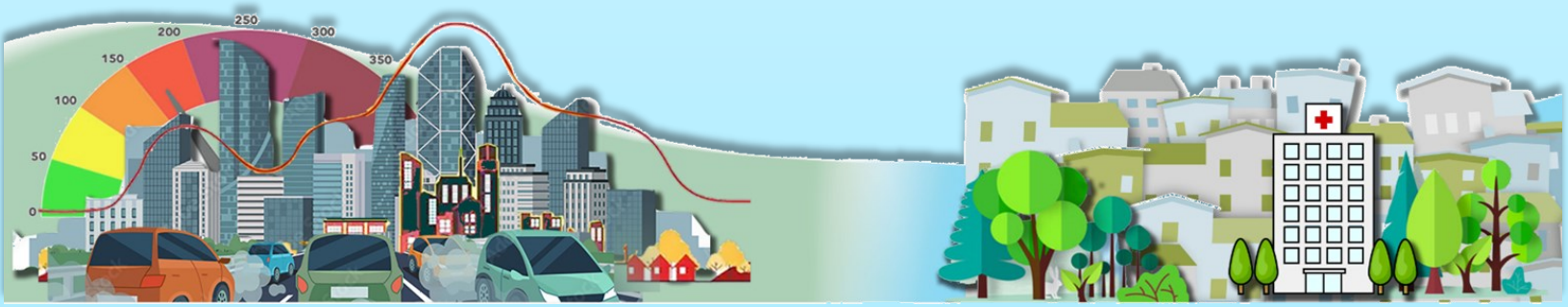
Report

Climate Change and Health: Driving Local Action

National Workshop on Programme Implementation and Learnings from Case Studies

July 12-14, 2023
NCDC, Delhi



National Programme on Climate Change and Human Health

Background

Climate change poses significant challenges to global health, and addressing its impacts requires a strong foundation of well-trained and skilled healthcare professionals. Recognizing this crucial need, the National Program for Climate Change and Human Health (NPCCHH) prioritizes capacity building for healthcare professionals. At the forefront of these efforts are the Nodal Officers-NPCCHH, responsible for implementing the programme at state and district levels.

Over the past few years, NPCCHH has successfully conducted numerous virtual and offline training Case Studies, engaging State Nodal Officers (SNO) in enhancing their knowledge and skills. While these initiatives were commendable, it became evident that additional focus was necessary to build capacity at the district level. As a result, a significant milestone was achieved when NPCCHH organized a three-day capacity-building workshop exclusively for District Nodal Officers (DNOs). The workshop occurred at the esteemed National Centre for Disease Control (NCDC) headquarters in New Delhi from July 12-14, 2023 (Annexure 1).

Urban areas, with their dense population, built structures, and existing socio-economic inequality, amplify the impacts of climate change on human health. The urban heat island effect and air pollution create heightened risks of heat and pollution-related illnesses for a larger population. Considering this, the workshop targeted District Nodal Officers (DNOs) from the capital district of all 36 states/Union Territories (UTs) for specialized training case studies specifically aimed at addressing priority climate-sensitive illnesses and health concerns. These case studies encompassed topics such as the health impacts of extreme weather events, air pollution, vector-borne diseases, water sanitation and hygiene, and the development of green and climate-resilient health facilities.

As a part of the workshop schedule, two Case Studies were allocated for case study presentations. Case studies have proven invaluable tools for rapid learning through practical examples, particularly concerning coordination and the implementation of activities. NPCCHH sought to enrich the workshop by inviting implementers from various parts of the country to present 20 case studies. The case studies were selected through an objective assessment process from 41 submissions received earlier this year. The case study presenters added a real-world perspective, highlighting the successful actions taken in the health sector on various climate change and health themes.

This report aims to provide a comprehensive account of the proceedings, insights, and outcomes of the NPCCHH DNO Workshop. It highlights the importance of capacity building in preparing health care professionals to tackle the unique challenges posed by climate change, with a particular focus on the implications in urban environments. Through subject-specific training case studies and valuable case study presentations, the workshop sought to empower DNOs to become leaders in promoting climate-resilient health practices and safeguarding the well-being of their communities in the face of a changing climate.

Inaugural Session

The workshop was inaugurated by **Prof. (Dr.) Atul Goel**, Director General of Health Services (DGHS), India; **Dr Anil Kumar**, Addition DGHS; **Dr S K Jain**, Principal Advisor, National Vector Borne Disease Control Programme (NVBDCP); and **Dr Aakash Srivastava**, Additional Director and Head of the Division for Centre for Environmental Health and Occupational Health, Climate Change and Health.

Dr Aakash Srivastava welcomed all the participants of the workshop and esteemed delegates of the inaugural Case Study. In his speech he set the context for the workshop and briefed the audience on key objectives of NPCCHH. He also informed participants that the workshop aims to empower DNOs and equip the, with necessary skills to develop district action plans for NPCCHH in their respective districts.

Dr Anil Kumar shared his experiences of changing needs of vector management due to the impact of climate change on vector life cycle and habitation. He emphasized on the role of sensitizing the community along with building capacities of the healthcare professionals to build communities which are resilient to climate change. He also highlighted that for successfully adopting and mitigating impacts of climate change on health, data driven planning at the local level is of utmost priority. He concluded his remarks by urging DNOs to utilize different data and IT platforms enabled by the Ministry of Health and Family Welfare in drafting district action plans for NPCCHH.

During his inaugural speech **Prof. (Dr.) Atul Goel** acknowledged the complex nature of the intersectionality between climate change and health and highlighted the importance of sensitizing DNOs on this complex subject to create community awareness. He emphasized that climate change is a global phenomenon, however, preparedness and mitigation majors at the local level can help prevent its impact on human health and loss

of human life. He also advocated for educating children as messengers of change to create community awareness and to foster future generations which are resilient to changing climate. He concluded his speech by appreciating commendable efforts by health functionaries at the ground level, and appreciated the commitment shown by DNOs to implement the NPCCHH programme at the grassroot level.

