Decarbonizing Healthcare in India: An Ecosystem Review

Sandeep Thaker

❑ Abstract

India has a multiple-entry point system of healthcare delivery with the private and public health system models, charitable and trust systems, private practitioners and others. The demand and functioning of these are also marked by the geographies, population characteristics, and the demand mechanism. It is imperative for the climate- health policy in the country to accommodate these models in its foundational framing. This paper is an attempt to understand the space of decarbonisation of the health systems in the climate –health policy for India. Climate change has been identified as a public health emergency by WHO. The national governments and the health programmes are to embed the climate change impacts in their functioning as a need to safeguard their populations and ensure the wellbeing of human health. In this regard, decarbonisation of healthcare systems is identified as an important step for climate mitigation, supporting the GHG emissions reduction, contributing to the SDG agenda, as well as upholding the medical principle of "do no harm". The paper will draw insights on the current decarbonisation agenda at the global level, the indulgence of the public healthcare system in India towards the same from the institutional governance point of view, and the state of efforts. The paper intends to draw outputs from the review of the current ecosystem and present suggestions drawing from global view points as well as local and regional engagement in accordance to the learnings of the National Programme on Climate Change and Human Health (NPCCHH), functional under the NHM umbrella, MoHFW.

❑ Context

The WMO provisional State of the Global Climate report confirms that 2023 was the warmest year on record. Data until the end of October shows that the year was about 1.40 degrees Celsius (with a margin of uncertainty of ±0.12°C) above the pre-industrial 1850-1900 baseline (WMO, 2023). The Climate Data Store trend details that Global warming reached an estimated 1.25 degree Celsius in October 2023 and if the 30-year warming trend leading upto then continued, global warming would reach 1.5 degree Celsius mark by 2034 (WMO, 2023). Climate change and its impacts, informed by projections inform the urgency of action. Human health is impacted by climate change in multiple direct as well as indirect ways. The direct impacts include deaths and illnesses due to rise in frequency of extreme weather events such as floods, cyclones, heat waves and cold waves i.e. the sudden shock events leading to loss of lives and or impacting the vulnerable populations. The long term slow onset events also impact human health in myriad of ways such as droughts, change in pathogen behaviours, air pollution exposure, disruption of food systems, increase in zoonosis, and food and water borne diseases and mental health impacts (WHO, 2023). The infographic placed below highlights the pathways of climate hazards, vulnerabilities, and risks encompassing environmental, socioeconomic, and susceptibility parameters as per IPCC 6, and the consequent risks they pose for human health (IPCC, 2023). The figure then presents a listing of solutions to these challenges and exposure pathways by investing in strengthening the healthcare systems and developing climate resilient pathways.

