness of the population through regular training workshops on health and nutrition education
11. Support and strengthen preventive programme on health nutrition (fortification and supplementation) and projects within public health divisions, with emphasis on community involvement projects.

Coordination with other sectors for reducing Nutrition related diseases

Ministry of Human Resource Development & Ministry of Women & Child Development

- Regular screening of school children for early detection of nutritional diseases.
- Inclusion of dietary guide in the school curriculum, with reference to Indian food habits.
- Sensitize students and teachers on nutritional deficiency, worm infestation and other Gastro-intestinal infections leading to malnutrition.

Ministry of Agriculture

- Promote agriculture practice addressing specific nutrition demand of general population and availability of same

F. Non-communicable Diseases (NCD) & Mental illnesses

Non-communicable diseases and mental disorders have been found to be closely associated with variation in climate, exposure to various types of pollutants and type of occupation

Vulnerability: Demography, Health status, Socio-economic status, type of occupation, accessibility to health care and diagnostic facilities, weather variables, exposure to pollution and Nutritional status

Role of Health Sector and related non-health sectors (State Nodal Officer and Task Force)

1. Establish & Integrate multisectoral mechanisms to plan, guide, monitor and evaluate and enactment of NCD through implementation of plans, policies and legislation

2. Adapt and implement WHO surveillance framework that monitors exposure (risk factors), outcome (morbidity and mortality), and health system response
3. Implement effectively the national health programmes aimed at reducing/ controlling NCD and mental illnesses.
4. Strengthen surveillance and monitoring for the high risk population and identify/ assess need in routine as well as in emergency situation (Emergency preparedness plans).
5. Ensure access to appropriate diagnostic facilities, related logistics and case management to the high risk population.
6. Define price regulatory mechanism for NCD drugs and basic diagnostic equipments and laboratory tests to increase affordability by the poor section of the society.
7. Risk communication, counselling and case management skills, should be available at all the levels including primary health-care level
8. Capacity building through training of human resource for addressing NCD related risk factors due to climate change.
9. Raise public and political awareness and understanding about NCDs including mental health, oral health, injuries and indoor air pollution through social marketing, mass-media and responsible media-reporting during extreme weather.
10. Assess the health impact of policies in non-health sectors e.g., agriculture, education, trade, environment, energy, labor, sports, transport, urban planning.
11. Strengthen supportive policies and legislations to promote healthy diet, reducing food with high transfat content, artificial colours and junk food
12. Strengthen capacity of the enforcement agencies (Police, Food Trade Inspectors and Road Safety Inspectors).
13. Provide adequate and sustained resources for NCDs by increasing domestic budgetary allocations, innovative financing mechanisms, and through other external donors

IX. NAPCCHH: ORGANISATIONAL FRAMEWORK FOR IMPLEMENTATION

Operational framework for implementation of National Action Plan for Climate Change and Human Health at National, States/UTs, District and Health-facility level is as follows:

National Level

A) National Level- Advisory Committee

This committee shall function under the Chairmanship of Secretary Health & Family Welfare. The proposed members of this committee are:

Secretary Health & Family Welfare	***Chairman***
Additional Secretary, Health, MoHFW, GOI	Member
Secretary Health Research cum Director General- ICMR, GOI.	Member
Director General Health Services, GOI	**Vice-Chairman**
Director, NCDC, Dte.GHS, MoHFW, GOI	**Member Secretary**
Director, NVBDCP, Dte.GHS, MoHFW, GOI	Member
Representation from other Ministries/ departments	
Director General, National Disaster Management Authority	Member
Secretary, Ministry of Environment, Forest & Climate Change	Member
Secretary, Ministry of Earth Sciences	Member
Secretary, Ministry of Agriculture	Member
Secretary, Central Ground Water Board, Ministry of Water Resources, Rural Development and Ganga Rejuvenation	Member
Chairman, Central Pollution Control Board	Member
Representation from Department of Science & Technology	Member

Roles and Responsibilities of the National Level Advisory/ Steering Committee

- Nodal body to take decision regarding the policy making and implementation of the National Action Plan for Climate Change and Human Health (NAPCCHH) in the country.
- Nodal body to roll out the NAPCCHH in the country.

B) ***National Level- Centre for Environmental & Occupational Health Climate Change & Health (CEOH&CCH)*** *at National Centre for Diseases Control*. This centre is nodal agency for Climate Change & Human Health and will provide technical inputs and support to Environmental Health Cell at state and UTs regarding the capacity building, implementation, monitoring, supervision & evaluation of the NAPCCH program. Director, NCDC is the Nodal Person and Member-Secretary of Climate Change and human Health. The proposed manpower structure at this centre is as follows:

Additional Director & Head (Public Health)	1
Joint Director (Public Health)	3
Deputy Director (Public Health)	3
Assistant Director (Public Health)	6
Senior Consultant-Capacity building/ Training	2
Senior Consultant-Environmental Health Specialist	2
Senior Consultant-Monitoring & Evaluation	1
Senior Consultant- Public Health Informatics Specialist	1
Consultant- Finance & Admin	1
Consultant- Communication/ Advocacy	1
Technical Officer-Data Management	3
Secretarial Assistants cum Data Entry Operators	3

Roles and Responsibilities of the CEOHCCH Division, NCDC are:

- Technical inputs to be provided to all states and UTs for activities related to climate change and human health.
- Plan, Coordinate, Monitor and evaluate NAPCCHH related activities at National, State and below level
- Support states and UTs for development of health adaptation plan and operational guidelines for Climate Sensitive Diseases'.
- Review meetings, field observations regarding implementation of NAPCCHH.
- Strengthening of Surveillance of Climate Sensitive Diseases
- Strengthening of health care system by involving premiere institutes and organisation for disease management

- Development of prototype of IEC and advocacy material, training modules for healthcare personnel, revision of students' curriculum.
- Guiding state health department for providing list of required manpower, logistics, drugs and equipments for managing climate sensitive illnesses.
- Conduction of operational research and evaluation studies for the NAPCCHH

For coordination with other stakeholders, government departments at National and states/ UTs level in the country, the Environmental Health Cell at the Directorate General Health Services will support CEOHCCH division at NCDC. It will help assess the achievement of targets planned under the NAPCCHH programme.