Day 1 (July 12, 2023)

Case Study 1. Response to 2018 floods at Kodagu district: a case study

Dr. Mahesh Hoolageri, Associate Professor from community medicine department, Kodagu Institute of Medical Sciences Madikeri, Karnataka shared his experience that the Karnataka state has been subjected to several Natural Disasters, especially Hydro Meteorological disasters with various intensity and magnitude across the state during successive years. The drought, floods, hailstorms are some of the major Hydrometeorological disasters which often occur in different parts of the states. It was observed that Kodagu district received 730 mm of rainfall with a departure of (+) 28%, which was highest in the last 118 years from August 8-17, 2018 and eventually resulted in landslide and floods. This extreme weather event led to devastating landslides and floods. The consequences were severe as communication links, public infrastructure including power gridlines, roads, and bridges were damaged or disrupted, causing economic activities to come to a standstill. Many residents were forced to evacuate their homes, and normal life was severely disrupted, resulting in long-lasting psychological

impacts for some individuals. The government provided continuous relief and response measures in close coordination with the district administration. He concluded by highlighting the climate change adaptation needs which were to be achieved by focusing on understanding vulnerability in all sectors, such as social, infrastructure, production, and environmental aspects. This knowledge should be utilized for the formulation of preparedness and response mechanisms.

Case Study 2. Integrating climate change lens into health system from community perspective: action research in Bhor Block, Pune, Maharashtra

Dr. Ritu Parchure from PRAYAS Health Group, Pune provided a brief overview of their organization's initiatives. Their focus lies in understanding the impact of climate change and promoting evidence-based actions at the local level. Under this study, the team followed a process included sharing learning dialogues, Participatory Rural Appraisal (PRA) tools, and action-oriented dialogues with different stakeholders (HCF, community-level officials and NGOs). These tools facilitated discussions on local vulnerabilities and their connections to health outcomes, encouraging people to share real-life cases and observations from different aspects of life, such as livelihoods and lifestyles. Dr. Parchure concluded by emphasizing that people can play an active role in climate-induced health vulnerability mapping, extracting contextual vulnerability insights from people's lived experiences. The scope for institutional integration was also highlighted, specifically integrating local vulnerability mapping and action for health adaptation in the program on 'Community Action for Health'. Moreover, vulnerability mapping data can be shared with village elected representatives to be used in the annual village health action plan. Furthermore, they recognized ample opportunities to incorporate the dimension of climate change into the existing health system.

Case Study 3. Generating awareness of Climate Change and Human Health and preparing the community for extreme climatic events

Ms. Punita Kumar, from Chhattisgarh presented a study on capacitating the communities through Panchayati Raj Institutions (PRIs) on climate change and human health. The primary focus is on preventing diseases that are influenced by climate change through effective communication strategies. She briefed about the objectives of the study, which included building the capacities, facilitating communities through PRIs, promoting inter-

sectoral actions and building health resilient communities that can resist climate change. She also explained the PRA process- a community-based approach followed by the team. The PRI members were trained on climate change and human health resulting in a community-based action plan to address the impacts of climate change. For instance, amongst 5,252 gram panchayats, 84% gram panchayats formulated plans for organic farming and implemented a ban on the use of chemical fertilizers, 82% gram panchayats planned for plantation and implemented a ban on felling of trees in their villages and 77% gram panchayats planned to promote smokeless chulha in the villages. The community took proactive initiatives and came up with various plans such as cleaning of ponds and wells, prohibiting the use of incense sticks/ mosquito coils, discouraging open defecation, restricting bursting of firecrackers, opposing illegal factories/ mill, promoting adoption of e-vehicles, and implementing IEC. Through its facilitation, NPCCHH has provided valuable support, freedom, and guidance to the Panchayati Raj Institutions (PRI) in addressing the global issue of climate change. This has positively strengthened the newly formed tribal state to have well-aware and sensitized communities, resulting in improved health outcomes with a particular emphasis on prioritizing the well-being of marginalized areas. She concluded by sharing the key learnings from the study highlighting the importance of mainstreaming climate change in the panchayat decisions, as panchayats can play a crucial role in reducing the impact of climate change. Moreover, she emphasized the significance of collaborative efforts by coordinating with other networking groups. Through collective decisions at a larger level community can address the challenges posed by climate change.

Case Study 4. Effects of solarization on Quepem Health Centre, Goa under NPCCHH Dr. Geetanjali Sardessai Kare, NPCCHH consultant from Goa shared her experience regarding a study on the effect of solarization on a 24*7 health center located in Quepem under the climate change program. The health center is situated in an isolated location on the highway. The health department initiated various activities to address the

health impacts of climate change. The Goa energy development agency installed a 20Kw solar power system and signed a MOU with the electricity department for connecting it with the grid. The department observed various positive outputs including decrease in electricity bills, better service delivery and better working conditions. She emphasized the need to address the challenges related to the stockpile of old electrical lights, maintenance of panels and ensuring warranty with detailed standard operating procedures.

Case Study 5. Building community capabilities to mitigate and respond to public health emergencies due to climate change

Dr. Amrita Gupta from Voluntary Health Services briefed regarding the adverse effects of climate change caused by both social and environmental factors and how climate change leads to various impacts, particularly due to extreme weather events. She stressed that the community members play a crucial role to mitigate and respond to public health emergencies due to climate change as they are most vulnerable and they should be equipped with skills and knowledge so they are prepared to respond in such situations. An assessment tool was developed to understand the community's situation, needs, vulnerability and hazards. The process comprised of series of meetings, in which community groups were encouraged to discuss, learn and engage in participatory decision-making that enabled them to take action to address the local problems. The team conducted several multi-sectoral coordination meetings, recognizing the critical role of community involvement in controlling and preventing risks associated with climate change. It was emphasized that community participation is the most effective component to achieve sustainability.