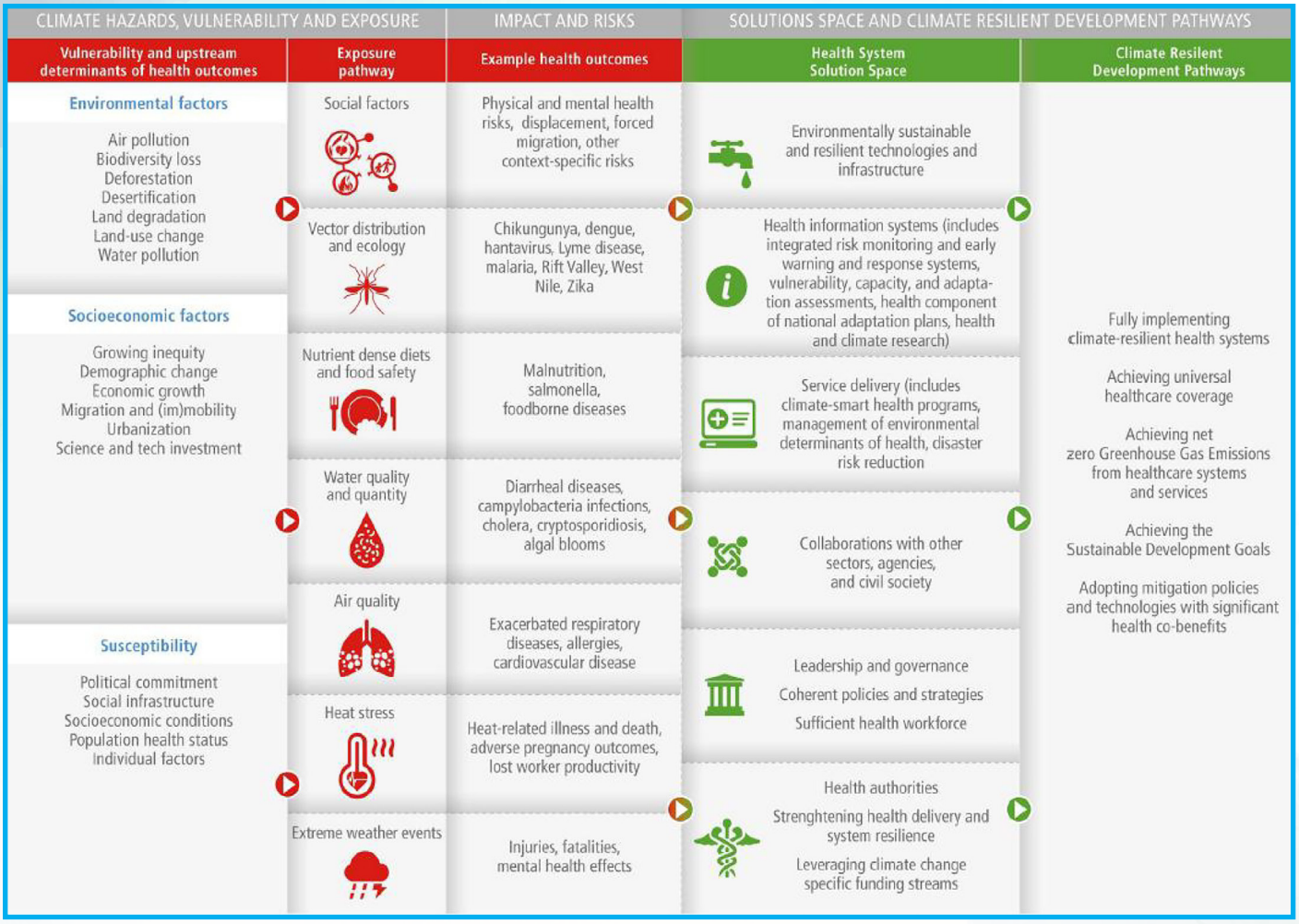


Figure 1- Climate change and human health and wellbeing- risks and responses

The **IPCC** AR6 document on health and climate change identifies climate resilient health systems as one of the key solutions to address the crisis. As per the report, climate resilient development has a strong potential to generate substantial co benefits for health and wellbeing and reduce risks of involuntary displacement and conflict. Sustainable and climate resilient development decreases exposure, vulnerability and societal inequity and that increases timely and effective adaptation and mitigation and reduce climate change impacts on health (IPCC, 2023). Further, addressing the threat of rising air pollution and related illnesses, given the overlap in sources of greenhouse gases and co pollutants in energy systems, strategies that pursue greenhouse gas emissions reductions and improvements in energy efficiency hold significant potential co benefits through air pollution reductions (IPCC, 2023).

Healthcare being at the core of wellbeing is to not only be informed by these trends in temperature and precipitation but also prepare to respond to the climate emergency. Building sustainable and resilient healthcare systems are key to long term strategy to address climate change. The recent events across the globe, specifically increased extreme weather events such as floods and heat waves indicate the urgency to strengthen the efforts for developing resilient healthcare.

The solution of decarbonizing healthcare is echoed by the Lancet Countdown 2023 report on *health and climate change: the imperative for a health centered response in a world facing irreversible harms*. As per the report, enabling a healthy future demands to go beyond the treatment of the health symptoms of climate change, to focus on primary prevention and rapidly increasing mitigation efforts. The findings

lay emphasis on a zero-carbon transition to not only avoid the health impacts but also deliver health and socio economic co-benefits. The 2022 report of the Lancet Countdown found that global health lies at the mercy of fossil fuels, and with the threat of climate change increasing, further delays in meaningful climate change mitigation put the world at risk of missing "a rapidly closing window of opportunity to secure a liveable and sustainable future". (Lancet, 2023)