State Level:

A) State Level - Governing Body

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

Honourable State Health Minister	*Chairman*
Principal Secretary (Health*)*	*Vice Chairman*
Director Health Services/Head of Health System	Member Secretary
Mission Director-National Health Mission	Member
Director Medical Education	Member
Regional Director -Health & Family Welfare	Member

B) State Level Task Force

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.

DHS will create an ***Environmental Health Cell*** within State Health Department, and will identify a ***Nodal Officer*** from Health department which preferably should be Public Health Expert of the rank of Joint/ Deputy Director. The State level task force shall have inter-ministerial members which are suggested as:

- *Public Health Expert* from State Health Department **Nodal Officer**
- Director, ICMR Institute/Centre (If any branch in the State/UT) Member

- Director, Meteorological department of State/UT Member
- Chairman, State Pollution Control Board Member
- Chairman, State Disaster Management Authority Member
- State Surveillance Officers Member
- Environmental Engineer/ Scientist from MOEFCC Member
- Secretary, State Agriculture Ministry Member
- Secretary, State Ground Water Board Member

The Task force of the State/ UT's Environmental Health Cell will coordinate with the Centre for execution of state/ UTs SAPCCHH. The proposed State Level Structure of Environmental Health Cell is as follows:

Structure at State/ UT Environment Health Cell:

Nodal Officer (State Health Department)	***1***
Consultant-Capacity building/ Training/ HR Management	***1***
Consultant-Environmental Health	***1***
Data Manager & Analyst	***1***
Secretarial Assistants cum Data entry Operator	***1***

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, 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.

District Level:

At District level, a District Environmental Health Cell shall be constituted; which shall be comprised of the following:

The proposed District Level Structure is as under:

• District Magistrate/ District Commissioner	Chairman
• Chief Medical Officer/ CDHO	Member Secretary
• Deputy CMO (Admin)	Member
• Senior Deputy CMO	Member
• DMO/DVBDOPO	Member
• District Health Education Information Officer	Member
• District Coordinator	Member

Structure at District Environment Health Cell:

District Coordinator	***1***
Data entry operator	***1***

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 profile for these illnesses.

Community Health Centre Level

The proposed CHC Level Structure is as under:

- Medical Superintendent (CHC Hospital) :Chairman
- Health Education Officer :Member Secretary
- Block Development Officer :Member
- Health Supervisor :Member

Health Facility Level:

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

X. NAPCCHH: CAPACITY BUILDING AND SYSTEM AWARENESS

Capacity building will be based on the baseline and follow-up situation which should be assessed periodically. Communication and training are crucial in adaptation to variability or changes in the climate. Communication programmes based on a thorough needs assessment must aim to enable and empower people, in particular, the illiterate, poor and other vulnerable people such as women, children, the elderly, people suffering from debilitating medical problems and those living in coastal areas, highlands and urban slums. Such programmes should have adequate and appropriately designed communication tools that are locally suitable, popular and comprehensible.

- ✓ Effective communication and public awareness activities/advocacy: sensitize, orient and take support of leaders/ opinion makers / stakeholders/ celebrities/ civil societies.

- ✓ Communication intervention for target audience: Appropriate, efficient and cost-effective measures include clear and timely information covering who is involved; what happened; when it happened; where it happened; and why or how it happened or what may happen – how, why, where, among whom and how to face it.

- ✓ National and Regional level capacity building institutions needs to be identified for capacity building of health staff: include training and imparting technical skills for case management, risk assessment skills, entomology, epidemiology, climate models, disaster management, meteorology, monitoring and evaluation, and research.

- ✓ Conducive institutional and management arrangements to ensure involvement of private sector by forming public private partnerships.

- ✓ Hospital and all other health-care systems must be strengthened. Involve community in the process of strengthening and in managing and maintaining the system.

- ✓ Inventory management: standardized list of adequate and appropriate logistics medicines, kits, equipment and machines along with efficient storage systems.

- ✓ Specific strategies and standard operating procedures for managing climate sensitive diseases need to be developed in light of the future impacts of climate change with prevention in mind.

- ✓ Communication interventions in schools are effective approaches for which teachers would need materials and training to educate the children.

XI. NAPCCHH: REPORTING, MONITORING AND EVALUATION

The Monitoring & Evaluation of the implementation of NAPCCHH has been stipulated with a mix of internal and external approaches. MoHFW, State DoHFW, District Health Officers and the individual health facilities will be involved in regular internal monitoring. External Monitoring will be done by an independent agency.

a) **Internal:** Monthly / quarterly progress monitoring for climate sensitive illnesses has to be done at all levels, i.e. District to State to MoHFW. These Monthly / Quarterly Progress Reports should include a collation / aggregation of the data / information compiled in each health care facility. The District Cell will have the responsibility of collation / aggregations of the data / information compiled in each health care facility and submit to the State Cell which will validate and forward the data to the National Cell. A set of indicators for NAPCCHH implementation should be merged with the overall HMIS that has been established under the NHM.

b) **External:** Each state should commission an independent evaluation every 2 years. At the minimum, the audit should cover one well performing district and one slack performing district. The agency to conduct the NAPCCHH Implementation Audit should be chosen based on the background, experience in the State's health sector, environmental auditing and reputation of reliability. The recommendations of the audit should be developed into an action plan to strengthen the existing system.