With the aim of improving the health system and making the community more confident and empowered- The 'Public Health Emergency Preparedness and Response in Community Setting' - a pilot project was initiated in Nausar Village of Khatima Block,

Udham Singh Nagar, Uttarakhand through CEMT (Community Emergency Management Team) and CERT (Community Emergency Response Team) under IDSP. The gram pradhan from panchayat leads the CEMT. The government and the community need to work together for better health outcomes. The project endeavours to enhance the capacity and capabilities at the community level for effective preparedness and response to public health emergencies and disasters and fosters the following objectives of the NPCCHH- to create awareness and to strengthen the capacities. Various awareness activities and multiple Case studies of capacity building were conducted for the community ranging from preparedness, risk reduction and response to floods and flood-related public health emergencies. Based on the analysis, it was observed that the participants' overall knowledge and awareness regarding the causes, transmission modes, seasonal spread, and preventive measures of various communicable and non-communicable diseases were significantly enhanced after the training case studies. The CEMT and CERT gained a clear understanding of their roles and responsibilities in outbreak management and addressing public health emergencies (PHE) or disasters related to climate change. The training gave a clear message to the participants of the essential helpline numbers and authorities to be contacted during a PHE or disaster and the importance of intersectoral coordination. They also learnt the concept of utilizing available resources at the community level. The long-term impact of the training will also be assessed via an After-Action Review.

Case Study 6. Mitigating extreme hydro met hazards and shocks through climate smart institutions to continue lifesaving and essential services in central India

Mr. Anand Ghodke, WASH officer UNICEF, Maharashtra in association with the consultant team and zilla parishad shared his experience on a simplified and integrated approach - 'The Green project' to propagate climate smart institutions and support the strengthening of health care systems. With the comprehensive cyclic approach towards green loop, the components included were solarization, net metering, heat reducing paints, rooftop rainwater harvesting, filter unit and filtration and other retrofitting measures. Consequently, there is a need for institutional changes in infrastructure, including passive cooling technologies, and ensuring strengthening of health infrastructure below district level aligning with remote access and generation of evidence. The Zilla Parishad initiated the intervention with the focus on PHCs, AWCs and schools with an objective to address issues of water scarcity, leakage, groundwater recharge and solarization. Unicef supported the technical assessments with demonstration of the concept at seven sites through partner agency SACRED. He concluded by highlighting the significance of this initiative for tackling the impacts of climate change and stating that multi-sectoral coordination is the key.

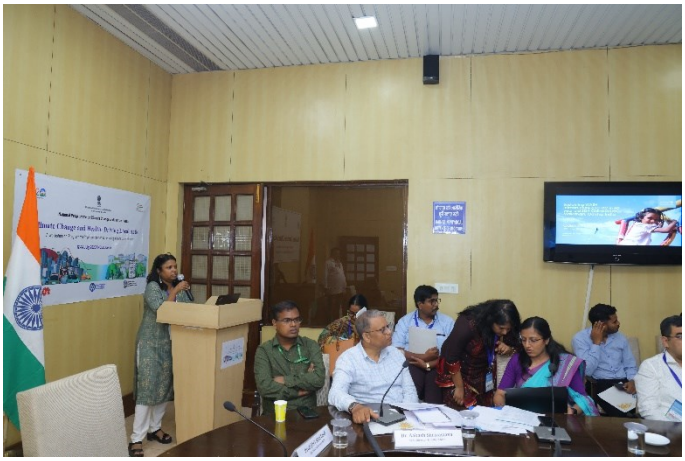
Case Study 7. Public health preparedness for respiratory emergencies in association with air pollution preparedness/response of healthcare systems to specific climate-sensitive illnesses

Ms Punita Kumar (under the guidance of Dr. Dharmendra Gahawai SNO/Deputy Director-Directorate of Health Services, Department of Health and Family Welfare) from Chhattisgarh presented a case study on health system preparedness to respond to respiratory emergencies and air pollution related events to build a resilient public health system in Raipur and Korba district of the state. She outlined the fact of increase of coal-based industrialization in the state is leading to the inevitable threat of air pollution and its health hazards. The assessment found major gaps in health services provided by the health centers in severe air pollution-impacted regions. The major gaps identified included the need for trained health professionals, suitable respiratory diagnostic tools,

spirometer and the need of respiratory emergency drugs. The planned interventions were required including community awareness programs and a strong follow-up system. She concluded with recommendations which included trained health professionals for treatment intervention, appropriate diagnostic tools, capacity building of the existing staff, training of ASHAs, establishing surveillance, availability of IEC materials, timely issue of alerts and warnings, multi-sectoral coordination and various community outreach programs to encourage community to avail the services from public health facility.

Case Study 8. Sustaining WASH infrastructure and IPC in a 60-year-old building located in hard-to-reach tribal areas: Sub-Divisional Hospital Chitrakonda, District Malkangiri, Odisha

Ms Shipra Saxena from UNICEF presented a study of a 60-year-old sub-divisional hospital in Chitrakonda highlighting several significant challenges it faced. These challenges included issues related to accessibility, aging infrastructure, language constraints, broken boundary wall, improper waste disposal and limited waste management options, open urination and spitting, and dependence on traditional healers. The UNICEF supported Kayakalp and WASH-IPC facilitation and assessment for the facility. As part of this initiative, various WASH interventions were undertaken, including leveling and tiling of floors, covering open drains, repairing toilets, installing elbow taps, proper cleaning of drainage systems, waste segregation, and sanitation staff training. The hospital also took measures under NPCCHH such as creating a herbal garden, adopting rain water harvesting, conversion to LED, ensuring proper plastic waste disposal, availability of sunstroke room, use of appropriate Personal Protective Equipment (PPE) for Bio-Medical Waste (BMW), burial pits, treating liquid waste, issuing early warning advisories, displaying Air Quality Index (AQI) information, and enhancing the overall hospital ambience. Furthermore, various community participatory activities and awareness campaigns were also organized by the team.