❑ Healthcare Decarbonization in India- Understanding the Policy context

India's climate commitments pertains to the Nationally Determined Contributions (NDCs) under the Paris Agreement, as a part of which National Action Plan on Climate Change (NAPCC) was designed in 2008 and eight missions were adopted. Later on, the National Health Mission was also included in this commitment. The National Programme on Climate Change and Human Health (NPCCHH) was initiated under the National Health Mission MoHFW to address the rising challenges of climate change on public health. The programme has identified seventeen intervention areas based on climate sensitive illnesses. One of the functional components includes green and climate resilient healthcare facilities which houses the decarbonisation component by investing in energy efficiency, use of renewable energy sources for facility electrification, water efficiency, smart buildings, and resilient facilities. An important caveat to understand here is that the Health Ministry has not made any commitments for decarbonisation and or low carbon development. Only the Environment ministry i.e. the nodal climate change ministry for India has made the commitments for 2030 use of sustainable energy and reduction in greenhouse gas emissions. India is also not a signatory to the COP 28 Health Declaration which identifies reduction in fossil fuel usage for healthier environmental and human health outcomes. Thereby, there is a lack of concrete policy on decarbonisation of healthcare systems in India. The current context and programme on climate change and health identifies only the two components which may be described as a derivative and or an outcome of the decarbonisation process i.e. climate resilient and environmentally sustainable healthcare and or strengthening healthcare systems to mitigate the climate impacts. The India's Long-term Low Carbon development Strategy, 2022, prepared by MoEF&CC, addresses the pillars of energy, buildings, transportation, and industries as key in developing the roadmap for low carbon development, whereas the healthcare pillar remains unaddressed. Subsequently, the NPCCHH programme and or any other Health ministry division has not made a net zero commitment. The state of Kerala, Directorate of Health Services, has enrolled for the Race to Zero emissions by 2050.

❑ Decarbonizing Healthcare- Pathways

The concept of decarbonisation concerns with the process of achieving zero fossil based carbon emissions. Scientifically, the decarbonisation process and pathways for major contributors has been identified with the mapping of contributing agents. These have then been categorized as Scope 1, Scope 2, and Scope 3 emissions, contributing both indirectly as well as directly to the carbon footprint (HCHW, 2019). In accordance with the Greenhouse Gas Protocol general framework, which has also been extended to health sector, the sources of Scope 1, Scope 2, and Scope 3 emissions are illustrated below-

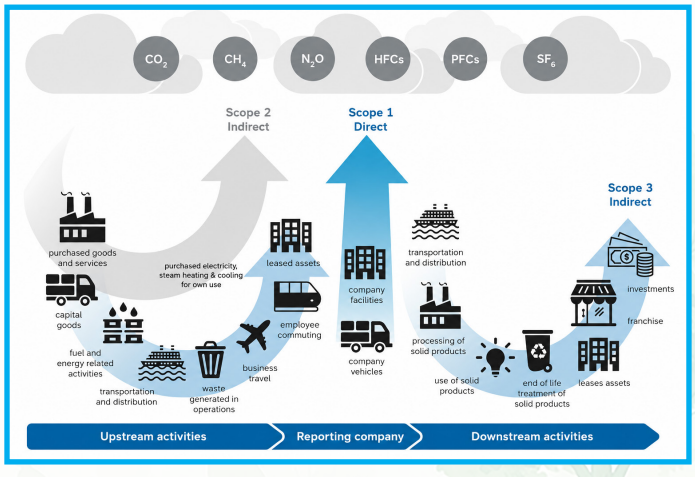


Figure 2- Greenhouse Gas Protocol Scopes 1, 2, and 3

It is important to note here that these present a guidance of the upstream and downstream activities and the associated emissions, it is suggested that national level studies may be conducted to understand the detailed emission profile. For example, the NHS England, has conducted multiple assessments to identify the emission sources, the percentage of their contribution to healthcare delivery to evidence inform the measures to be taken for climate mitigation by the health sector. These include- Energy consumption (transport, electricity, heating and cooling) as well as product manufacture, procurement, use and disposal.