XII. FRAMEWORK FOR STATE SPECIFIC ACTION PLAN FOR CLIMATE CHNAGE AND HUMAN HEALTH

India is a diverse country in terms of geography, climatic conditions, resources and health related infrastructure. Also, it is a highly populous country, undergoing rapid industrialisation, unplanned urbanization, increasing malnutrition and having triple burden of diseases comprising of communicable, non-communicable, emerging and re-emerging diseases. All these factors have cumulative effect resulting in risk of ill- health of citizens of India.

States have developed Action Plan on Climate Change (available at MoEFCC's website), but, 'health related component' is missing in it. Hence all states and Union Territories are being encouraged to develop their State-specific Action Plan on Climate Change and Human Health (SAPCCHH). The broad suggested framework for the same is as follows:

1. Background

(Following Data has to be compiled district wise)

Geo-physical & Climate variables: Type of area (Plain/ Mountain/ Desert/ Coastal), type of Climatic or extreme events (heat/ cold/ drought/ flood/ cyclone/other) usually occurring in the state/ UT with potential to affect health status of the population. Approximate green cover and recent change in green cover/ forest, if any.

Statistics of state/ UT: Population (Total, Population density), Vulnerable Population (Under five Children, Adolescents, Elderly, migrants and Occupation (Primarily for major population and others).

Health care Infrastructure: Enlist the number of Health care Infrastructure/ facilities like PHC, CHC, District hospital, Tertiary care hospitals- Government as well as Private in State/UTs (preferably District wise).

Enlist and identify roles and responsibilities of operational district level bodies relevant to climate change and their constitution, such as Distt. Disaster Management Authority, Disease Surveillance Programmes, Distt. Health Information System, district unit of Departments of Meteorology, Pollution Control Board, Water and Sanitation, Public Works Departments and civil societies etc.

2. Operational Framework at State Level

Governing Body

The state level governing body for policy level decision may be constituted under Chairmanship of Honourable State Health Minister or any other Senior Officer. The suggested body is as below:

• Honourable State Health Minister	Chairman
• Principal Secretary (Health)	Vice Chairman
• Director Health Services/Head of Health System	Member Secretary
• Director Medical Education	Member
• Mission Director-National Health Mission	Member
• Regional Director -Health & Family Welfare	Member

(*However, State may take its own decision*).

Task Force: The task force under the guidance of Principal Secretary (Health) with Directorate of Health Services (DHS) of the state, and will ensure implementation of the State Action Plan for Climate Change and Human Health (SAPCCHH) in their state/UT.

Environmental Health Cell within State Health Department, DHS may identify a Nodal Officer from Health department, preferably should be Senior Public Health Expert. The State level task force shall have inter-ministerial members which are suggested as:

• Public Health Expert from State Health Department	Nodal Officer
• Director, ICMR or other Research Institute	Member
• Director, Meteorological department of State/UT	Member
• Chairman, State Pollution Control Board	Member
• Chairman, State Disaster Management Authority	Member
• Environmental Engineer/ Scientist from MOEFCC	Member
• Secretary, State Agriculture Ministry	Member
• Secretary, State Ground Water Board	Member
• State Surveillance Officers	Member

The details of Nodal Officer and experts in Task Force like name, designation, contact details (Phone number, postal address and email) should be listed in the SAPCCHH.

3. Current status of Climate Sensitive Illnesses

- Identify, assess, and document potential risks of climate sensitive diseases (as applicable to the state) like
  - Extreme weather events affecting health
  - Vector Borne diseases
  - Water & Food Borne disease
  - Cardio-respiratory illnesses
  - Zoonotic diseases
  - Others like renal diseases, nutritional deficiency disease etc

- Document Morbidity, Mortality and related statistics of these Climate Sensitive diseases with reference to change in recent years.
- Risk Mapping to identify the 'Hot spots' for vulnerable population with respect to health infrastructure and other resources.

4. Adaptation strategy and action plan for each of the illnesses/ diseases sensitive to Climate variability (as listed in point 3 above)

- List the stakeholders with defined roles and responsibilities (Govt. & non-Govt)
- Identify and list the resources available
- Identify actions for risk reduction that are agreed upon by stakeholders and the public
- Operational Coordination (Stakeholders' role and involvement): Building partnerships by involving citizens, organizations, and businesses.
- Make a detailed action plan with checklist for each identified climate sensitive illness:
    - Logistics required at health care facilities
    - Preparedness of health system and personnel
    - List activities for prevention of illnesses (IEC, pamphlets, advisories, training, workshop etc).
    - Operational communication channel
    - Mechanism to ensure data maintenance, surveillance, timely sharing with concerned departments and stakeholders.

