LANCET COUNTDOWN: TRACKING PROGRESS ON HEALTH AND CLIMATE CHANGE

PUBLIC HEALTH FOUNDATION OF INDIA

CENTRE FOR ENVIRONMENTAL HEALTH

Lancet Countdown 2018 Report: Briefing for Indian Policymakers

November 2018

Introduction

This briefing, launched in parallel with the 2018 Lancet Countdown on Health and Climate Change, focuses on the linkages between health and climate change, and their implications for India's policy commitments. Developed in conjunction with the Public Health Foundation of India and their Center for Environmental Health, this brief serves to provide strategic direction for policy makers in four key areas:

- Health effects of heatwaves and change in labour capacity due to heat
- Premature mortality from ambient air pollution by sector
- Sustainable travel infrastructure and uptake
- Media coverage of health and climate change

Acknowledgements

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Data illustrations were provided by Shivam Pandey.

Strategic Partners

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About the Lancet Countdown

The *"Lancet Countdown: Tracking Progress on Health and Climate Change"* is a global, interdisciplinary research collaboration between 27 academic institutions and inter-governmental organizations. It monitors progress on the relationships between health and climate, and their implications for national governments, reporting annually. The Lancet Countdown follows in the footsteps of two Lancet Commissions on climate change. The first determined that "climate change is the biggest global health threat of the 21st century,"[1] whilst the second concluded that responding to climate change could represent "the greatest global health opportunity of the 21st century."[2] The 2018 report presents data on indicators selected following a consultation process in 2017. These span 5 domains, from impacts and adaptation, to mitigation, and the economic and political drivers of response.[3]

About the Public Health Foundation of India

The Public Health Foundation of India (PHFI) is a public private initiative that has collaboratively evolved through consultations with multiple constituencies including Indian and international academia, state and central governments, multi & bi-lateral agencies and civil society groups. Launched in 2006 by Prime Minister Manmohan Singh, PHFI is a response to redress the limited institutional capacity in India for strengthening training, research and policy development in the area of Public Health. PHFI recognizes the fact that meeting the shortfall of health professionals is imperative to a sustained and holistic response to public health concerns in the country, which in turn requires health care to be addressed not only from the scientific perspective of what works, but also from the social perspective of who needs it the most.

About the Centre for Environmental Health, PHFI

The Centre for Environmental Health was launched in May 2016 as a joint initiative of the Public Health Foundation of India and the Tata Institute of Social Sciences. The aim of the Centre is to build capacity in India in environmental health research and training, and to provide evidence-informed policy guidance based on research in several thematic areas including air pollution; water; sanitation and hygiene; chemical exposures; climate change, and other environmental issues of concern.

Lancet Countdown 2018 Report

Briefing for Indian policy makers

Recommendation 1

Identify "heat hot-spots" in India through appropriate tracking and modelling of meteorological data, and promote the timely development and implementation of local Heat Action Plans with strategic inter-agency co-ordination, and a response which targets the most vulnerable groups.

Recommendation 2

Review existing occupational health standards, labour laws and regulations for worker safety in relation to climatic conditions sector-by-sector; draft new rules where required; and ensure multi-sectoral co-ordination and implementation through National and State Climate Action Plans.

Recommendation 3

Decrease health-harming air pollution by carrying out source apportionment studies, emission inventories, and health impact assessments of ambient and household air pollution through State-wise Clean Air Action Plans, and use these findings to inform policies targeted at reducing the main sources of pollution via an inter-ministerial approach.

Recommendation 4

Carry out annual comprehensive city-level traffic diary surveys to guide urban infrastructure planning and facilitate solutions which address growth in population and travel demands while promoting uptake of sustainable travel forms like walking and cycling.

Recommendation 5

Promote strategic media coverage of climate and health linkages at the state level, in regional languages, to increase support for state-by-state climate mitigation and adaptation responses.

Climate Change and Health—a call for an effective policy response

"Never before in human history have we been so forewarned of a doomed destiny, but never before in human history have we been so forearmed with the knowledge and tools to alter the course of that destiny." *- K. Srinath Reddy, Global Climate Action Summit, 2018*

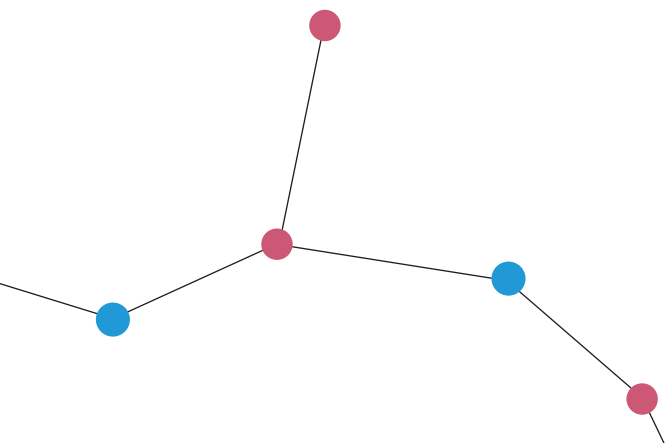
Tackling climate change could be the greatest global health opportunity of the 21st Century *- The Lancet, June 2015*

Climate change is the biggest global health challenge of the 21st century.[1] If unaddressed, it threatens to undo several decades of public health gains. Globally, according to the 2018 *Lancet Countdown* report, present day changes in labour capacity, vector-borne disease, and food security provide early warning of compounded and overwhelming impacts expected if temperature continues to rise.[3] From 2010 to 2016 air pollution worsened in 70% of cities around the globe, with coal use accounting for approximately 16% of premature mortality related to ambient fine particulate matter.[3] Low and middle-income countries with the most vulnerable populations are likely to be worst affected by climate change, given weaker health systems and poorer infrastructure. This translates into further widening of existing health and economic inequities.[3]

The recent Special Report on Global Warming by the United Nations Intergovernmental Panel on Climate Change (IPCC) outlines the need to limit global warming to 1.5 degrees above the pre-industrial era, rather than the 2 degrees which is the main target of the Paris Agreement.[4] It found that "global warming is likely to reach 1.5°C between 2030 and 2052 if it continues to increase at the current rate," and that "global net human-caused emissions of carbon dioxide (CO_2) would need to fall by about 45% from 2010 levels by 2030, reaching 'net zero' around 2050, to stay within 1.5°C."

A recent report places India amongst the countries who most experience high social and economic costs from climate change: each additional tonne of carbon dioxide emission costs India US$86, followed by USA at US$48 and Saudi Arabia at US$47.[5] The implications of climate change for India cannot therefore be understated.

Reducing carbon emissions and air pollution, particularly from coal, oil, and natural gas, is of prime importance for public health in India.