- **Scope 1 GHG emissions** - Direct emission sources include those emanating directly from on-site fuel consumption in health care facilities and vehicles owned by health care facilities.
- **Scope 2 GHG emissions** - Indirect emissions refer to energy used by facilities, such as electricity, steam, cooling and heating
- **Scope 3 GHG** - emissions A third significant source of emission primarily derived from the health care supply chain is through the production, transport and disposal of goods and services, such as pharmaceuticals and other chemicals, food and agricultural products, medical devices, hospital equipment as well as instruments purchased and used by health care facilities

In accordance with the first Global study conducted by Healthcare Without Harm (HCHW), 2019, about 4.4% of the total global emissions are contributed by healthcare (HCHW, 2019). This figure was then identified to be nearing 5% in 2022-23. As per the study, although India was not categorized in the high-emitters list, it is observed that as per the increase in population, the healthcare demand, as well as the increased burden on healthcare due to climate change, there is to be a considerable increase in the emissions by the health sector in India. The study identified emissions per multiple areas of healthcare systems delivery were identified as per the WHO System of Health Accounts which included hospitals, long term care, ambulatory care, ancillary services, retailers, preventive care, admin+ finance, providing care at home, and providing care to non-residents. Furthermore, the study identified “energy generation and distribution” to have majority i.e. 40% contribution to the healthcare emissions followed by other supply chain contributions (HCHW, 2019) as illustrated in the figure below.

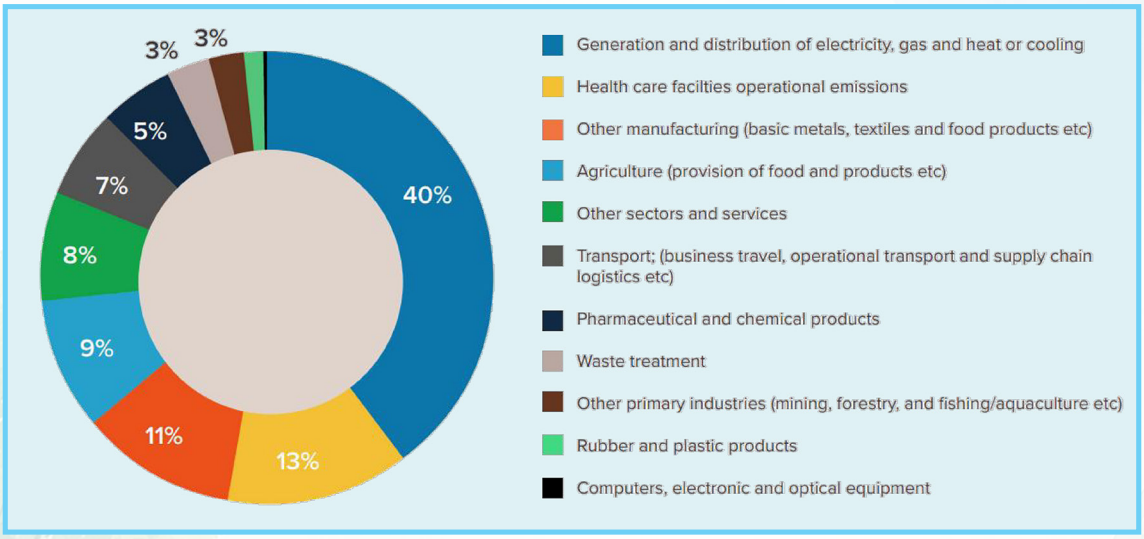


Figure 3- Emissions from Healthcare as per HCHW report

Healthcare Decarbonization in India- Current Approach and Practices

In India, public healthcare is a state subject, i.e. driven by both the central government as well as state level governments. Further, the delivery of healthcare services is supported by various actors including private hospitals, charitable and or trust driven hospitals and clinics and other models based on the patient catchment characteristics as well as the rural and urban geographies.

❑ National Level-

As established in the policy section above, the decarbonisation component is being undertaken at the national level under NPCCHH programme as a part of building climate resilient healthcare. As the nodal agency, the programme has developed guidelines for Green and Climate Resilient healthcare which underscores the WHO Operational Guidelines and Framework for developing climate resilient facilities, 2015. Under the programme, Energy Efficiency, Water Efficiency, Green Buildings, Smart Healthcare, and Waste Management have been identified as key intervention areas. The programme is also supporting the component of solar powering healthcare facilities to improve energy access, healthcare service delivery during extreme weather events, ensuring service continuity during climate change impacts, and to reduce the carbon emissions due to usage of fossil based energy source. Under the programme, the state health departments are advised to undertake energy efficiency measures such as replacement of all light bulbs with LED bulbs, as well as installation of solar energy generation models.