Case Study 9. Composting Vertical Pipes (V)

Dr. Balachandra Mesta, Medical Officer (MO) from CHC Shirali, Karnataka represented a case on mini-composting. He shared a brief background about the increase in food wastage at their facility which in turn caused land and air pollution. The Compost Vertical Pillars were implemented as an intervention to address and prevent air, water and soil pollution. These pillars help in fermenting the waste food material and transforming it to compost which were further used to nourish the plants near the premises. The composting within the vertical pipe is an ongoing three-six months cycle. He concluded by advocating that this idea has been highly effective in controlling land and air pollution. Moreover, the compost generated serves as natural fertilizer for the plants.

Case Study 10. Assessment of state health adaptation plans of human health to climate change

Ms. Vidhu Gupta, associate fellow from TERI presented a case study on assessing the health adaptation plans of a state, which was drafted to reduce the health vulnerability of the population to climate sensitive illnesses. She shared the significance of health problems due to climate change and the extent to which human health is affected. The objective was to assess the needs of the state in terms of capacity building, technical awareness of the state officials and new adaptation strategies. The states from three climatic zones were selected (Andhra Pradesh, Gujarat and Uttarakhand). The team reviewed the action plan to identify the types of activities and policy actions undertaken. The priority areas for dominant climate sensitive diseases were also identified. An online questionnaire was prepared using the constructs (The Consolidated Framework for Implementation Research) dimensions (Constructs guide) for a survey with State Nodal Officers (SNOs) under the dimension of situation, policy planning and engagement, and adaptation strategies.

Case Study 11. Heat Action Plan for Ahmedabad city: development and lessons

This case study included process of development of Ahmedabad heat action plan after a deadly heatwave in May 2010. It elaborated process of stakeholder engagement in identifying flow of communication for response to heatwave and roles and

responsibilities. The presentation summarized lessons learnt throughout the implementation of the heat action plan from 2013 till date.

Session: Health Impacts of Heat, Heat-Health Action Planning

Dr. Purvi Patel, Senior Consultant from NPCCHH division took the Case Study on health impacts of heat and the significance of health system preparedness to health-related illnesses. She shared a brief overview of the deviations in temperature that India has experienced over the past decade. In the country, heatwave is considered if the temperature deviates from the normal to 4.5 C to 6.4 C and when the actual maximum temperature in plains is >=45 C. She discussed the spectrum of heat related illness including heat oedema, prickly heat, heat cramps, syncope, heat exhaustion and heatstroke. She highlighted the impact of exposure to extreme heat on health, both directly and indirectly. She stressed the importance of surveillance and timely reporting of data, particularly in the context of heat-related illnesses. The purpose of heat surveillance was to assess the burden of illnesses and mortality, planning of response and evaluate impact of climate action. She emphasized that mandatory reporting of heat-related data is crucial, even when there are no reported cases. She outlined the case definitions of suspected heat stroke cases and deaths and confirmed heatstroke deaths. Further, reporting framework and data entry formats were discussed, which were followed by discussion on reporting in IHIP portal. She emphasized the importance of health sector preparedness to address heat-related illnesses. She highlighted program activities aimed at tackling the impact of extreme heat on public health, which encompassed awareness campaigns, capacity-building initiatives, early warning systems, and measures to enhance health facilities' resilience to heat. She concluded by sharing the significance of health sector preparedness in effectively managing heat events and also stressed the necessity of adopting long-term adaptation measures.

Session: District Action Plan on Climate Change and Human Health

Dr. Purvi Patel, Senior Consultant from NPCCHH division took the Case Study on the outline of district action plan and how it should be drafted as per the state action plan. She highlighted the significance of the different components under the DHAP as it will allow long term planning for delivery of NPCCHH objectives at the ground level. It is an action-oriented document on health department's response to climate change and diseases prevalent in the district

Day 2 (July 13, 2023)

Session: Energy Assessment and Solarization of Health Facilities

The Case Study was led by Mr. Rahul Pachauri from National Institute of Solar Energy (NISE) explained about core activities of NISE, the various type of solarization technology available and the technical and practical aspects of adopting renewable energy options in health facilities. He explained that health facility assessment for energy demand, solar availability, critical care requirement and type of health facility, infrastructure, and critical load is important. He also demonstrated a new application that has been developed by NISE for conducting these assessments at health facilities. The results of sample facilities in a state would help identify and standardize solar PV requirement and generate tender specification.

Session: Green and Climate Resilient Healthcare facilities

Dr. Gajjala Sivaprasad headed the Case Study and shared an overview regarding the environment friendly and sustainable climate resilient infrastructure. He briefly explained the interlinkages between environment and health, focusing on the environmental and health impacts. Globally, health care's climate footprint is contributing to about five percent of global net emissions and in India, specifically, the healthcare sector is the seventh-largest contributor to these emissions. Healthcare sector has direct and indirect sources of greenhouse gases emissions. Moreover, healthcare supply chain and procurement are significant

contributors. The need for the climate resilient facilities were highlighted. **Health care workforce, WASH (water, sanitation, hygiene) and health care waste management, energy, and infrastructure**, are four components identified for interrelations for green and climate-resilient health systems and HCF. The intervention under each component was discussed in detail. The high impact actions for decarbonizing healthcare was outlined, out of which two of them (power with 100% clean renewable energy, and investing in zero emissions buildings and infrastructure) were being addressed by NPCCHH through organizational and financial framework. According to the NPCCHH guidelines, the Global Climate Resilience (GCR) activities emphasized various measures such as energy efficiency, retrofitting of existing facilities, water efficiency, and waste management, with a particular emphasis on energy efficiency.