Health Effects of Heatwaves in India and Suggested Policy Responses

Exposure to heatwaves is increasing in India. The Indian government and related public health agencies must identify "heat hot-spots" in India through appropriate tracking and modelling of meteorological data, and promote the timely development and implementation of local Heat Action Plans, with strategic inter-agency co-ordination, and a response which targets the most vulnerable groups.

According to *Lancet Countdown* data, in 2017, 157 million heatwave exposure events occurred globally, representing 18 million additional exposure events compared with 2016.[3] Between 1901 and 2007, there was an increase of more than 0.5°C in mean temperature in India, with considerable geographic variation, and predictions for further increases averaging 2.2-5.5°C in northern, central and western India by the end of the 21st century.[6-8]

Health effects

Heatwaves are associated with increased rates of heat stress and heat stroke, exacerbations of heart failure and acute kidney injury from dehydration.[9] Preliminary evidence from a recent US study has linked higher temperatures to rising rates of suicide.[10] Children, the elderly and those with pre-existing morbidities are particularly vulnerable.[2]

Recent trends

The frequency, intensity and duration of heat waves in India has increased over the past half-century, with 1985-2009 showing worse trends than 1960-1985.[6] According to more recent data provided by the Lancet Countdown, which tracks the change in exposure as compared to a 1986-2008 baseline, there has been a marked increase both in the number of vulnerable people over 65 years of age exposed to heatwaves (Figure 1) as well in the duration of the heatwaves (Figure 2) in the last two decades.[3] In absolute numbers, there were an additional 40 million heatwave exposure events in India in 2016 as compared to 2012, representing a dangerous surge in the impact of heatwaves on health.[3]

Mortality trends during the Ahmedabad heatwave showed markedly elevated all-cause mortality during the peak heatwave season, with a 43% increase over reference periods.[6] Data reflected inequities in access to preventive and cooling strategies and adequate health care, therefore signaling an urgent need to allocate resources for prevention and mitigation action in disadvantaged populations.[6]

Health system preparedness and prevention strategies

The regional Ahmedabad Heat Action Plan (HAP) developed after the 2010 heat wave has been successfully deployed and shows that a concerted strategy for prevention at community and health-system levels can significantly reduce the impacts of heatwaves.[11] Such HAPs should be actively adopted and promoted in "heat hotspots" in India selected through appropriate tracking and modelling of meteorological data.

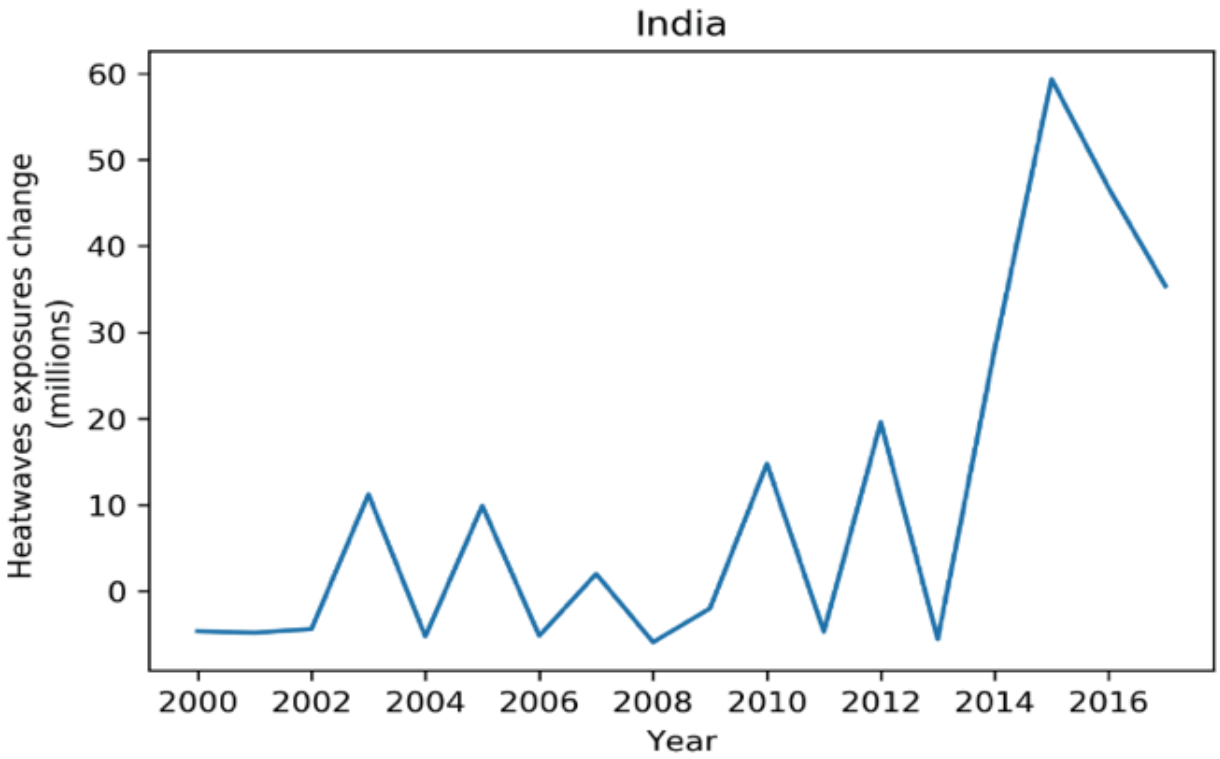


Figure 1: Change in exposure to heatwaves in India in millions per year compared with the recent past average (1986-2008) (Data provided by the *Lancet Countdown*)

