

1-2-2018

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Recommended Citation

Suresh, K. and Palaniraj, N. Ph.D. (2018) "Impact of Air Pollution on Human Health," *International Review of Business and Economics*: Vol. 1: Iss. 3, Article 50.

Available at: <https://digitalcommons.du.edu/irbe/vol1/iss3/50>

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44. IMPACT ON AIR POLLUTION ON HUMAN HEALTH

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INTRODUCTION

Among the most pressing of today's environmental issues is the pollution of air. Air is the breath of life, yet there many kinds of air pollution contributing to problems that range from human health issues to climate change. Air pollution can be defined as the presence of toxic chemicals or compounds in the air, at levels that pose a health risk. In an even broader sense, air pollution means the presence of chemicals or compounds in the air which usually not present and which lower the quality of the air or cause detrimental changes to the quality of life. Air pollution is the leading environmental cause of death worldwide according to the state of global air 2017, a new first annual report and interactive website launched today. The report also finds that 92% of the world's population lives in areas with unhealthy air. All told, long-term exposure to fine particulate matter the most significant element of air pollution contributed to 4.2 million premature deaths and to a loss of 103 million healthy years of life in 2015, making air pollution the 5th highest cause of death among all health risks, including smoking, diet, and high blood pressure.

The analysis found that China and India together were responsible for over half of the total global attributable deaths, the study also finds that increasing exposure and a growing and aging population have meant that India now rivals China for among the highest air pollution health burdens in the world, with both countries facing some 1.1 million early deaths from air pollution in 2015.

Air pollution is probably one of the most serious environmental problems confronting our civilization today. Most often, it is caused by human activities such as transportation, mining, construction, industrial work, agriculture, smelting, etc. However, natural processes such as volcanic eruptions and wildfires may also pollute the air, but their occurrence is rare and they usually have a local effect, unlike human activities that are ubiquitous causes of air pollution and contribute to the global pollution of the air every single day.

AIR POLLUTION IN WHO

Air pollution is the contamination of indoor or

outdoor air by a range of gasses and solids that modify its natural characteristics. Key health harmful pollutants include particulate matter, carbon monoxide (CO), ozone (O₃), blackcarbon (BC), sulfur dioxide and nitrogen oxides (NO_x). Air pollution is often not visible to the naked eye as the sizes of the pollutants are smaller than the human eye can detect. The fact that you cannot see the air pollution does not mean that it does not exist. They can become visible in some situations for example in the form of sooty smoke from the open burning of crop residues or other waste, as well as from burning wood, coal, petrol and diesel fuels for cooking and heating, transport or power production.

CAUSES OF AIR POLLUTION

Anything people do that involves burning things, using household or industrial chemicals or producing large amounts of dust the potential to cause air pollution. Step back a century or two and the cause of most air pollution was easy to identify; filthy factories, powering the Industrial Revolution. Today, tighter air pollution laws, greater environmental awareness, and determined campaigns mounted by local communities make it far harder though by no means impossible for factories to pollute in post industrial nations such as the United States and Britain. The biggest culprit today is traffic, though power plants and factories continue to make an important contribution. Before we start laying the blame for air pollutions let's remember one very important thing most of us drive cars, use electricity and buy goods made in factories. If we're pointing fingers, ultimately we're going to have to point them at ourselves. Now let's look a bit closely at the three key sources of air pollution

- Traffic
- Smog
- Power plants
- Industrial plants and factories

AIR POLLUTION IN INDIA

Many major Indian cities, including Mumbai, Pune and Kolkata, grapple with air pollution. However, India's air pollution crisis is largely due to the noxious, winter air quality in Delhi and some cities in north and central India. In 2016, the World Health Organization put 10 Indian cities on the list of the world's most polluted.