Dr. Chinamayi Swain, Sr. Consultant from NHSRC briefed about the program and the Kayakalp interlinkages. The IPHS guidelines introduced an eco-friendly theme that encompassed four key components for eco-friendly health facilities: energy efficiency, addressing air and noise pollution, implementing the three Rs (Reduce, Reuse, Recycle), and promoting initiatives to save the earth and environment while also prioritizing health and well-being. As the Kayakalp guidelines are currently under revision, additional Global Climate Resilience (GCR) components are being incorporated this year.

Case Study 12. Water, Sanitation and Hygiene (WASH) in context of Climate change

Dr. Pratibha Singh, WASH Specialist form UNICEF initiated the discussion on significance of WASH in healthcare facilities highlighting some of the facts related to poor quality health care due to WASH components. Multiple benefits of WASH in healthcare in context to health and safety, disease prevention and treatment, climate change and disaster resilience, cost, community hygiene, staff performance and people-centered care were pointed out. She stressed upon the Global Climate Resilience (GCR) framework of WHO, highlighting the fact that basic WASH services in HCF are fundamental to provide quality care. GCR guidelines include water and waste management as the key areas. She emphasized on the facility driven approach as the strategic approach for ensuring sustainable WASH health care facility. She detailed out the various parameters and indicators under WASH and the indicators covered in Kayakalp checklist. She concluded by outlining some of the opportunities under this component such as capacity building and sensitization of key stakeholders on GCR, strengthening existing programs such as Kayakalp, Laqshya; leveraging resources, promoting convergence among different

initiatives, documentation and dissemination of best practices for promoting sharing of knowledge.

Case Study 13. Solarization of sub-centres in Meghalaya to reduce energy costs and avail financial and environmental benefits

Ms Indumathi Arunan, Research Associate from Centre for Chronic Disease Control, New Delhi briefed about HELP (Health and environment leadership platform), platform for transitioning Indian health system to climate smart healthcare with a network of over 7,000 hospitals and health Institutions in India. It offers support to members in reducing carbon footprint, by education and training, communication with public, policy and advocacy presence and showcasing best practices in healthcare sustainability. She emphasized that remote and hilly areas have different challenges and need customized, and consistent health care supply. In context to Meghalaya, she outlined the infant and maternal mortality rate and the frequent power cuts that affect healthcare. The government partnered with SELCO foundation under NHM for solarization, and 100 sub centers were solarized in eleven districts. The sub centers switched to energy efficiency equipment and staff was also trained on its maintenance. The team found out significant improvement in functioning of sub centres and no interruption during delivery. Additionally, it significantly reduced the cost and carbon emissions.

Case Study 14. Solarization of Patewa Public Health Centre, a success story

Ms. Nitha George from Healthy Energy Initiative from Chhattisgarh in collaboration with SHRC and CREDA had developed a guidance document for healthcare facilities to shift to renewable energy. It was developed to bridge the gap between healthcare workforce and the technicality of solarization of healthcare facilities to provide quality and uninterrupted healthcare services. The 24*7 PHC in Patewa village located in the outskirts of Raipur serves a population of thirty-three thousand of which 30-40% are tribal. She highlighted power cut as one of major issue faced by the health facility. An assessment was conducted by CREDA to understand the electricity needs of the centre, including possibilities for climate vulnerabilities. The health centre is 30% solarized and the maintenance services are provided by CREDA. Various testimonials from the staff were projected which depicted how solarization benefitted the staff and the facility in terms of electricity, water and sanitation, service delivery and the cost. Few challenges were weak roof tops and water stagnation, underutilization, and ownership of the staff. One of the

key learnings highlighted from the case study was that solarization of public health facilities should be an integral part of the health system. Solarizing these facilities was identified as a crucial factor contributing significantly to achieving universal health coverage.

Case Study 15. Public health emergency management in context of land subsidence attributed to climate change in Joshimath, Chamoli district in Uttrakhand in January 2023

Dr. Akhilesh Tripathi, Regional Technical Officer-Emergency Management, VHS-CDC, Uttrakhand briefed about land subsidence and the challenges faced by the district in January 2023 as it's a high-risk area for floods, earthquake and landslides. As part of the public health preparedness and response strategy, comprehensive measures were planned including issuance of various public health advisories. The primary focus of these measures was on strengthening the capacities of District Health Officers (DHOs), establishing camps, psycho-social support and counseling, vaccination drives, robust surveillance system and daily reporting, community awareness and Information, Education, and Communication/Behavior Change Communication (IEC/BCC) measures, and hospital level preparedness measures. Other disaster management measures included deployment of rapid response teams, relief camps, nutritional food arrangements. Due to effective inter-sectoral coordination and planned response measures, no disease outbreaks or clusters were reported among the displaced population. Healthcare remained accessible to them, ensuring their well-being and minimizing the overall impact on public health. The main lessons from this study are the importance of having a pool of trained health personnel for emergency and disaster management, ensuring the availability of critical services, emergency medicine, and equipment, and the significance of retrofitting healthcare infrastructure.