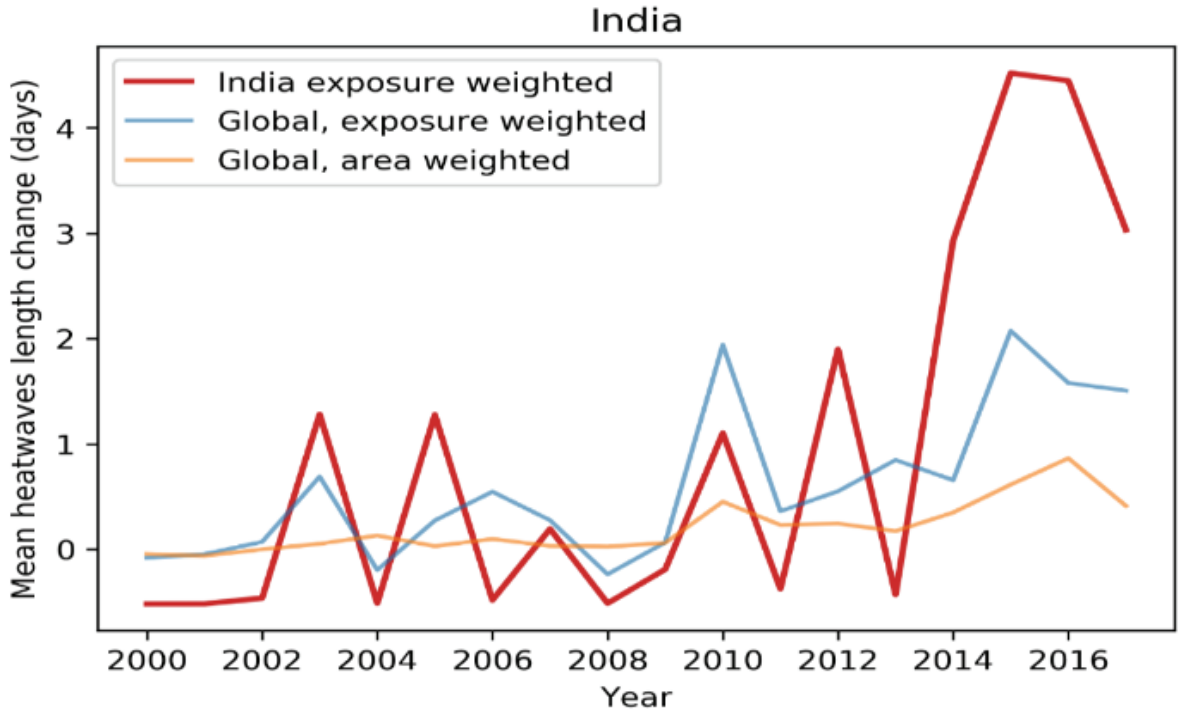


Figure 2: Change in mean heatwave length in India compared with the recent past average (1986-2008) (Data provided by the *Lancet Countdown*)

Change in Labour Capacity due to Heat

Globally, rising temperatures have proven to be a critical occupational health risk factor affecting work hours and labour capacity. The Indian policy community must review existing occupational health standards, labour laws and regulations for worker safety in relation to climatic conditions, sector-by-sector; draft new rules where required; and ensure multi-sectoral co-ordination and implementation through National and State Climate Action Plans.

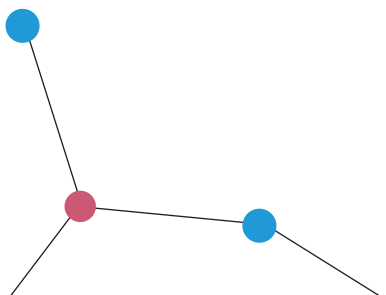
As shown in the International *Lancet Countdown* report, 153 billion hours of labour were lost globally in 2017 due to heat, an increase of 62 billion hours relative to the year 2000.[3] The impacts vary with different sectors, with the agriculture sector (metabolic rate of 400W) being more vulnerable as compared to the industrial (metabolic rate of 300W) and service sectors (metabolic rate of 200W). Areas in India, South-East Asia and Sub-Saharan Africa were the regions found to be most-impacted.[3] The large dependency on the agricultural and farming sectors in these regions means that these heat impacts further aggravate health and economic inequities.

For India, whose large agricultural economy makes up 18% of the country's GDP and employs nearly half of the population,[12] this translates into substantial climate-related impacts on the workforce and economy. A recent World Bank report on South Asia's Hotspots predicts a 2.8 % erosion of the country's GDP by 2050, accompanied by a fall in living standards due to changes in temperature, rainfall and precipitation patterns.[13]

A steady increase in hours of labour lost between 2000-2017 is seen across India.[3] For the agriculture sector alone, the labour hours lost rose from about 40,000 million hours in 2000 to about 60,000 million hours in 2017.[3] Similar trends, although of smaller magnitude, affect the industrial and service sectors, where the effect of climatic variations is reduced due to less physically strenuous work conditions. Overall, the country lost nearly 75,000 million hours of labor in 2017, relative to about 43,000 million hours in 2000, an increase of over 30,000 million hours over two decades.[3]

For a developing economy like India, this represents a substantial impact on individual, household and national budgets, necessitating urgent national and regional adaptation plans.

Immediate response should include a sector-by-sector review of occupational health standards, regulations and labor laws that focus on worker safety standards and the setting of minimum and maximum working hours in relation to safe working environments under changing climatic conditions, with due attention to the drafting of new regulations where these are lacking.



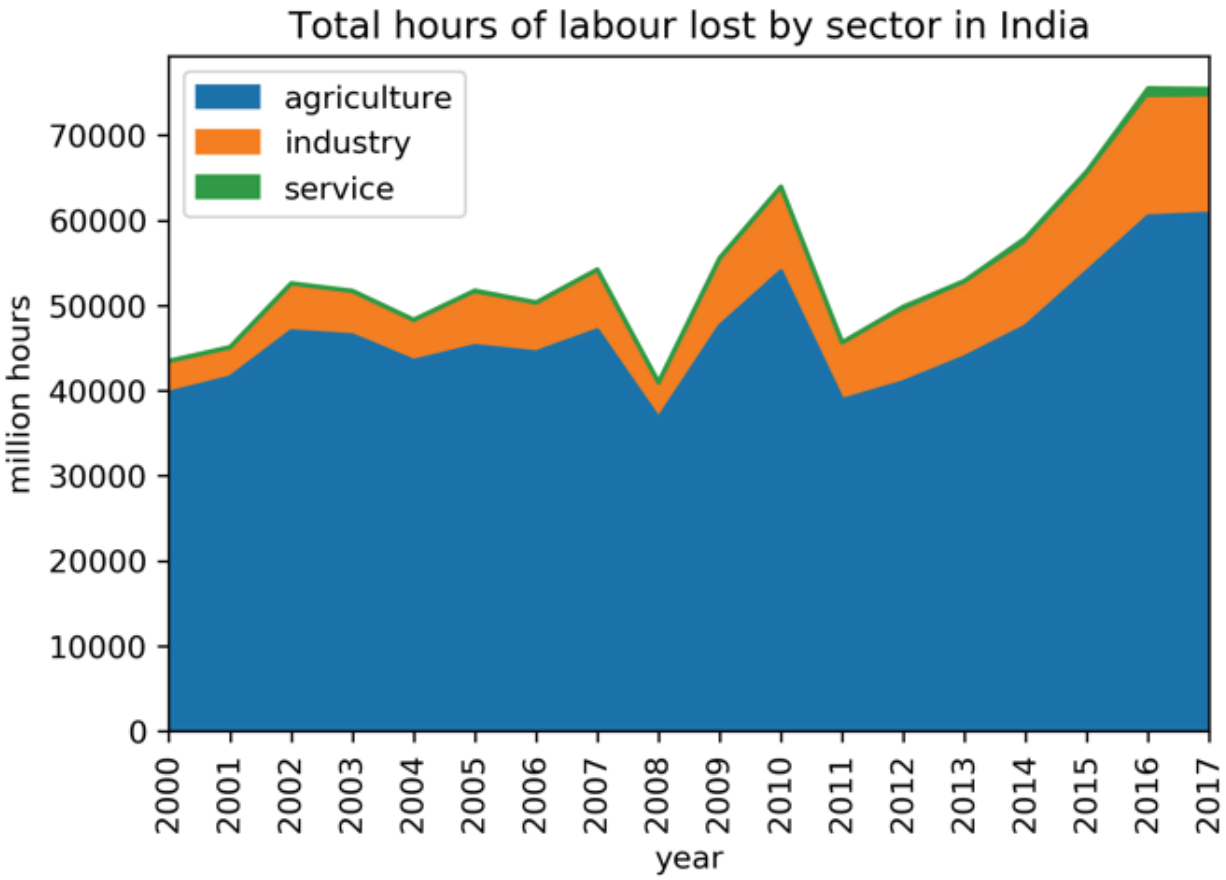


Figure 3: Total hours of labour lost by sector due to heat in India (Data provided by the *Lancet Countdown*)

