

Climate Change and Public Health in Vidarbha: Time for Climate-Health Observatory

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INTRODUCTION

Climate change is increasingly influencing the determinants of human health, evolving from an environmental concern into a central public health priority.[1] Rising global temperatures, altered precipitation patterns, and increased frequency of extreme weather events are reshaping disease patterns, stressing healthcare systems, and affecting essential determinants such as food security, water availability, and livelihoods.[2-4] These impacts are no longer theoretical; they are already evident through heatwaves, droughts, floods, and emerging infectious diseases, contributing to both acute health events and long-term disease burdens. Health effects occur through multiple pathways. Direct impacts include heat-related illnesses, injuries, and mortality, while indirect effects arise from environmental disruptions leading to vector-borne diseases, poor water quality, reduced agricultural productivity, and worsening air pollution. These influences extend across communicable and non-communicable diseases and affect mental health and social well-being. Vulnerable populations particularly rural communities and agricultural workers bear a disproportionate burden due to limited adaptive capacity.[5]

India exemplifies the intersection of climatic exposure and social vulnerability. A large proportion of the population depends on climate-sensitive sectors like agriculture, making them highly susceptible to environmental

variability. Evidence shows that rising temperatures are already contributing to increased mortality and morbidity in Indian settings, highlighting the urgency of addressing climate-sensitive health risks.[6]

Climate Vulnerability in Vidarbha

The Vidarbha region of eastern Maharashtra represents a critical hotspot where climatic stress and public health vulnerability converge. Characterized by semi-arid conditions, recurrent droughts, erratic rainfall, and increasing temperatures, the region faces significant environmental challenges. Local studies indicate that communities perceive substantial changes in rainfall patterns, rising temperatures, and declining water availability, reflecting ongoing climatic shifts.[1] These environmental changes are closely linked with socioeconomic stressors. Dependence on agriculture, coupled with climate variability, contributes to livelihood instability, nutritional insecurity, and psychological distress. Vulnerable groups especially farmers, women, and the elderly experience prolonged environmental stress with limited resilience, making Vidarbha particularly susceptible to climate-sensitive health outcomes.[5]

Health Impacts in the Region

The health impacts of climate change in Vidarbha are multifaceted. Heat exposure is among the most immediate risks. Studies from Indian cities such as Ahmedabad

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and Nagpur show that extreme heat significantly increases mortality, with effects persisting beyond exposure periods.[7] In some cases, heatwaves have been associated with substantial increases in mortality, underscoring their serious public health implications. Water-related risks are also significant. Recurrent droughts and declining groundwater affect both availability and quality, increasing the risk of water-borne diseases and limiting hygiene practices. Additionally, changing environmental conditions influence the distribution of vector-borne diseases such as dengue and malaria.[8] Environmental exposures, including groundwater salinity and contamination, may also contribute to chronic conditions such as chronic kidney disease of uncertain etiology (CKDu).[9] Climate change further affects mental health and social stability. Economic stress from crop failure and livelihood insecurity contributes to psychological distress, reinforcing the role of climate change as a “threat multiplier” influencing multiple determinants of health simultaneously.[5]

Gaps in Public Health Systems

Despite growing recognition of climate-related health risks, current public health systems remain fragmented. Disease surveillance programs primarily focus on specific diseases without integrating environmental or climatic data. Similarly, meteorological information is not routinely linked with health planning and response systems. This lack of integration limits the ability to anticipate and respond effectively to climate-sensitive risks. Early warning systems for heatwaves or disease outbreaks often operate independently, reducing their effectiveness. Evidence suggests that localized and context-specific data are essential for understanding climate health relationships, yet such integrated systems are largely absent in regions like Vidarbha.[6]

Climate-Health Observatory: A Way Forward

A regional Climate-Health Observatory offers a practical and forward-looking solution. Such an observatory would integrate health surveillance, meteorological data, environmental monitoring, and research evidence into a unified framework. This would enable better understanding of climate-health linkages and support evidence-based decision making. Operationally, the observatory could strengthen surveillance by linking disease trends with climatic variables, enabling early detection of risks. It could also support predictive modelling for events such as heatwaves and vector-borne disease outbreaks. Structurally, it may be anchored within a government medical college, with linkages to district health systems and national programs like the National Programme on Climate Change and Human Health. A phased implementation approach starting with pilot districts in Vidarbha would allow gradual scaling. Strengthening intersectoral collaboration among health, environment, agriculture, and meteorology departments, along with capacity building and use of digital technologies, will be essential. Community engagement must also be prioritized to ensure context-specific and acceptable interventions.

CONCLUSION

Climate change is an immediate and escalating public health challenge, particularly in vulnerable regions like Vidarbha. The increasing frequency of extreme weather events, combined with socioeconomic vulnerabilities, is generating complex health risks that current systems are not fully equipped to manage. Establishing a Climate-Health Observatory can bridge this gap by integrating data, strengthening surveillance, and enabling proactive responses. Vidarbha has the potential to serve as a model region for climate-resilient health systems in India. The need for action is urgent, and the opportunity to build a robust, evidence-based response is both timely and necessary.

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