Case Study 16. Piloting of the Climate and disease vulnerability assessment in selected healthcare facilities of Idukki district, Kerala

Dr. Manu, State Nodal Officer, Kerala presented a case study on enhancing preparedness and resilience of healthcare infrastructure to assess the current vulnerability and understand the potential impacts posed by climate variability and change in critical components of healthcare facilities. Idukki district, located in western ghats is always associated with power generation. About 66% of the state power needs come from the hydroelectric power projects in the district. The vulnerability assessment was conducted in coordination with the district NPCCHH division. Four hospitals were selected based on the levels of service delivery in the district, which included a community Health Centre, Primary Health Centre, Family Health Centre and Taluk hospital of the district. The hospital staff received training on a short-customized vulnerability assessment questionnaire, with technical support from the Health Energy Initiative. The trained staff administered the vulnerability assessment questionnaire related to infrastructure and climate sensitive diseases at their respective healthcare facilities under the guidance of the technical team. The key issues identified during the assessment were extreme weather events which disrupted the health services at the facilities, infrastructure damage, long power outages, persistent water shortages, no standard SOPs, training for disaster preparedness and response, lack of access to facilities and intersectoral coordination. He strongly advocated the implementation of several recommendations at the institutional level, which included retrofitting healthcare facilities, developing written Standard Operating Procedures (SOPs), providing comprehensive training, exploring renewable energy alternatives, implementing rainwater harvesting systems, and establishing a contingency plan. The team planned follow-up actions as per the assessment and concluded climate vulnerability assessment is the first step in building health system resilience.

Case Study 17. Millets - A step towards sustainable future

Dr. Ratika Samtani from Center of Excellence, IIHMR briefed about the projected impact of climate change on agriculture yields especially in developing countries. She added that India has been experiencing an exponential increase in extreme events and increase in

temperatures, changing monsoon and frequent extreme climatic events have affected cultivation, forestry, and aquaculture. In her presentation, she showcased a case study from Odisha, highlighting the adverse effects of climate change on millet yields. She outlined the health impacts of this crop and provided a brief overview of the government's program called 'Millet Mission,' which has been extended to 30 districts. The primary focus of the mission is to increase millet consumption in the state, aiming to address the challenges posed by climate change and its impact on crop production. Many Indian states have introduced millets in their food security program such as Karnataka, Odisha, and Telangana. To create awareness and disseminate information about the advantages of millets, numerous awareness camps and outreach programs have been organized.

In her conclusion, she emphasized the key learnings derived from the study. The first is the importance of including millets in the Public Distribution System (PDS) as a means to combat malnutrition and enhance nutritional diversity. Additionally, she highlighted the role of millets in mitigating the impact of climate change. Furthermore, she stressed the need for behavioral change campaigns to create awareness and promote the consumption of millets among the public. Lastly, enabling policies that support millet farming, and significance of investments in research, infrastructure, and supply chain development to make millets more accessible and widely available for the population was also highlighted. Promoting agronomic practices, accessibility to quality seed and locally suitable varieties would help in boosting production to balance demand and supply. Through such comprehensive and innovative approaches, PDS can be reformed to include millets, and with these steps, India may improve its ranking in the Global Hunger Index.

Case Study 18. Leadership in primary healthcare in Noolpuzha, Kerala Family Health Centre as a step towards climate resilience

Ms Indumathi Arunan from CDC, New Delhi presented a case on FHC Noolpuzha of Wayanad district where the efforts by the medical officer proved to be the changemaker.

With the aim of providing quality and accessible primary health care to the tribal population, he pursued sustainable interventions in digital health, solar energy, water and waste management, green cover and e-transport. Under digital health, the medical officer implemented e-health cards, paperless prescription, teleconsultation services at the facility. He also initiated solarization in terms of solar water heater and for electricity needs. In addition, rain water harvesting was implemented and promoted the use of waste water in gardening for water management measure. Under waste management, he implemented composting of waste, segregation of waste in colored bins and e-waste collection by the firm (formed by the LSG). The facility also took other green measures like protecting green cover on the premises and e-auto for patient transport.

Case Study 19. Acute Respiratory Illness (ARI) surveillance in eight districts of Chhattisgarh (data driven approaches for climate action-health focus)

Ms Punita Kumar under the guidance of Dr. Dharmendra Gahwai SNO/Deputy director at DHS, Chhattisgarh conducted and presented the study on ARI Surveillance for climate action addressing the respiratory illnesses. The State National Program of Climate Change and Human Health has identified eight sites for ARI surveillance based on poor air quality. Out of all the selected districts proposed for ARI surveillance seven were considered vulnerable in association with poor air quality. ARI surveillance is designed to predict, prepare and respond with integrated coordination between the health systems for epidemic outbreaks of ARI, emerging occupational and environmental hazards influenced by poor environmental factors in eight districts of Chhattisgarh. Its first round of activities aimed to increase the capacity of health institutions / Medical Colleges to measure, evaluate and manage Acute Respiratory Illnesses. ARI clinic was set up in the district hospital and data entry was done. Nursing cadre's potential of being an important team member in data collection was realized. She concluded by highlighting the key learnings from the study: training of MO and nursing cadre, timely data sharing and advisories to be circulated, importance of generating scientific data and field monitoring.

Case Study 20. Assisted telemedicine services for increasing access to healthcare and reducing its carbon footprint

Mr. Mohammad Gowth, Senior Faculty from Aravind Eye Care presented on various measures the health facility to provide environmentally friendly eye care services. Some of the measures include patient friendly layout and design of the facility, provision of comprehensive services that reduces need for follow up visits, provision of tele-

consultation, solarization of the facility and supporting local staffing. These measures have helped reduce need for travelling to health center for the patients by approximately 60-million-person miles over 2022, equivalent to 1,050 metric tons of carbon emissions.

It is interesting to note here that, on July 13, 2023, Delhi experienced sudden flooding in low-lying areas due to episodes of very heavy rainfall in Himachal Pradesh and Uttarakhand two days earlier. NCDC is located within 5km from banks of Yamuna River. As rapidly rising waters and inundation that had begun in nearby areas since early morning, the afternoon sessions had to be cut short to allow for safe evacuation of the participants. This incident would remain as a grim reminder and lived experience in every participant's mind that climate change's impacts are no longer distant from us in time and place, and how impact far away has potential to gravely endanger our lives without early warnings and adequate preparedness.