Premature Mortality from Ambient Air Pollution by Sector

India's continuing dependency on fossil fuel combustion across sectors translates into a sustained source of ambient air pollution and the resultant impacts on health and premature mortality require strategic and urgent planning and redressal.

Globally, ambient and household air pollution are responsible for one in nine deaths annually.[15] This accounts for approximately 7 million premature deaths every year, with nearly two-thirds of these occurring in Asia.[15] Using data provided by the *Lancet Countdown*, this section focuses on the impacts of the fine particulate ($PM_{2.5}$) component of air pollution in India.

As shown in Figure 4, coal is responsible for 73,000 yearly $PM_{2.5}$-related premature deaths from use in power plants, 24,000 deaths from use in industry, and 10,000 deaths due to household-related consumption of coal. The largest proportion of non-coal $PM_{2.5}$-related deaths (nearly 132,000) are due to household–level sources, with industrial activity (almost 60,000), land-based transport and agriculture (52,000 each) and power plants and waste management accounting for the remainder (about 11,000 deaths each). (Figures 5 and 6)

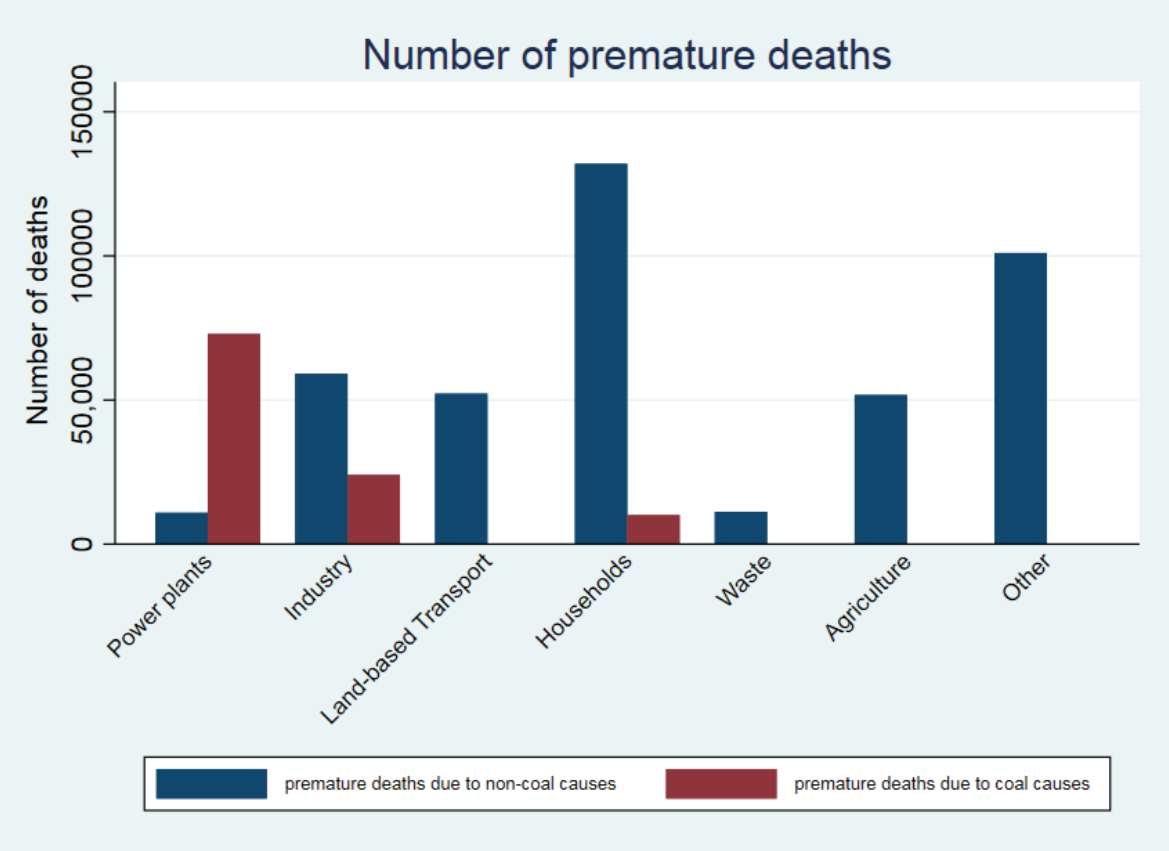


Figure 4 - Distribution of $PM_{2.5}$-related coal versus non-coal premature deaths from $PM_{2.5}$ in India (Data provided by the *Lancet Countdown*)