5. List Actions undertaken and further proposed to reduce the burden of Climate sensitive illnesses at State/UT

- Activities conducted and planned for awareness generation on the health impacts of climate change
- Activities conducted and proposed to integrate climate-sensitive health concerns in respective health programmes or policy.
- Activities undertaken if any and further proposed to train health workforce on climate change.
- Actions undertaken if any and further proposed to ensure unaffected water supply, sanitation, waste management and electricity.
- Activities undertaken and further proposed related to greening of health sector i.e. health facilities use energy-efficient services and technologies.
- Activities undertaken and further proposed related to integration with State Disaster Management Authority for emergency risk reduction and early response.

- Activities undertaken and further proposed related to data collection and analysis, strengthening of surveillance related to climate variable and climate change sensitive illnesses.

6. Miscellaneous

- Diseases Specific Action plan/ Advisory/ IEC prepared if any, please enumerate and may kindly share with NCDC at email: ncdc.env@gmail.com.
- Other factors (if any) contributing to increase/ decrease of climate sensitive illnesses in your state
- How effective are current health and other sector policies and programmes to manage the climate sensitive illnesses in your state/UT.
- Success Stories if any, of the State/ UT health sector for adaptation or mitigation of climate sensitive illnesses.
- Research studies, reports, innovative actions etc related to climate change and human health if taken in the state must be shared with CEOHCCH division at NCDC for sharing it further with our states and UTs.

(Note: The indicators related to input process, output and outcome shall be added in the State Action Plan during subsequent meetings at time of firming up the State Action Plan for Climate Change and Human Health).

Regional Consultations

The *Centre for Environmental and Occupational Health Climate Change & Health*, National Centre for Disease Control, Delhi, conducted four regional consultations in 2017-18 involving all the states and Union Territories' of the country. Officials from Health department and related stakeholders were invited in these consultations.

Regional consultations aimed at sensitising states and Union Territories on reassessment of diseases' morbidity and mortality with respect to climate variability and extremes have been conducted. Prior to these regional consultations, the states and UTs were requested for:

1. Identification of *Nodal Person for Climate Change* from *State Health Department.*
2. Constitution of *"State Environment Health Cell"* at State Health Ministry level.
3. Notification of a Task Force with experts from other departments/ organisation or other stakeholders identified by state.

These regional consultations had participations from ministries and department of states and UTs including Senior Regional Directors, Regional Directors from Regional Office of Health & Family Welfare, State Nodal Officers, State Surveillance Officers, National Vector Borne Diseases Control Programme, Officers from Integrated Diseases Surveillance Programme, representatives from identified Centre of Excellence, representatives from Regional Centre of Meteorological Departments, Ministry of Environment Forest and Climate Change and Central Ground Water Board. The states and UTs' representatives were aware of the urgency and serious concern for the agenda of the consultation.

State health teams were expected to list and prioritize climate sensitive illnesses in their state and UTs, compilation of data on morbidity and mortality, statistics related to vulnerable population, geographical factors, health care infrastructure/ facilities, or any mitigation and adaptation measures adopted by state against impact of climate change on human health. The salient points of recommendations of regional consultations are as follows:

- Representative from Regional Centre, Indian Meteorological Department suggested to use the term '*Climate Variability'* to study the health consequence as Climate Change is more vast and generic term.
- The geographical distribution, mapping and epidemiology of the diseases like vector borne, water borne etc should be done at the earliest in each state/ UT.
- "*Personal Cooling Garment*" or equivalent devices developed by other agencies may be advocated for use if it is (these are) found appropriate.
- Existing surveillance system like IDSP should be used for disease related data capture, through expanding of reporting units and regularly conducting review meetings may be weekly.
- As population is indirectly related and resulting to climate change, population policy may be revised.
- Vector survival and breeding are known to be affected by the climate variability hence programme on vector borne diseases control should be revised to check diseases occurrence in new areas.
- For dealing with the extreme heat events, reconsider the following for issue of health related advisories:
    - OPD timings in healthcare settings
    - Drugs and vaccine storage
    - Norms for Working hours at workplace
    - School timings etc

- Detailed plan for each climate sensitive illnesses should be laid down by each state/ UT considering planning for present illnesses and also with scope to include new/ emerging or re-emerging climate sensitive illnesses.
- The state while drafting their state health action plan for climate change should also refer the Joint Monitoring Meeting report of IDSP.
- Rapid Response Teams may be trained at state level using infrastructure of CSU, IDSP and medical colleges.
- Participants proposed rules and regulations formulation should be in place for the factors which are directly or indirectly affecting weather and climate and hence the human health.
- Actionable points/ good initiatives/ practices should be shared so as the same can be adopted by other states/ UTs.
- Chairman proposed a 'Climate Change Health Forum' to include all experts as informal members. This forum will help in sharing of experience, meeting outputs and further it will bring all together to contribute in terms of feedback, suggestions,

XIII. NAPCCHH: BUDGET

The proposed activities under NAPCCHH focus primarily on awareness generation, sensitisation for effect of climate on occurrence of CSD, making of health system climate resilient, capacity building of states and UTs for preparing their specific action plan for climate change, promotion of partnership with multiple stakeholders and strengthening of monitoring, surveillance of CSDs in a geographic area and encouraging research for identifying linkages between weather parameters and diseases in a geographic area and supporting evidence based building capacity of health personnel.

To undertake proposed activities, it requires establishment of an 'Environment Health cell', hiring of experts and other human resources on the subject, arrangement of logistics/ equipments, carrying out capacity building activities like training and meetings, development of IEC material and advisories (*Dissemination cost of IEC material cost is not included in the first year of proposed budget*), development of Health Adaptation Plan and prediction model for developing early warning system for climate sensitive diseases.