Day 3 (July 14, 2023)

Session: District level actions on air pollution related illnesses

Dr. Rameshwar Sorokhaibam, Deputy Director from NPCCHH headed the Case Study and shared an overview regarding the Air pollution and district level action planning. He briefly explained the interlinkages between environment and health, focusing on the air pollution and its health impacts.

Session: Surveillance Initiation & Reporting on Air Pollution Related Illnesses at district level

In continuation, new application for data collection under National Outdoor Air Pollution and Disease Surveillance (NOADS) was explained in detail by Dr. Nivethitha Krishnan.

Session: Vector-borne diseases in context of Climate Change

Mr. Praveen, Senior Consultant from NPCCHH briefed regarding the wide range of health impacts that occur due to climate change. During his presentation, he shared information about the prevalence of Vector-Borne Diseases (VBDs) and presented the epidemiological trend of these diseases. The change in temperature, humidity and rainfall patterns has direct impact on VBDs. For instance, an increase in temperature leads

to more frequency of feeding and in turn disease transmission. Rainfall also helps in increase in relative humidity and modifies temperature which affects the longevity of mosquitoes, and helps in transmission of diseases. Other indirect impacts such as urbanization, socio-demographic factors change and affect the vector ecology hence the transmission increases. There is also a potential threat of change in tempo-spatial distribution of VBD. He emphasized the actions by NPCCHH addressing the climate change impact on VBDs. NPCCHH in collaboration with COE will develop National Health Action Plan on Climate Change and Vector Borne Disease which will be followed by states/UT to develop respective State Health Action Plan. Other measures are to develop IEC, capacity building of HCP and develop training modules, strengthening health system preparedness through surveillance and inter-sectoral coordination.

Session: Health Sector Response to Extreme Weather Events

Dr. Purvi Patel, Senior Consultant from NPCCHH-HQ discussed the significant temperature changes that India has experienced since 1901 and its impact on the environment and lives of people. Through an interactive quiz Case Study, she highlighted the key points on health impacts of heat and health sector preparedness and response. The Ministry of Earth Sciences reported that India is now 30 times more likely to face heatwaves compared to previous years. By 2100, it is estimated that climate change, particularly heat stress, could cause around 1.5 million excess deaths per year, as per IMD projections. Dr. Patel explained that the 2023 summers witnessed early heatwaves in western and west coastal states, as well as 'Flash heatwaves' characterized by high heat between episodes of rain. To declare a heatwave in India, specific criteria based on maximum temperatures of different regions are used. She briefed about the heatwave which is considered in India if the maximum temperature of a station reaches at least 40 C or more for plains, 37 C or more for coastal stations and at least 30 C or more for hilly regions, and the significance of the criteria used to declare the heatwave. She discussed about the different spectrum of heat related illnesses and the heat related mortality. Multiple factors, including physiological, behavioral, socio-demographic, and environmental aspects, determine heat-related illness (HRI). Exposure to extreme heat impacts health both directly and indirectly. At the district level, Dr. Patel advocated various actions, including timely dissemination of Information, Education, and Communication (IEC), campaigns, sensitization Case Studys, training, advocacy, multi-sectoral coordination, timely reporting, and ensuring health facility preparedness to

combat heat-related challenges. She highlighted the set examples from India of various extreme weather events, where significant decrease in tropical cyclones and increased frequency of very severe cyclonic storms post monsoon (2000-2018, Source: An assessment of Climate Change over Indian Region, A report of the Ministry of Earth Science,GoI) have been observed. She also detailed out the increasing air pollution burden and its health impacts. The NPCCHH's role in disaster reduction and the significance of multi-sectoral coordination in risk reduction were discussed. Measures for disaster risk preparedness under the NPCCHH program, including awareness activities, capacity building, and strengthening health sector preparedness, were outlined. She concluded by highlighting the importance of taking appropriate actions at both district and healthcare facility levels to address the challenges posed by climate change and protect public health.

All the case study presenters were awarded a memento as a token of appreciation. All district nodal officers were provided all the digital content discussed during the workshop. A collection of these case studies will be published under NPCCHH.

Key Challenges

- Inter-departmental coordination for programme implementation.
- Delayed disbursement of PIP funds from the State to district level for program implementation.
- Non-availability of fund
- Lack of involvement of Senior leadership
- Lack of detailed SOPs
- Administrative challenges such as delayed approval from State MD NHM for supporting program implementation.

Way Forward

An interactive group work cum Case Study was conducted to discuss the key learnings from the workshop and the action points that can be planned at district level by the participants. Dr. Varun kakde from WHO reiterated the objective of the workshop and how the officials at district level can take lead in promoting climate-resilient health practices and support in strengthening the health facility preparedness for the well-being of the larger communities in response to the impact of climate change. He discussed the

prevention, management, Surveillance and Monitoring, and evidence generated activities for Air pollution, Heat, vector borne diseases, extreme weather events and green measures. There were few key action points that can be summarized after the discussion:

- District Action Plan on Climate Change and Human Health (DAPCCHH) to be prepared for all the districts
- Training of health staff and initiating HRI and ARI reporting should be expanded and monitored
- Training of health counterparts on GCR component implemented by partners should help in implementation of GCR activities under NPCCHH
- Detailed guidelines for Community mobilization should be created
- Health facility preparedness plan for the extreme events is required

Principal advisor Dr. Sen, Addl Director Dr. Shrivastava and Deputy Director Dr. Sorokhaibam presenting mementos to the presenters Dr. Hoolageri, Ms. George and Dr. Parchure (from Top left, top right and bottom image)