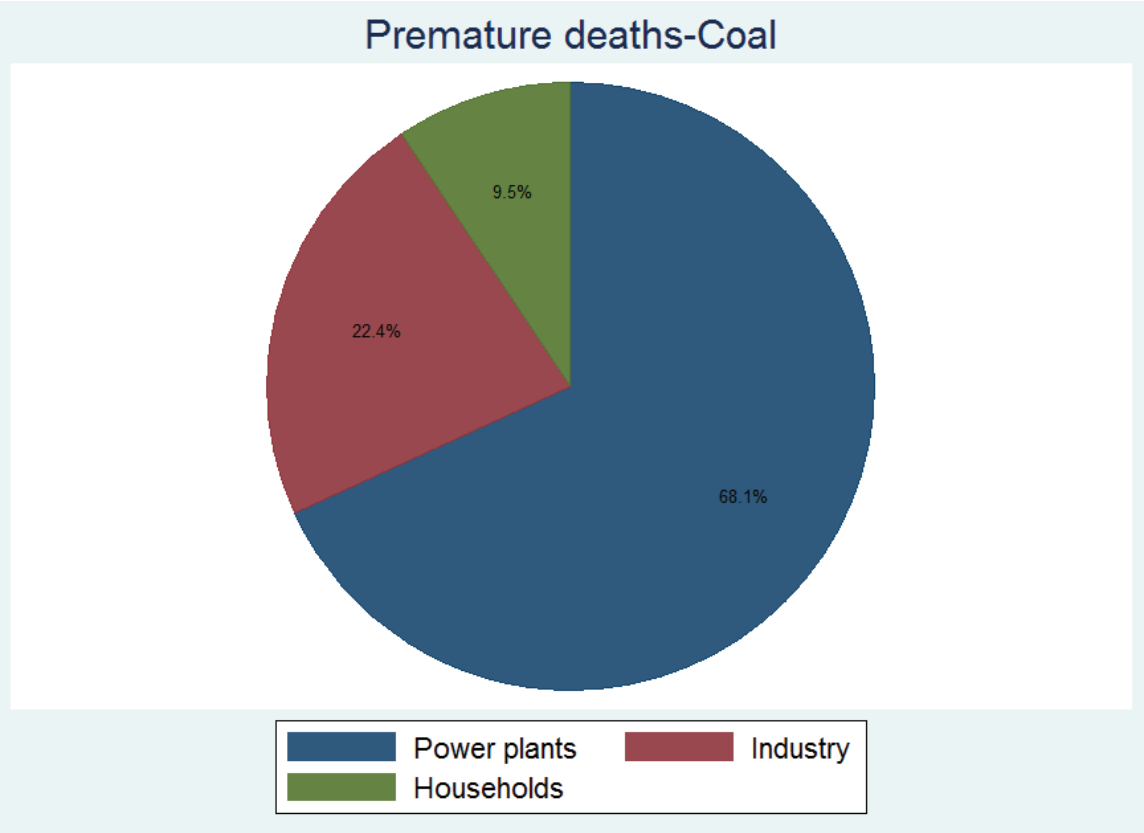


Figure 5 – Premature $PM_{2.5}$-related deaths in India due to coal–related factors. (Data provided by the *Lancet Countdown*)

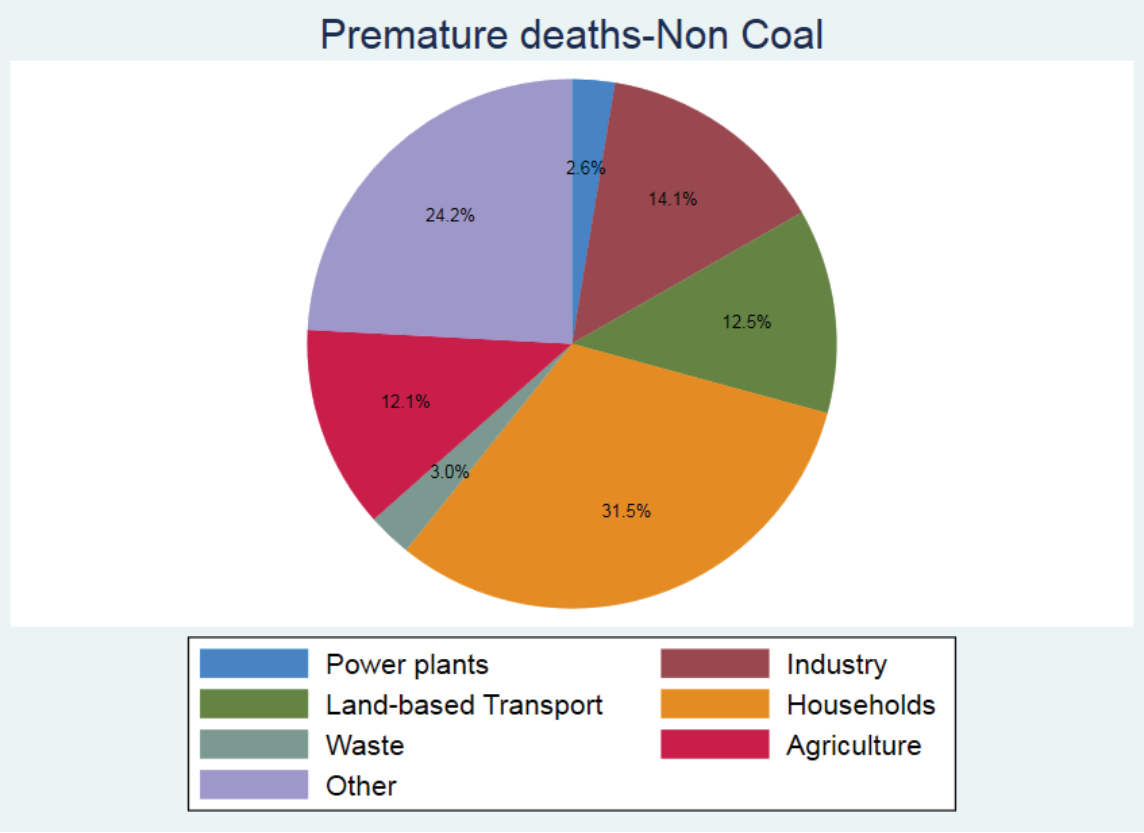
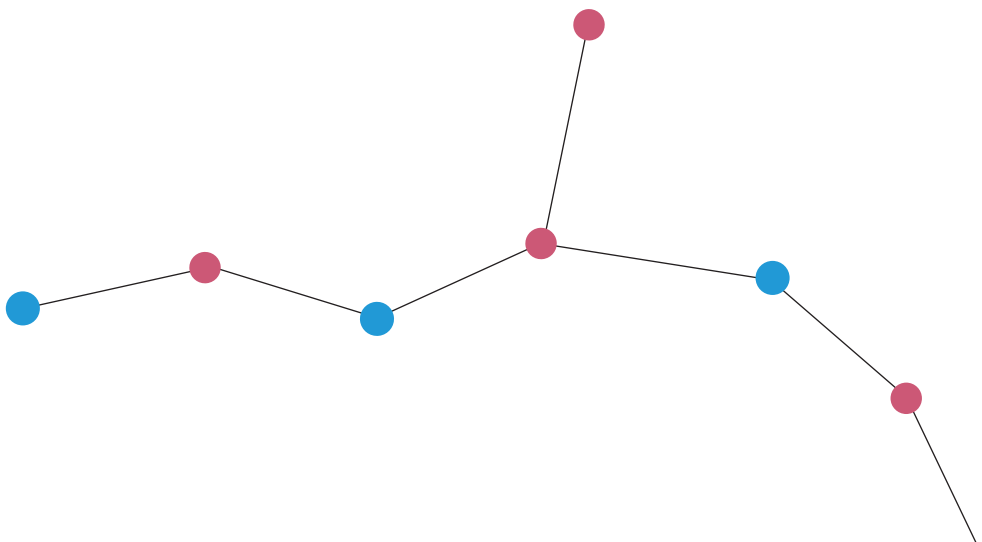


Figure 6 – Premature $PM_{2.5}$-related deaths in India due to non-coal factors. gure .
(Data provided by the *Lancet Countdown*)

National commitment to reduce ambient air pollution in India has increased in recent years. The Indian Ministry of Health's Steering Committee on Air pollution and Health-related Issues advocates strong inter-ministerial co-ordination even while providing recommendations for policy and programmatic responses within ministries.[15]

Further research studies including emission inventories and source apportionment studies are required to document the health effects of both ambient and household air pollution and enable focused delivery of regulatory interventions. This must be combined with the strict enforcement of existing policies and renewed efforts to mitigate across sectors under the direction of a single competent coordinating authority. Curtailing the current trends in premature mortality due to air pollution is imperative for safeguarding national economy.



