

# Residential biomass burning, open waste burning responsible for highest PM 2.5 exposure: Study

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NEW DELHI: A new study released on Thursday titled "Burden of Disease Attributable to Major Air Pollution Sources in India" has found that residential biomass burning or use of solid fuels inside homes followed by coal combustion contributes to highest PM 2.5 exposure in both cities and villages.

The study by IIT Bombay, US-based Health Effects Institute and Institute for Health Metrics and Evaluation (IHME) also found that unlike many other countries where cities are worst affected, in India PM 2.5 exposure levels are similar in both rural and urban areas.

The study which takes 2015 as the base year attributes nearly 25% of deaths linked with PM 2.5 exposure (26.7 lakh) in 2015 to biomass burning in homes. Surprisingly, these estimates do not even include indoor air pollution exposure from biomass burning.

"Residential biomass burning also impacts outdoor air quality, so the emissions exit the kitchen area and cause high exposures outside," said Chandra Venkataraman, a scientist from IIT Bombay who led a part of the research study. Even in Delhi, which records one of the highest PM pollutions among Indian cities, the largest source of PM 2.5 is residential biomass burning followed by the open burning of trash and biomass according to the study.

Coal combustion emissions from both industries and thermal power plants were responsible for 15.5% deaths attributable to PM 2.5 pollution nationally, about 6.1% were from agricultural burning even though the practice is limited to some northern and central Indian states. Venkataraman added that the deaths linked to PM 2.5 are going to increase substantially if aggressive action is not taken to control emissions.

According to the study's analysis of a 2050 scenario with no further air pollution control actions, the health burden would increase to over 73 million healthy years of life lost and over 3.6 million deaths in 2050. However, under an aggressive control scenario which includes a variety of actions like complete LPG cover, shift from kerosene lighting to solar, 70% to 80% non-coal generation, field mulching to replace crop burning, private vehicle share drops to 40% and many others could avoid over 1.2 million annual deaths in 2050 if implemented.

A recent Global Burden of Disease (GBD) report had found that PM 2.5 exposure is a risk factor for various diseases highest among which is ischemic heart disease (IHD) followed by chronic obstructive pulmonary disease (COPD) and stroke. It also estimated that exposure to outdoor air pollution is the third leading risk factor contributing to premature deaths among 79 behavioural, environmental and metabolic causes of mortality that were analysed. This study further builds on the GBD report to estimate source wise contribution to health impacts and PM 2.5 exposure.

The inventories developed by the IIT Bombay team include emissions of sulphur dioxide (SO<sub>2</sub>), nitrogen oxides (NO<sub>x</sub>), PM 2.5, black carbon and others from a multipollutant database for India between 1996-2015. IIT Bombay estimated emissions from each sector including industry, power, transport etc at the district level using government statistics and records like national sample survey (NSSO) and national family health survey (NFHS). The emissions were then projected to 2030 and 2050 under different energy and air pollution control scenarios. Further, PM 2.5 estimates from satellite data and ground monitoring data were used to estimate approximate population exposure by scientists from IHME.

The national level contribution to mortality burden from transport was found to be only 2%. But authors caution that the geographic scale of the grid used for this analysis is large and unlikely to capture variation in traffic-related exposure. "Transport and distributed diesel sources operate in closer proximity to populations..." the study notes.