The programme also supported the conduct of first baseline study in India to understand the energy consumption behaviour of public and private healthcare facilities in India. This is a remarkable step in documenting appropriate data of energy patterns in the healthcare in order to design a roadmap for decarbonisation. The Towards Climate Smart Hospitals; Insights from a National Hospital Energy Consumption Survey, is a baseline for the public and private healthcare in the country, determining the energy consumption patterns as well as the projected CO2 emissions. The study details the difference in consumption patterns across the public and private healthcare facilities related to lightning, use of alternate energy sources, HVAC system, refrigeration, as well as compiles the baseline Energy Performance Indices as well as Annual Energy Usage per Bed (AEUB) . These findings are to be analysed in the context of geographies, population in the catchment area of the facility as well as the kind of services being provided by the facility. In accordance with the computations made, public healthcare facilities (<2L) emit 7 lath tonnes of tCO2 annually, whereas about 40 thousand private facilities emit around 70 lath tCO2 annually (NPCCHH, 2023). Although, the study is informative to the extent of establishing the energy consumption pattern in private and public healthcare in the country, the scope of these studies needs to be expanded to develop a thorough understanding of the emissions per sources of other areas such as the waste management, pharma, transportation and other such intensive systems collaborating for effective healthcare systems to arrive at a robust decarbonisation mechanism.

Interestingly, the big private healthcare chains such as Apollo Hospitals Enterprise Limited (AHEL), as per their commitment to Sustainable Business practices, are engaging with the ESG frameworks for optimization of and reducing their carbon footprint. Although no regulatory commitments have been issued in this regard.

❑ State Level-

As per the guidance from NPCCHH, the state governments are initiating measures for facilitating solar power in the public health

facilities. Under the programme, the Primary Health Centers, Community Health Centers, and District Hospitals are prioritized for installation of solar panels. The programme is also supporting the conduct of energy needs assessment for facilities to establish their current energy usage pattern and infrastructure support for solar models, via a mobile app. This assessment is to further inform the solarisation needs and costing estimations for the state government. Based on these, the states in collaboration with the technical expertise from REDAs are issuing tenders for solarisation. A few states such as Chhattisgarh have invested in this activity much before and have reached quite a scale.

Chhattisgarh initiated the measures for decarbonizing its public healthcare infrastructure during 2000s with the support from the Chhattisgarh Renewable Energy Development Agency (CREDA). As per the 2023 update, about 906 healthcare facilities have been solarized in Chhattisgarh including district hospitals, CHCs, PHCs, and sub health centers benefitting approx.. 80,000 patients per day (CREDA, 2023). Meghalaya, with support from Selco Foundation, remote areas access, labour room electricity and other such models of assurance. Certain other states are also investing in these initiatives, with identification of a few healthcare facilities, whereas scale up initiatives need to be invested in.

Other states making considerable progress in solar powering the healthcare facilities include Manipur, Meghalaya, Assam, Kerala, Uttar Pradesh, Gujarat, and Goa amongst others.

Solarization of Sub-Centres in Meghalaya to Reduce Energy Costs and Avail Financial and Environmental Benefits

"Before the installation of solar panels, the delivery of health services used to be affected due to power cuts. Since the installation, the Auxiliary Nurse Midwives have experienced significant improvement in the functioning of sub-centres, especially in the way there is no interruption during the delivery of pregnant women. The sub-centres run entirely on solar energy. The staff has been trained on how to maintain the solar panels which includes cleaning it and refilling the distilled water in batteries."

The subcentres are saving up to Rs 7,380/ annually each, while preventing approximately 25 tonnes of carbon dioxide emissions.

-As informed by State Nodal Officer- NPCCHH, Meghalya

❑ Discussion and Way Forward

At the outset it is important to note that decarbonisation of healthcare is a long drawn extensive process with a requirement of being driven by a clear policy, understanding the needs across the areas of healthcare delivery and mapping against efficiency measures and alternatives, prioritizing and preparing a roadmap. Using decentralized energy systems as a step towards decarbonisation is a comprehensive initiative addressing the major global commitments on climate mitigation. Additionally, when viewed in the context of India, wherein reliable energy access is still a gap, investing in this initiative serves a plethora of purposes towards strengthening public healthcare in the country.