Sustainable Travel Infrastructure and Uptake

Substantial population growth in urban India has created increased demand for travel infrastructure.

Annual comprehensive city-level traffic diary surveys would facilitate urban planning solutions which address growth in population and travel demands while promoting the uptake of sustainable travel forms like walking and cycling.

India has had a considerable increase in its urban population, from 286 million people in 2001, to about 377 million or 30% of the country's population in 2011.[16] Current estimates predict further growth to about 550-600 million by 2030.[16] Much of the fastest growth occurred in cities like Surat, Nashik and Faridabad.[17] Despite the fact that small cities are forecast to show continuing growth through 2030, there has been little assistance from state and national governments in addressing their transport needs.

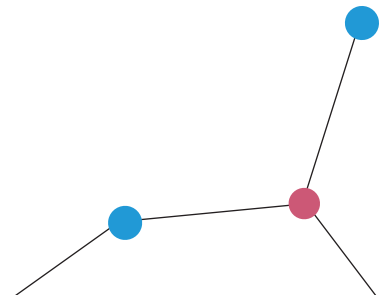
Vehicular pollution continues to be a major source of air pollution. As seen above in the discussion on air pollution, land-based transport is responsible for a substantial number of $PM_{2.5}$-related deaths. Disorganized expansion of travel infrastructure results in motor-vehicle-related injuries, traffic congestion, idling at traffic signals, and highly polluting exhaust fumes, which combine to cause a hazardous environment with poor air quality.

Improved adoption of active transport forms such as walking and cycling can decrease the prevalence of overweight and obesity, established risk factors for chronic diseases like diabetes and heart disease, in addition to decreasing incidence of respiratory diseases from air pollution.

Strategic planning is required to ensure healthy transport-related outcomes.

Urban transport in India covers a fair mix of intra-city movement modes for people and goods including cycling and walking; non-motorized transport options such as cycle-rickshaws and push carts; motorized personal vehicles like two-wheelers and cars; public transport, including bus and rail, and private-public transport modes like shared taxis.[18]

The Sustainable Healthy Urban Environments (SHUE) project provides travel information for 98 cities.[19] Of these, 48 provided cycling data for the past decade (2008-2018).[19] Overall, there has been poor uptake of cycling and walking, with increased adoption of motorized and public transport, and considerable regional variations in sectors based on both income and population sizes.[19] Figures 7 shows modal share in large cities, and Figure 8 in smaller, but fast-growing cities.



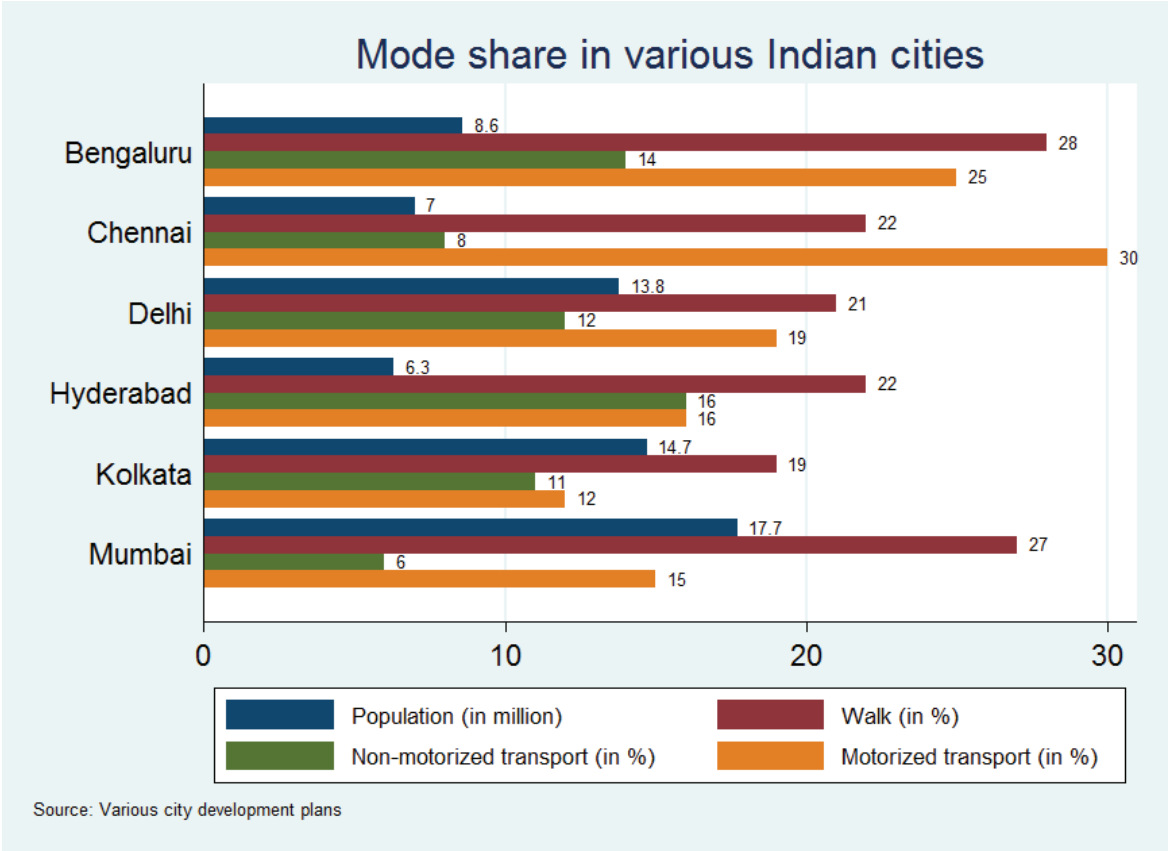


Figure 7 – Transport modal share in large Indian cities[19]

Large cities demonstrate high rates of both walking and personal vehicle use. This can probably be accounted for by considering the huge migrant labour forces living alongside more established parts of the population that own private motorized forms of transport. The construction of metro rail infrastructure in Delhi stimulated public transport use, but last mile connectivity necessitates interdependency of other modes of transport. Such complex inter-dependency, if not factored in during transport expansion plans, can have counter-productive effects. Small-vehicle congestion outside metro stations can lead to idling vehicles with considerable polluting potential.