The tentative budget proposal of NAPCCHH has been proposed under the NHM through EPC. The proposed sub-heads are as a) Human Resource (Contractual), b) Logistics/ Equipments, c) Trainings/ Meetings/ Workshops, d) Centre of Excellence (initially six in first year), e) Development of pilot models like Integration, Green hospitals etc, f) Development of prototype of IEC/ Advisory for impact of Climate Change on Human health (do not include dissemination cost) and g) Air pollution and Human health (do not include dissemination cost).

The budget for states and UTs: As the states and UTs are in the initial phase of establishment of 'Environment Health cell', identification of State Nodal Officer (CC) and notification of Taskforce involving multiple stakeholders. Hence it is proposed that once the initial phase is complete, state should propose their budget through State PIP and the same will be released only after the establishment of Environment Health Cell in the Health department of State/UT. The tentative annual budget is at Annexure-E

XIV. REFERENCES

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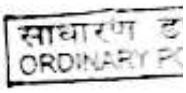
LIST OF ABBREVIATIONS

WHO	World Health Organisation
IPCC	Intergovernmental Panel on Climate Change
IPCC SREX	Intergovernmental Panel on Climate Change -Special Report on Extreme Events
UV	Ultraviolet
GOI	Government of India
NGO	Non-Governmental Organisation
NIMR	National Institute of Malaria Research
IITM	Indian Institute of Tropical Meteorology
IMD	India Meteorological Department
DGHS	Director General of Health Services
ICMR	Indian Council of Medical Research
MOHFW	Ministry of Health & Family Welfare
MOEF&CC	Ministry of Environment, Forest and Climate Change
NCDC	National Centre for Diseases Control
NDMA	National Disaster Management Authority
MHRD	Ministry of Human Resource Development
NEERI	National Environmental Engineering Research Institute
TERI	The Energy and Resources Institute
PHFI	Public Health Foundation of India
UNICEF	United Nations International Children's Emergency Fund
IEC (ICT)	Information Education Communication (Information and communications technology)
EWS	Early Warning System
PHC,	Primary Health Care
CHC	Community Health Centres
V&A	Vulnerability and Adaptation Assessments for Climate Change assessments
FSSAI	Food Safety and Standards Authority of India
MHA	Ministry of Home Affairs
DHR	Department of Health Research
DST	Department of Science & Technology
DOS	Department of Space
GIS	Geospatial Information System
ENSO	El Niño-Southern Oscillation

PRECIS	Providing Regional Climates for Intervention Studies
HADCM3	Hadley Centre Coupled Model, version 3
Ministry of I&B	Ministry of Information & Broadcasting
MCI	Medical Council of India
Dy.DG	Deputy Director General
DoHF&W	Department of Health & Family Welfare
NAPCCH	National Action Plan on Climate Change & Health
RKS	Rogi Kalyan Samiti
NHM	National Health Mission
PIP	Programme Implementation Plan

Constitution of NEGCCH: Office Order



T-25013/03/2015-NCD
Government of India
Ministry of Health and Family Welfare

Nirman Bhawan, New Delhi
Dated 2nd July, 2015

OFFICE ORDER

Subject: Constitution of National Expert Group on Climate Change and Health

Pursuant to the decision to establish a Health Mission on Climate Change, the Government hereby constitutes an Expert Group comprising representatives from different Ministries, Institutions, State Governments and Special invitees as under:

Composition of the Expert Group

Sl.No	Name and Designation	
1	Dr Vishwa Mohan Katoch, Former Secretary (Health Research), Government of India & Former DG ICMR	Chairperson
2	Joint Secretary (PH), Ministry of Health & Family Welfare, GOI	Members
	Joint Secretary (NCDs), Ministry of Health & Family Welfare, GOI	
	Joint Secretary (VBDs), Ministry of Health & Family Welfare, GOI	
3	Director (NVBDCP), Dte.GHS, MOH&FW, GOI	
	Dy. Director General (PH), Dte.GHS, MOH&FW, GOI	
	Dy. Director General (NCD), Dte.GHS, MOH&FW, GOI	
4	Representative of National Disaster Management Authority*	
5	Representative of Ministry of Environment Forest & Climate Change*	
6	Representative of Ministry of Earth Sciences*	
7	Representative of Central Ground Water Board, Ministry of Water Resources, River Development & Ganga Rejuvenation*	
8	Representative of Ministry of Agriculture*	
9	Representative of ICMR, New Delhi*	
10	Chairman, Central Pollution Control Board, New Delhi or his representative*	
11	Director / Director General Health Services from the State Governments**	
14	Director, National Centre for Disease Control, Delhi	Member Secretary

*Joint Secretary level representative from Ministries / Departments / Institutions.
** Representative from the State Governments of Maharashtra, Uttarakhand and Odhisa at present.

Special Invitees:

Sr.no	Name and Designation
1	WHO India Country Representative, New Delhi
2	Dr K Srinath Reddy, President, Public Health Foundation of India, New Delhi
3	Director, Calcutta School of Tropical Medicine, Kolkotta
4	Director, Centre for Environment and Occupational Health, MAMC, New Delhi
5	Director, National Environmental Engineering Research Institute (NEERI), Nagpur
6	Director, The Energy and Resources Institute (TERI)
7	Dr (Ms) H Achyuthan, Dept. of Geology, Anna University, Chennai
8	Dr R Nigam, Scientist F, Dy. Director, Geological Oceanography Division, National Inst. Of Oceanography, Goa

The MoH&FW, Govt. of India, may add members / experts to the said expert group as per requirement.