As per the Lancet 2023 report, reliable electricity in health-care facilities is essential for quality health-care provision. Electricity is needed for basic amenities, such as lighting and clean water; it powers crucial devices in health-care settings, including vaccine and medication refrigeration, oxygen concentrators, and some diagnostic and surgical equipment; and it enables the use of key tools for maternal and child health, including ultrasounds, fetal heart monitors, and baby warmers. (Lancet, 2023). Health centres without

electricity perform fewer deliveries and have fewer patients. (Lancet, 2023). Thus prioritizing energy efficiency measures and solar powering facilities provides a platform to address these concerns.

A component of decarbonisation is being addressed in the NPCCHH with solar powering the healthcare facilities. This is a major step to support in the transition to non-fossil fuel based energy source while enabling sustainability, in addition to supporting the climate change mitigation efforts. The solarisation efforts currently are in their initial stages and thereby need to be viewed within a life-cycle approach for environmental sustainability; to be ensured by maximum resource utilization, proper maintenance and upkeep of the equipment, and safe disposal mechanisms. Further, currently in India, a fragmented approach is visible concerning this initiative, creating a requirement for strengthening the institutional governance and policy around the same. There is a need for the health directorate to be the nodal agency so as to ensure system ownership, monitoring the energy efficiency measures, as well as reduction in carbon footprint, comprehensive monitoring framework across the interventions required, ensure capacity building which in turn is to support the NDCs and building community resilience and efforts in reducing emissions as a safeguard against increased climate sensitive illnesses.

It is encouraging to view the models adopted by different states to support solarisation by building partnership with state REDAs, there is also a need for sensitization of healthcare staffs and personnel to undertake ownership of the equipment, monitor the impact of these initiatives, support and or explore joint financing models, and capacity building of the staff for ensuring maintenance for system continuity, and maintaining energy consumption behaviour. The synergies of the same may be explored with the Kayakalp initiative under the eco-friendly facilities component as well as IPHS guidelines.

Clean, renewable energy presents an opportunity to provide electricity to remote settings or energy-poor settings, with the potential of saving lives and improving the health of vulnerable populations. Although extending national grids can be expensive and slow, options such as solar photovoltaics are cost effective and offer non-polluting energy without the need for grid connection or fuel input (Lancet, 2023).

Additionally, electrification has been shown to improve vaccination rates, emergency capabilities, and the quality of maternity care, it could be a key tool in limiting gender and health disparities. (Lancet, 2023).

Urgent mitigation can still keep temperatures within adaptability thresholds, simultaneously delivering health co-benefits in the immediate term. Increasing access to zero-carbon energy can, if delivered with health as a key priority, not only reduce energy poverty, but also improve air quality, saving millions of deaths each year. Urgent decarbonisation efforts for healthcare in India are a necessity needs to be built upon (Lancet, 2023)

A few steps in this direction include strengthening the drive and institutional mechanism for low carbon development by arriving at near term as well as long term net zero targets. Further, it is necessary to understand the need and growth of healthcare industry in India, service and patient care expansion and accordingly develop plans. Initiating financing mechanisms at the central government as well as state government levels to strengthen local measures for decarbonisation would also be a great contributory step.

References

CREDA. (2023). Health Insights. Chhattisgarh: CREDA.

HCHW, A. (2019). Healthcare;s Climate Footprint. USA: HCHW,Arup.

IPCC. (2023). 6th Assessment Report IPCC. New York: IPCC.

Lancet. (2023). Health and Climate Change . New York: Lancet.

NPCCHH, P. (2023). Towards Climate Smart Hospitals: Insights from a National Hospital Energy Consumption Survey. New Delhi: NPCCHH.

WHO. (2023, October 12). Climate and Health. Retrieved from WHO: https://www.who.int/news-room/fact-sheets/detail/climate-change-and-health#:~:text=Climate%20change%20affects%20food%20availability,700%20000%20annually%2C%20may%20rise.

WMO. (2023). State of Global Climate Report 2023. New York: WMO.