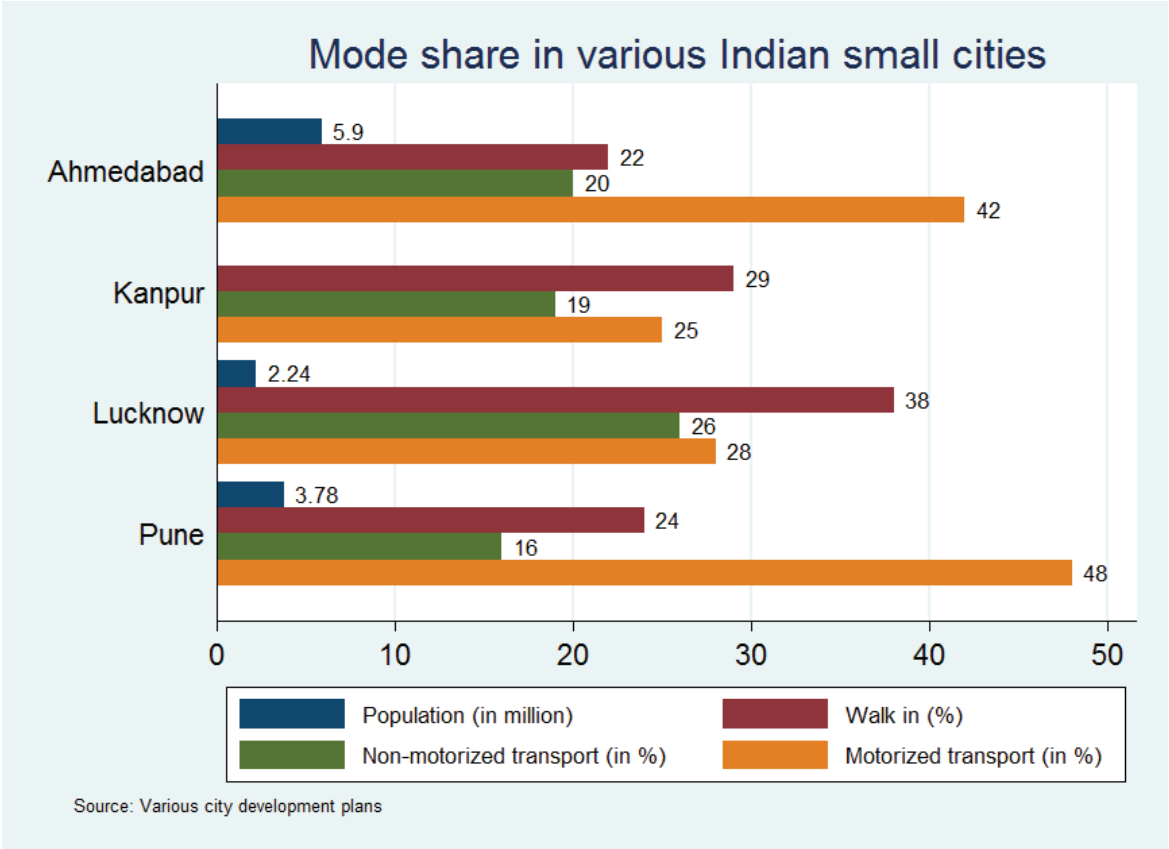


Figure 8– Transport modal share in small Indian cities[19]

Ahmedabad and Pune, both cities with a remarkable growth rate, show high levels of motorized vehicle modal share.

In India, diversity of income, and access to transport options are challenges to a focus on sustainable transport. Sustainable options can be adopted in smaller cities in a phased manner, facilitated by cross-sectoral engagement between health workers, city planners, transport and energy authorities.

Pollution can also be decreased by switching to zero-emission vehicles. It is estimated that India can save 64% in anticipated passenger road-based, mobility-related energy demand and 37% in carbon emissions in 2030 by pursuing a shared, electric, and connected mobility future.[20] In an aggressive move towards electric mobility, the Indian government aims to have a 100% electric vehicle (EV) fleet by 2030. The Faster Adoption and Manufacture of (Hybrid) and Electric vehicles (FAME) scheme provides incentives for EV buyers and has stimulated an acceleration towards electrification of cars and buses.[20]

Implications for health and the environment

An emphasis on the health co-benefits of walking and cycling will resonate in a country like India where lifestyle disorders like overweight and obesity are rising among all ages and both genders.[21] Coupled with a vision of healthy air quality, this will provide motivation to policy makers. Thus far, transport-related surveys have been biased by location, timing, and inadequately representative population sampling. Comprehensive traffic diary surveys have been previously noted to be effective tools for policy change and must be therefore implemented in order to provide critical inputs prior to traffic expansion plans.

Media coverage of health and climate change

Substantial increases in global media coverage of climate change issues, in particular with reference to the health effects of climate change, can play a large role in enhancing awareness across all sectors, and stimulate resource allocation for adaptation and mitigation.

In India, this must include regional coverage in a diversity of languages.

Globally, the extensive media coverage of climate change in recent years reflects a positive trend. An in-depth analysis of newspaper coverage of climate change and health issues from WHO regions showed an almost 40% increase over the last decade.[3] Shining the spotlight on climate change and health linkages may lead to more appropriate action in terms of adaptation and mitigation.