Terms of Reference

(1) Prepare an Action Plan for climate change, environment and human health
(2) Recommend strategies for mitigating adverse effects of climate change on human health
(3) Review epidemiological data on environment health and climate change
(4) Recommend strategies including indicators for monitoring and evaluation of health impact of climate change
(5) Recommend coordination mechanism with various stakeholders
(6) Recommend means of financial assistance to States and other Agencies working in the field of health and environment / climate change
(7) Suggest ways for building capacity in different areas of health including human resources, infrastructure and research for addressing the issues emanating from climate change
(8) Recommend National Environment Health Policy and Strategy
(9) Any other matter as requested by MoH&FW, Govt. of India

Meetings and Report

The "Expert Group" will meet as required with the objective to submit an interim report by the end of 3 months and a final report by the end of 6 months from the date of this office order.

All financial expenditure towards organizing meetings of the "Expert Group", including TA/DA, etc. will be borne under the NCDC Budget as per Govt. of India norms. TA/DA of government officials will be borne by their respective organizations as per Govt. of India norms. TA/DA of non-official members (including Special Invitees) will be provided by NCDC as per eligibility and as per Govt. of India norms. The outstation non-official members shall be entitled to economy class to & fro airfare as per applicable rules.

(A.K. Arora)
Deputy Secretary to the Government of India.
Tele: 23061975

Distribution:

Chairperson and all Members / Special Invitees of the "Expert Group" on Climate Change and Health

Copy with request to nominate appropriate level officer as indicated in the OM for "Inter Ministerial Expert Group" to:-

1. Secretary, MOEF&CC / Secretary, Ministry of Earth Sciences / Chairman, NDMA / Secretary, Ministry of Water Resources, RD &GR / Secretary, Ministry of Agriculture / DG, ICMR / Director, TERI / Health Secretaries of the State Govt. of Uttarakhand, Odhisa & Maharashtra

Copy for information to:

1. Secretary (H&FW)
2. DGHS
3. AS & MD, NHM, MOH&FW / AS (Health), MOH&FW / AS (SK), MoEF&CC
4. JS (PH)
5. Director (IFD)

Annexure-B

National Expert Group for Climate Change & Health (NEGCCH)

S.No.	Name & Designation	
1	**Dr Vishwa Mohan Katoch,** Former Secretary (Health Research), Government of India and Former DG, ICMR	**Chairman**
2.	**Shri Anshu Prakash**, Joint Secretary (PH & NCD), Ministry of Health and Family Welfare, Nirman Bhawan, New Delhi – 110011	Member
3.	**Shri Ravi S. Prasad**, Joint Secretary, Ministry of Environment, Forests and Climate Change, Indira Paryavaran Bhawan,JorBagh, Aliganj, New Delhi – 03.	Member
4.	**Dr N. S. Dharmshaktu**, Additional Director General, Directorate General of Health Services, Nirman Bhawan, New Delhi – 110011	Member
5.	**Dr A.C. Dhariwal**, Director, National Vector Borne Disease Control Programme, Block Number -III, Ground Floor, Delhi IT Park Shastri Park, Delhi- 110053	Member
6.	**Dr Inder Parkash**, DDG(PH), Dte General of Health Services, Nirman Bhawan, New Delhi –110011	Member
7	**Dr Mohammed Shaukat**, DDG(NCD), Directorate General of Health Services, Nirman Bhawan, New Delhi – 11	Member
8	**Dr A.K. Sinha**, Senior Research Officer, National Disaster Management Authority, No. 1, Safdarjung Enclave, NDMA Bhawan, New Delhi-110029	Member
9	**Dr Ajay Raghav**, Scientist F, Climate Change Division, Ministry of Environment, Forests and Climate Change, Indira Paryavaran Bhawan, Jor Bagh, Aliganj, New Delhi – 03	Member
10.	**Dr S. K. Peshin**, Scientist F, India Meteorological Department, Prithvi Bhawan, Opposite India Habitat Centre, Lodhi Road, New Delhi-110003	Member
11	**Dr B. C. Joshi**, Scientist D, Central Ground Water Board, Bhujal Bhawan, NH-IV, Faridabad – 121001	Member
12.	**Dr Dushyent Gehlot**, Soil Conservation Officer (Climate Change), Climate Change Cell (Room No. 22), Department of Agriculture and Cooperation, Ministry of Agriculture, Krishi Bhawan, New Delhi	Member
13.	**Dr D. K. Shukla**, Scientist G, Indian Council of Medical Research (ICMR), ICMR HQ, New Delhi	Member
14.	**Dr R.M. Bhardwaj**, Scientist E, In-charge, Pollution Assessment Monitoring Survey, Central Pollution Control Board, Parivesh Bhawan, East Arjun Nagar, Delhi – 110096	Member
15.	**Dr S. Venkatesh**, Director, National Centre for Diseases Control, 22-Shamnath Marg, Delhi-110054	Member Secretary

Special Invitees

S.No.	Name & Designation
1	**Dr Sadhna Bhagwat**, National Professional Officer (NCD), WHO Country Office For India, First Floor, RK Khanna Stadium, Safdarjung Enclave, Africa Avenue, New Delhi-110029.
2	**Dr V. Rao Aiyagari**, Senior Advisor, Research and Scientific Operations, Public Health Foundation of India (PHFI), Plot No. 47, Sector 44, Gurgaon 122002.
3	**Prof Nandita Basu**, Director, School of Tropical Medicine, 108, C. R. Avenue, Kolkata 700073
4	**Dr T. K. Joshi**, Director, Centre for Occupational and Environment Health, Maulana Azad Medical College, New Delhi 110002.
5	**Dr Pravin Naoghare**, Scientist, Environmental Health Division, National Environment Engineering Research Institute (NEERI), CSIR Lab, Nehru Marg, Nagpur-440020.
6	**Dr Suruchi Bhadwal**, Associate Director, Earth Science and Climate Change Division, The Energy and Resources Institute (TERI), Darbari Seth Block, India Habitat Centre, Lodhi Road, New Delh-110003.
7	**Dr Hema Achyuthan**, Department of Geology, Anna University, Chennai