In 2016, severe air pollution has disrupted everyday life, especially during the winter. In 2015 air pollution (PM2.5) levels increased in a rapid manner overtaking even China. Even though pollution levels are increasing across the country, the emphasis so far has been on Delhi. There has been a growing realization that the majority of Delhi’s pollution is coming from outside its borders and that pollution levels

in other states like Karnataka, Tamil Nadu and Maharashtra are also increasing. However, the country is yet to come to the full understanding that air pollution is a national problem and to win the fight against it, we need to act as a country and across city or even regional boundaries. India’s air pollution has become a public health and economic crisis.

| Total Registered Motor Vehicles in India (State-Wise) As on 31st March, 2002-2012 | | | | | | | | | | |
|--|--------|--------|--------|--------|--------|---------|---------|---------|---------|---------|
| (In thousands) | | | | | | | | | | |
| State and Union Territory | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
| Andhra Pradesh | 5,002 | 5,720 | 6,458 | 7,218 | 6,367 | 7,208 | 8,059 | 8,923 | 10,189 | 12,424 |
| Arunachal Pradesh | 21 * | 21* | 22* | 22*22* | 22* | 22* | 22* | 22* | 145 | 151 |
| Assam | 657 | 727 | 815 | 914 | 1,021 | 1,116 | 1,235 | 1,384 | 1,582 | 1,807 |
| Bihar | 1,121 | 751 | 1,352 | 1,432 | 1,577 | 1,739 | 1,960 | 2,357 | 2,673 | 3,113 |
| Chhatisgarh | 1,076 | 1,216 | 1,375 | 1,541 | 1,734 | 1,935 | 2,115 | 2,436 | 2,766 | 3,104 |
| Goa | 397 | 436 | 482 | 529 | 579 | 624 | 674 | 727 | 790 | 866 |
| Gujarat | 6,508 | 7,087 | 7,817 | 8,622 | 9,497 | 10,289 | 10,999 | 11,873 | 12,993 | 14,414 |
| Haryana | 2,279 | 2,548 | 2,854 | 3,087 | 3,528 | 3,973 | 4,425 | 4,792 | 5,377 | 5,978 |
| Himachal Pradesh | 269 | 289 | 301 | 334 | 342 | 371 | 494 | 538 | 622 | 737 |
| Jammu & Kashmir | 399 | 439 | 478 | 524 | 570 | 620 | 668 | 739 | 927 | 917 |
| Jharkhand | 1,101 | 1,217 | 1,357 | 1,505 | 1,686 | 1,850 | 2,038 | 2,767 | 3,113 | 3,158 |
| Karnataka | 3,738 | 3,977 | 5,436 | 6,220 | 5,486 | 6,217 | 6,953 | 9,044 | 9,930 | 10,910 |
| Kerala | 2,552 | 2,792 | 3,122 | 3,559 | 3,957 | 4,430 | 4,860 | 5,398 | 6,072 | 6,893 |
| Madhya Pradesh | 3,459 | 3,804 | 4,188 | 4,609 | 5,047 | 5,523 | 6,011 | 6,591 | 7,356 | 8,144 |
| Maharashtra | 8,134 | 8,969 | 9,936 | 10,966 | 12,171 | 13,335 | 14,451 | 15,768 | 17,434 | 19,432 |
| Manipur | 97 | 106 | 114 | 124 | 133 | 147 | 147 | 194 | 207 | 125 |
| Meghalaya | 73 | 73 | 92 | 104 | 117 | 128 | 142 | 158 | 176 | 198 |
| Mizoram | 37 | 42 | 47 | 52 | 61 | 66 | 70 | 80 | 93 | 102 |
| Nagaland | 162 | 172 | 172 | 184 | 210 | 226 | 240 | 254 | 273 | 291 |
| Orisea | 1,359 | 1,525 | 1,715 | 1,932 | 2,148 | 2,370 | 2,607 | 2,932 | 3,338 | 3,759 |
| Punjab | 3,308 | 3,529 | 3,876 | 4,035 | 4,294 | 4,573 | 4,832 | 5,274 | 5,274 | 6,263 |
| Rajasthan | 3,487 | 3,834 | 4,261 | 4,754 | 5,336 | 5,902 | 6,490 | 7,166 | 7,986 | 8,985 |
| Sikkim | 15 | 17 | 20 | 22 | 25 | 26 | 29 | 34 | 39 | 43 |
| Tamil Nadu | 8,005 | 8,575 | 9,257 | 10,054 | 10,981 | 11,930 | 12,891 | 14,062 | 15,638 | 17,412 |
| Tripura | 66 | 76 | 73 | 106 | 120 | 131 | 144 | 160 | 188 | 204 |
| Uttara Khand | 457 | 516 | 573 | 643 | 643 | 731 | 787 | 831 | 997 | 1,244 |
| Uttar Pradesh | 5,928 | 6,460 | 7,344 | 7,989 | 9,086 | 9,826 | 10,779 | 11,988 | 13,287 | 15,445 |
| West Bengal | 2,366 | 2,548 | 2,681 | 2,872 | 3,198 | 2,762 | 3,044 | 2,747 | 3,261 | 3,861 |
| A&N Islands | 28 + | 28+ | 37 | 41 | 48 | 53 | 60 | 62 | 69 | 77 |
| Chandigarh | 562 | 586 | 617 | 647 | 678 | 712 | 747 | 949 | 1,008 | 1,058 |
| D&N Haveli | 31 | 35 | 40 | 45 | 51 | 58 | 63 | 69 | 76 | 85 |
| Daman&Diu | 44 | 48 | 51 | 55 | 62 | 68 | 70 | 72 | 78 | 85 |
| Delhi | 3,971 | 4,237 | 4,187 | 4,487 | 5,492 | 5,899 | 6,302 | 6,747 | 7,228 | 7,350 |
| Lakshadweep | 5 | 5 | 5 | 6 | 7 | 7 | 7 | 8 | 9 | 10 |
| Puducherry | 293 | 313 | 347 | 384 | 432 | 484 | 538 | 599 | 673 | 755 |
| Grand Total | 67,007 | 72,718 | 81,502 | 89,618 | 96,707 | 105,353 | 114,951 | 127,746 | 141,866 | 159,491 |