- Leveraging partners and medical college support at state and district level would help in expansion on implementation
- Handholding support to districts and state would be available through partner agencies like NISE, UNICEF and Jhpiego
- Support in planning activities for the program for the PIP should be ensured

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Ministry of Health & Family Welfare
Government of India

National Programme on Climate Change and Human Health

CLIMATE CHANGE & HEALTH: DRIVING LOCAL ACTION

on **July 12-14, 2023** at **NCDC, Delhi**

Agenda Wednesday July 12, 2023		
8:30-8:45am	Welcome address	Dr. Aakash Shrivastava
8:45-8:50	Introduction	
8:50-9:10	Response to 2018 floods at Kodagu district: A Case study	Dr Mahesh Hoolageri
9:10-9:30	Integrating Climate Change Lens into Health System from Community Perspective: Action research in Bhor Block, Pune, Maharashtra.	Dr. Ritu Parchure
Tea/Coffee break (9:30-10:00am)		
10:00-10:10	**Opening Remarks by Principal Advisor (PH)**	Dr. Anil Kumar
10:00-10:20	**Address by Additional Secretary (PH)**	Mr. Lav Agarwal
10:20-10:30	**Address by Director General of Health Services**	Prof. (Dr) Atul Goel
10:30-10:50	Generating awareness of Climate Change and Human Health and preparing the community for extreme climatic events.	Ms. Punita Kumar
10:50-11:10	Effect of Solarization of Quepem Health Centre, Goa under NPCCHH.	Dr. Geetanjali Sardessai Kare
11:10-11:30	Building community capabilities to mitigate and respond to public health emergencies due to climate change	Dr Amrita Gupta
11:30-11:50	Mitigating extreme hydro met hazards and shocks through Climate Smart Institutions to continue Lifesaving and Essential Services in Central India	Mr. Anand Ghodke
11:50-12:10	Public Health Preparedness for Respiratory Emergencies in association with Air Pollution Preparedness/response of healthcare systems to specific climate-sensitive illnesses	Ms. Punita Kumar
12:10-12:30	Sustaining WASH infrastructure and IPC in a 60-year-old building located in hard-to-reach tribal areas: Sub-Divisional Hospital Chitrakonda, District Malkangiri, Odisha	Ms. Shipra Saxena
12:30-12:50	Composting Vertical Pipes (V)	Dr. Balachandra
12:50-1:10	Assessment of State Health Adaptation Plans of Human Health to Climate Change (V)	Ms. Vidhu Gupta
1:10-1:30	Question-Answer	
Lunch break (1:30-2:15pm)		
2:30-2:50	Heat Action Plan for Ahmedabad City: Development and lessons	TBD
2:50-4:30	***Health Impacts of Heat, Heat-Health Action Planning***	Dr. Purvi Patel
Tea/Coffee break (4:30-5:00pm)		
5:00-5:30pm	***District Action Plan on Climate Change and Human Health***	Dr. Purvi Patel

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Thursday July 13, 2023		
9:00-10:00am	***Energy Assessment and Solarization of Healthcare Facilities***	Mr. Rahul Pachauri
	Tea/Coffee break (10:00-10:30am)	
10:30-12:30	***Green and Climate Resilient Healthcare Facilities*** ***Water, Sanitation and Hygiene (WASH) in context of Climate Change***	Dr. Dr Gajjala Sivaprasad Dr. Pratibha Singh
12:30-12:40	Question-Answer	
12:40-1:00	Solarization of sub-centres in Meghalaya to reduce energy costs and avail financial, and environmental benefits	Ms. Indumathi Arunan
1:00-1:20	Solarization of Patewa PHC, A success story of a solarized health facility	Ms. Nitha George
1:20-1:30	Question-Answer	
	Lunch break (1:30-2:15pm)	
2:30-2:50	Public health emergency management in context to land subsidence attributed to climate change in Joshimath area, District Chamoli, Uttarakhand, India in January 2023	Dr. Pankaj Singh
2:50-3:10	Piloting of the climate and disease vulnerability assessment in selected healthcare facilities of Idukki district, Kerala	Dr. Manu
3:10-3:30	Millets-A step towards sustainable future	Dr. Ratika Samtani
3:30-3:50	Leadership in primary healthcare in Noolpuzha, Kerala Family Health Centre as a step towards climate resilience	Ms. Indumathi Arunan
3:50-4:10	ARI Surveillance in Eight Districts of Chhattisgarh (Data-driven approaches for climate action – Health Focus)	Ms. Punita Kumar
4:10-4-30	Question-Answer	
	Tea/Coffee break (4:30-5:00pm)	
5:00-5:20	Climate Action Improves Health from Cleaner Air in Ahmedabad, India (V)	Dr. Vijay Limaye
5:20-5:40	Assisted Telemedicine Services for increasing access to healthcare and reducing its carbon footprint (V)	Mr Mohammed Gowth
5:40-5:50	Question-Answer	

Friday July 14, 2023		
9:00-10:00am	***District level actions on Air Pollution related illnesses***	Dr. Rameshwar Sorokhaibam
	Tea/Coffee break (10:00-10:30am)	
10:30-12:30	***Surveillance Initiation & Reporting on Air Pollution Related Illnesses at district level***	Dr. Rameshwar Sorokhaibam
12:30-1:00	***Vector-borne diseases in context of Climate Change***	Mr. Praveen G
	Lunch break (1:30-2:15pm)	
2:15-3:15	***Health Sector Response to Extreme Weather Events***	Dr. Purvi Patel
3:15-4:30	Challenges, Action Planning &Way Forward	Participants +NPCCHH
4:30-4:45	Concluding remarks	Dr. Aakash Shrivastava
Tea/Coffee break (5:00-5:15pm) & **End of Session**		

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