Invitees

S.No.	Name & Designation
1	**Dr Jyoti Misri**, Principal Scientist (AH), Indian Council of Agriculture Research (ICAR), Room No. 410-A, Krishi Bhawan, New Delhi 110001
2	**Dr Tanvir Kaur**, Scientist E, Indian Council of Medical Research (ICMR), ICMR HQ,New Delhi
3	**Dr Anjali Srivastava**, Chief Scientist and Head, NEERI Zonal Centre, LohaMandiMarg, Naraina Industrial Area Phase I, Naraina, New Delhi, Delhi 110028.
4	**Ms Meena Sehgal**, Fellow, The Energy and Resources Institute (TERI), Darbari Seth Block, India Habitat Centre, Lodhi Road, New Delh-110003.
5	**Dr D.R.Sikka**, Former Director, Indian Institute of Tropical Meteorology (IITM), Dr. Homi Bhabha Road, Pashan, Panchawati, Pune, Maharashtra 411008.
6	**Dr Akhilesh Gupta**, Head, Climate Change Programme & Strategic Programme, Large Initiatives and coordinated Action Enabler (SPLICE), Department of Science & Technology, Technology Bhawan, New Mehrauli Road, New Delhi-110016.
7	**Dr Nisha Mendiretta**, Scientist F and Director, Climate Change Programme, Department of Science & Technology(DST), Ministry of Science & Technology, Government of India

8 **Dr D. Behera**, Professor and Head, Pulmonary Medicine, PGIMER, Kairon Block, Sector-12, Chandigarh – 160012.

9 **Prof. Manju Mohan**, Professor, Centre for Atmospheric Sciences, Indian Institute of Technology, Delhi –16

10 **Dr Sagnik Dey**, Assistant Professor, Centre for Atmospheric Sciences, Indian Institute of Technology, New Delhi – 110016.

11 **Dr Vidhya Venugopal**, Professor, Department of Environmental Health Engineering, Sri Ramachandra University, Porur, Chennai – 600116.

12 **Dr P.K. Sen**, Additional Director, National Vector Borne Disease Control Programme, Block Number -III, Ground Floor, Delhi IT Park, Shastri Park, Delhi- 110053.

13 **Dr. Sher Singh**, Assistant Director (PH), National Vector Borne Disease Control Programme, Block Number -III, Ground Floor, Delhi IT Park, Shastri Park, Delhi- 110053.

OFFICERS FROM NCDC (Nodal Agency for Climate Change & Human Health)

S.No. Name & Designation

1 **Dr CS Aggarwal**, Additional Director, Centre for Environment, Occupational Health, and Climate Change, National Centre for Disease Control (NCDC), Delhi 110054

2 **Dr Shikha Vardhan**, Deputy Director, Centre for Environment and Occupational Health, National Centre for Disease Control (NCDC), Delhi 110054

3 **Dr Pranil M Kamble**, Assistant Director, Centre for Environment and Occupational Health, National Centre for Disease Control (NCDC), Delhi 110054

Annexure: C

NAPCCHH: Proposed Annual Budget

Proposed Annual Budget for supporting Activities at CEOHCCH Division at NCDC			
S.No	**Expenditure Category**	**Estimated Budget**	**Recurring/ Non-Recurring**
1	Human Resource (Contractual)	Rs 1,67,40,000/-	Recurring
2.	Logistics/ Equipments	Rs 12,60,000/-	Non-Recurring
3.	Trainings/ Meetings/ Workshops	Rs 55,37,500/-	Recurring
4.	Centre of Excellence (Initially six in first year)	Rs 15,00,000/-	
5.	Development of 'Pilot Models' like Green hospitals, Integration Platform	Rs 70,00,000/-	
6.	Development of 'Prototype' of IEC/ Advisory for impact of climate change on human health (Dissemination cost is not included)	Rs 2,00,000/-	
7.	Development of 'Prototype' of IEC/ Advisory for impact of Air Pollution (AAP, IAP & HAP) on human health (Dissemination cost is not included)	Rs 2,00,000/-	
Subtotal at CEOHCCH, NCDC		**Rs 6,35,37,500/-**	
Proposed Annual Budget for Environment Health Cell at State Health Deptt[#]			
1	Human Resource (Contractual)	Rs 26,40,000/-	Recurring
2.	Logistics/ Equipments	Rs 4,00,000/-	Non-Recurring
Subtotal at Env Health Cell at State		**Rs 30,40,000/-**	
# The budget has to be proposed through State PIP and the same will be released only after the establishment of Environment Health Cell in the Health department of State			
Proposed Annual Budget for supporting Activities at Environment Health Cell at District level			
1	Human Resource (Contractual)	Rs 7,80,000/-	Recurring
2.	Logistics/ Equipments	Rs 75,000/-	Non-Recurring
Subtotal at Env Health Cell at District		**Rs 8,55,000/-**	