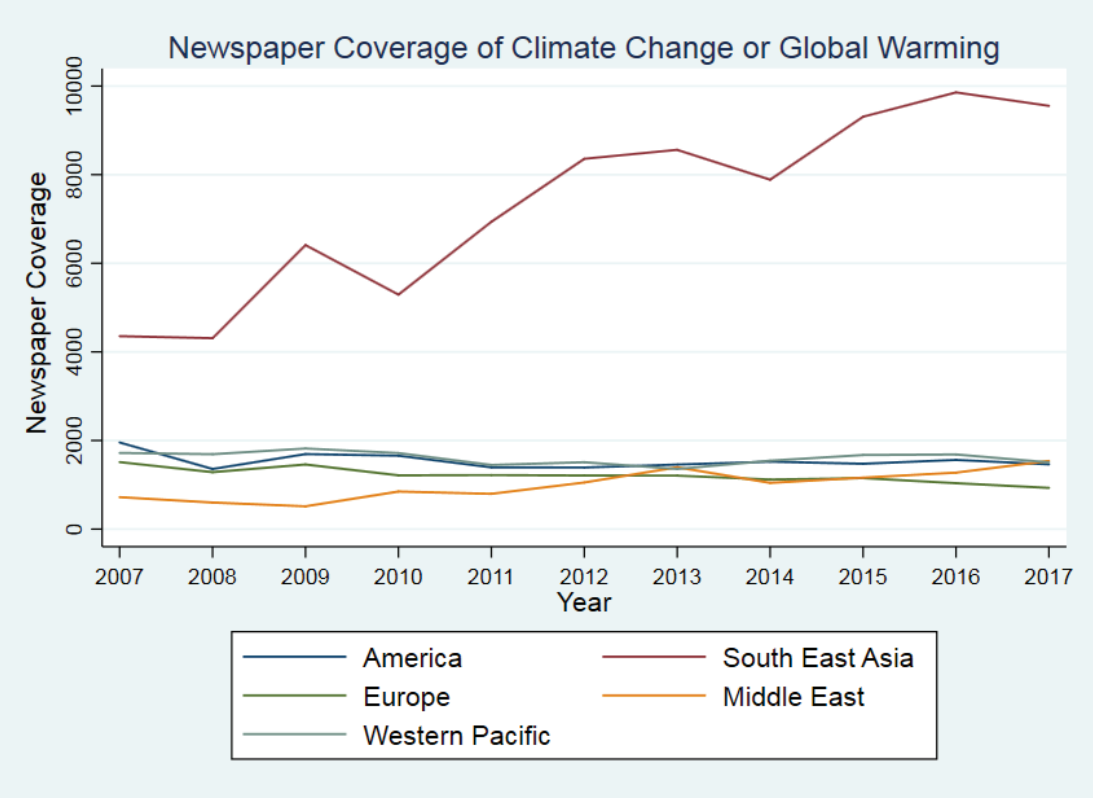
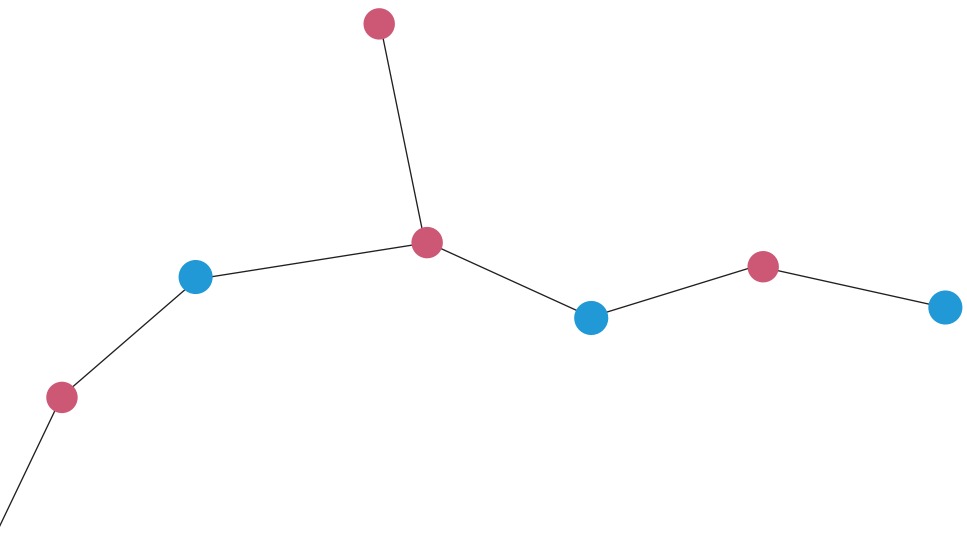


Figure 9 - Global coverage in newspapers of Climate Change (2007-2017). (Data provided by the *Lancet Countdown*)

The greatest proportion of media coverage came from contributions by leading dailies in South-East Asia, (Figure 9) with specific inputs from Indian newspapers like the Times of India and Hindu.[3] The decadal increase between 2007-2017 of coverage of climate change issues in Times of India was 458% while Hindustan Times increased by 415%.[3] The vast reach of these English dailies across population segments with significant opinions and perspectives on social, political and economic landscapes could help instigate dialogue for action where most required. While newspapers like these English dailies do have a significant impact, India also has regional language newspapers across states and not much evidence exists on the coverage of climate change and health issues by these. Therefore, while encouraged by levels of coverage in national English dailies in India which are high enough to significantly contribute to global statistics, we should address with caution the actual situation in India.

States where the impacts of climate change are worst with respect to health-related consequences, may in fact have less than requisite media coverage. Inequalities in media coverage may actually translate into inappropriate resource allocations and action plans.

Hence while appreciating the strong media coverage in India's large English-language dailies, India must critically analyze regional coverage of climate change issues, ensure that it occurs in a diversity of languages, and work to ensure that the awareness raised is leveraged into an effective state-by-state policy response.



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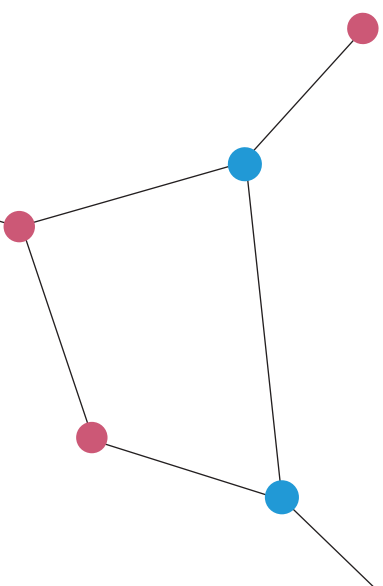

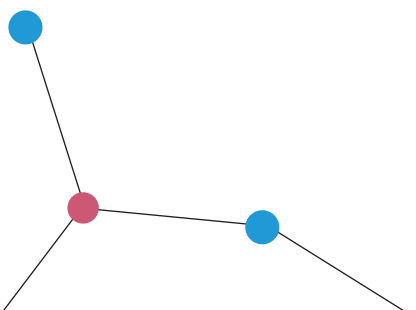

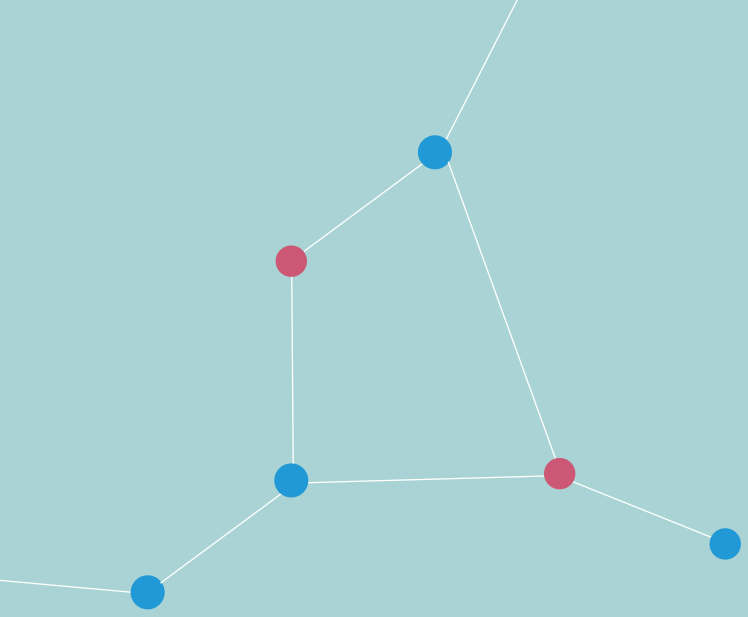

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TRACKING PROGRESS
ON HEALTH AND
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