NTU Singapore Establishes Interdisciplinary Research Centre to Address Health Impacts of Climate Change

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Nanyang Technological University (NTU) Singapore has announced the launch of a groundbreaking interdisciplinary research centre dedicated to addressing the complex health challenges posed by climate change in tropical regions. This new entity, named the Centre for Climate Change and Environmental Health (CCEH), is set to become a pivotal hub for investigating and mitigating the multifaceted impacts of environmental change on human health, particularly in Southeast Asia where climate vulnerabilities are pronounced. By consolidating expertise from diverse scientific disciplines, CCEH aims to generate region-specific knowledge and develop actionable solutions to protect and enhance public health against the backdrop of escalating climate crises.

Climate change increasingly represents a profound threat to global health, with tropical regions like Southeast Asia facing unique and exacerbated risks due to their distinctive climatic and environmental conditions. Rising temperatures, heightened humidity, shifting monsoon patterns, and pervasive air pollution events such as transboundary haze complicate health outcomes in these areas. CCEH will focus its research on three critical pillars that directly influence climate-related health risks: air quality degradation, extreme heat exposure, and challenges related to water supply and quality. These areas are empirically linked to respiratory diseases, cardiovascular stress, heat-induced illnesses, and waterborne infections, all exacerbated by ongoing climatic shifts.

The establishment of CCEH responds to a notable gap in climate-health research, which has historically concentrated on temperate regions primarily located in Western countries, leaving tropical environments understudied. The centre’s interdisciplinary approach will encompass advanced methodologies including the deployment of artificial intelligence technologies, environmental sensors, remote sensing, and sophisticated modeling techniques to elucidate how environmental variables driven by climate change interact with human physiological and psychological health. Such methods promise to generate high-resolution data sets crucial for precision public health interventions tailored to the tropical context.

A distinctive feature of CCEH is its collaborative framework, integrating experts from NTU’s broad research ecosystem. Key institutional partners include the Lee Kong Chian School of Medicine (LKCMedicine), the Asian School of the Environment (ASE), the Earth Observatory of Singapore (EOS), the Singapore Centre for Environmental Life Sciences Engineering (SCELSE), and the Nanyang Environment & Water Research Institute (NEWRI). This convergence of medical, environmental, engineering, and social science expertise facilitates a holistic examination of climate change’s health implications, from molecular mechanisms to population-level impacts, and policy translation.

Associate Professor Steve Yim, the newly appointed director of CCEH, underscores the importance of regional perspective: “Southeast Asia remains one of the most vulnerable areas globally to climate-related health hazards but is underrepresented in current research. By centering our efforts on tropical-specific challenges such as monsoonal weather patterns and persistent haze pollution, CCEH is positioned to produce scientifically robust, culturally, and environmentally relevant findings that can drive effective mitigation strategies.” His vision aligns with the global demand for tailored knowledge that respects ecological and socio-economic variability across geographies.

At the institutional leadership level, NTU Vice President (Research) Professor Ernst Kuipers emphasizes the urgency of this initiative: “Climate change is an emergent risk multiplier for human health worldwide, and in tropical regions like ours, the urgency is higher due to complex environmental dynamics. The CCEH will foster cutting-edge interdisciplinary research, drive translational innovation, and catalyze regional partnerships aimed at building resilient health systems that can withstand the worsening climate crisis.”

The centre’s research agenda includes the investigation of the physiological and epidemiological mechanisms by which air pollution, heat stress, and water contamination synergistically exacerbate chronic and acute health conditions. A particularly innovative component is the use of artificial intelligence to analyze environmental sensor data and disease surveillance records. These technologies will enable near real-time monitoring and predictive modeling to forecast health emergencies triggered by extreme heatwaves or pollution episodes, offering critical lead time for public health responses.

Complementing its research goals, CCEH prioritizes the establishment of a regional consortium comprising universities and health institutes from countries including Indonesia, India, Thailand, Taiwan, and the United Kingdom. This consortium will facilitate data sharing, harmonize research methodologies, and disseminate best practices, fostering a cohesive scientific community dedicated to tropical climate-health issues. Collaborative capacity building is central to ensuring sustainable progress and equitable distribution of expertise and resources across member institutions.

Another emerging interest of the centre is investigating novel environmental hazards such as microplastics and their cascading effects on human health and healthcare sustainability. Assessing the economic burden linked to these emerging risks will inform resource allocation and policy development geared toward sustainable disease prevention strategies. By aligning scientific inquiry with policy relevance, CCEH aspires to bridge the gap between knowledge generation and practical application in health governance.

The World Health Organization (WHO) has acknowledged the significance of the centre’s mission. In a congratulatory message, Dr Maria Neira, Director of the WHO’s Department of

Environment, Climate Change and Health, highlighted the critical role of scientific expertise in accelerating societal transitions toward clean energy, sustainable urban environments, and healthier food systems—all essential for mitigating climate-induced health risks. CCEH's launch thus resonates on a global scale as a vital contribution to these overarching goals.

Training and capacity development are foundational to the centre's vision. Over the next five years, CCEH plans to nurture a cadre of climate-health researchers and PhD candidates equipped with interdisciplinary skills necessary to tackle complex environmental health challenges. This educational mandate ensures that advancements in research are continually reinforced by fresh scientific talent, fostering innovation and sustaining leadership in the tropical climate-health research arena.

In summary, NTU Singapore's Centre for Climate Change and Environmental Health marks a transformative step in climate and health scholarship with an emphasis on tropical regions. By leveraging technological advancements, fostering regional and international partnerships, and embracing interdisciplinary inquiry, CCEH strives to generate nuanced understanding of environmental determinants of health under climate stress. Its outcomes are expected to not only illuminate tropical vulnerabilities but also shape resilient policies and interventions that safeguard vulnerable populations amid a rapidly changing climate landscape.

Subject of Research: Climate change and its impact on human health in the tropics, with a focus on air quality, heat, and water issues in Southeast Asia.

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