REGIONAL METEOROLOGICAL OFFICES: Address

Regional Meteorological office	Address
India Meteorological Department, Regional Meteorological Centre, Chennai	New 6, Old 50, College Road, Chennai, Tamil Nadu- 600006
India Meteorological Department, Regional Meteorological Centre, Guwahati	LGBI Airport, Guwahati, Assam- 781015
India Meteorological Department, Regional Meteorological Centre, Kolkata	4, Duel Avenue, Alipore, Kolkata, West Bengal – 700027
India Meteorological Department, Regional Meteorological Centre, Mumbai	Regional Meteorological Centre, Mumbai, Colaba, Mumbai, Maharashtra- 400089
India Meteorological Department, Regional Meteorological Centre, Nagpur	Regional Meteorological Centre, IMD DBAI Airport, Sonegaon, Nagpur, Maharashtra- 440005
India Meteorological Department, Regional Meteorological Centre, New Delhi	RMC Building, Lodi Road, New Delhi- 110003

Annexure-E

STATE POLLUTION CONTROL BOARD: Address

State Pollution Control Board	Address
Andhra Pradesh Pollution Control Board	Paryarana Bhawan, A-3, Industrial Area , Sanathnagar, Hyderbabad-500 018, Andhra Pradesh
Arunachal State Pollution Control Board	Government of Arunachal Pradesh Office of the Principal Chief and Secretary (E&F) Conservator of Forests, Itanagar 791111, Arunachal Pradesh
Assam Pollution Control Board	Control Board Bamunimaidam, Guwahati - 781021 Assam
A & N Islands Pollution Control Committee	Van Sadan, Port Blair-744 102
Bihar State Pollution Control Board	IInd Floor, Beltron Bhavan, Jawaharlal Nehru Marg, Shastri Nagar, Patna 800023, Bihar.
Chattisgarh State Environment Conservation Board	Nanak Nivas, Civil Lines Raipur - 492001 Chattisgarh
Chandigarh Pollution Control Committee	Chandigarh Administration, Additional Town Hall Building, IInd Floor, Sector 17-C, Chandigarh 160 017.
Delhi Pollution Control Committee	4th Floor, I.S.B.T. Building, Kashmere Gate, Delhi-110006
Daman Diu & Nagar Haveli Pollution Control Committee	Office of the Dy. Conservator of Forests, Moti Daman-396220, Daman
Goa State Pollution Control Board	Dempo Tower, Ist Floor Patto Plaza Goa 403110
Gujarat State Pollution Control Board	Sector 10-A, Gandhi Nagar 382043 Gujarat
Haryana State Pollution Control Board	S.C.O.No.11 A-12, Sector 7-C Madhya Marg, Chandigarh – 160019
H.P. State Environment Protection & Pollution Control Board	Paryavaran Bhawan, Phase III New Shimla -171 009 Himachal Pradesh
Jammu & Kashmir State Pollution Control Board	Sheikhul Alam Campus, Behind Govt. Silk Factory, Rajbagh , Srinagar (April - Oct.) Parivesh Bhawan Forest Complex, Gandhi Transport Nagar (Nawal), Jammu (Nov. - March)
Jharkhand State Pollution Control Board	T.A. Building, HEC P.O. Dhurwa Ranchi - 834004 Jharkhand
Karnataka State Pollution Control Board	6th-9th floors Public Utility Building NSB Building, Mahatama Gandhi Marg Bangalore 560001 Karnataka

Kerala State Pollution Control Board	Plamoodu Junction Pattom Palace Trivandrum 695004 Kerala
Meghalaya Pollution Control Board	“ARDEN”, Lumpyngngad, Shillong – 793 014, Meghalaya.
Madhya Pradesh Pollution Control Board	E-5, Arera Clony, Paryavaran Parisar, Bhopal - 463016 Madhya Pradesh.
Maharashtra Pollution Control Board	Kalpataru Points, 3rd & 4thfloor, Opp. Cine Planet, Sion Circle, Sion (E) Mumbai-400 022.
Mizoram State Pollution Control Board	M.G. Road, Khatna, Aizwal-796 012, Mizoram
Manipur Pollution Control Board	Langol Housing Complex, Imphal-795 004, Manipur.
Nagaland Pollution Control Board	Office of the Chairman, Forests Colony, Dimapur, Nagaland
Orissa State Pollution Control Board	A-118, Nilakantha Nagar, Unit-VIII, Bhubaneswar 751012. Orissa
Punjab Pollution Control Board	Vatavaran Bhawan, Nabha Road, Patiala-147 001 Punjab.
Pondichery Pollution Control Committee	Department of Science, Technology & Env. Housing Board Complex, IIIrd Floor Pondicherry-600 005
Rajasthan Pollution Control Board	A-4, Institutional Area, Jalana Dungri, Jaipur-302 004, Rajasthan.
Sikkim Pollution Control Board	State Land Use and Environment Cell Govt. of Sikkim, Deorali,- 737101
Tamil Nadu Pollution Control Board	No. 76, Mount Salai, Guindy, Chennai- 600 032, Tamil Nadu.
Tripura State Pollution Control Board	Vigyan Bhawan, Pandit Nehru Complex, Gorkhabasti,PO-Kunjaban, Agartala (W)-799 006 (Tripura) .
Uttar Pradesh Pollution Control Board	IIIrd floor PICUP Bhavan, Vibhuti Khand, Gomti Nagar, Lucknow - 226020, UP.
West Bengal Pollution Control Board	Paribesh Bhavan, 10-A, Block LA, Sector III, Salt Lake City, Kolkata-700 091.