There are increasing numbers of people who die prematurely every year with the increasing pollution levels. Deaths due to air pollution are only a fraction less than the number of deaths caused by tobacco usage. Global Burden of Disease (GBD), a comprehensive regional and global research program including 500 researchers representing over 300 institutions and 50 countries, has estimated that 3283 Indians died per day due to outdoor air pollution in India in 2015, making the potential number of deaths due to outdoor air pollution in India in 2015 to 11.98 lakh. On the economic front, loss of productivity and the forced closures of schools and industries have already started impacting our economy.

The World Bank estimates that India loses around 3% of its GDP due to air pollution. This makes air pollution one of the biggest issues to fight if we are to protect peoples' lives, public health and our economy. Air pollution is a complex issue, requiring an array of solutions. There are many sources that contribute to pollution across the country. Depending on region and climatic conditions, the contribution of particular sources will also differ. However, what is very clear is that irrespective of where you live, burning of fossil fuels (coal & oil) contributes majorly to air pollution levels across regions.

The purpose of this report is to show that air pollution is a national problem and it needs to be addressed equally across the country and

not only in Delhi or the National Capital Region. The report also tries to identify major sources of pollution in parts of the country based on past research. As a way ahead for the country, our long term goals to solve the air pollution crisis can be universal, while short term solutions are to be decided based on the levels of pollution prevailing in the region.

VEHICLES POLLUTION

The major car pollutants are carbon monoxide, hydrocarbons, nitrous oxides, carbon dioxide, and particulates. Most car pollutants come from the exhaust but brake pads, tires, oil, grease, anti-freeze, hydraulic fluids, and cleaning agents also contribute pollutants to the environment. Ozone- Produced by chemical reactions among pollutants, released mainly by motor vehicles (nitrogen oxides and volatile hydrocarbons).

Environmental impacts- A strong oxidant gas that damages animal respiratory systems, plant leaf cells, reducing photosynthesis. Human health concerns- A respiratory irritant causing damage to the lungs, reducing lung capacity and aggravation respiratory problems, especially in the elderly, the very young and the asthmatic. An average of 80 ppm (parts per million) for any 8 hour period. It is important to note that the current guidelines have been found to be inadequate in protecting human health and are in the process of being revised.

The total number of registered motor vehicles in India was 210023289 as on 31.3.2015. There were 7 states having more than 1000000 registered motor vehicles.

| States | Registered Vehicles | Share |
|----------------|---------------------|--------|
| Maharashtra | 25562175 | 12.17% |
| Tamil Nadu | 22518669 | 10.72% |
| Uttar Pradesh | 21635531 | 10.3% |
| Gujarat | 18720561 | 8.91% |
| Karnataka | 14784961 | 7.04% |
| Rajasthan | 12378929 | 5.89% |
| Madhya Pradesh | 11141127 | 5.3% |

Source: road transport year book

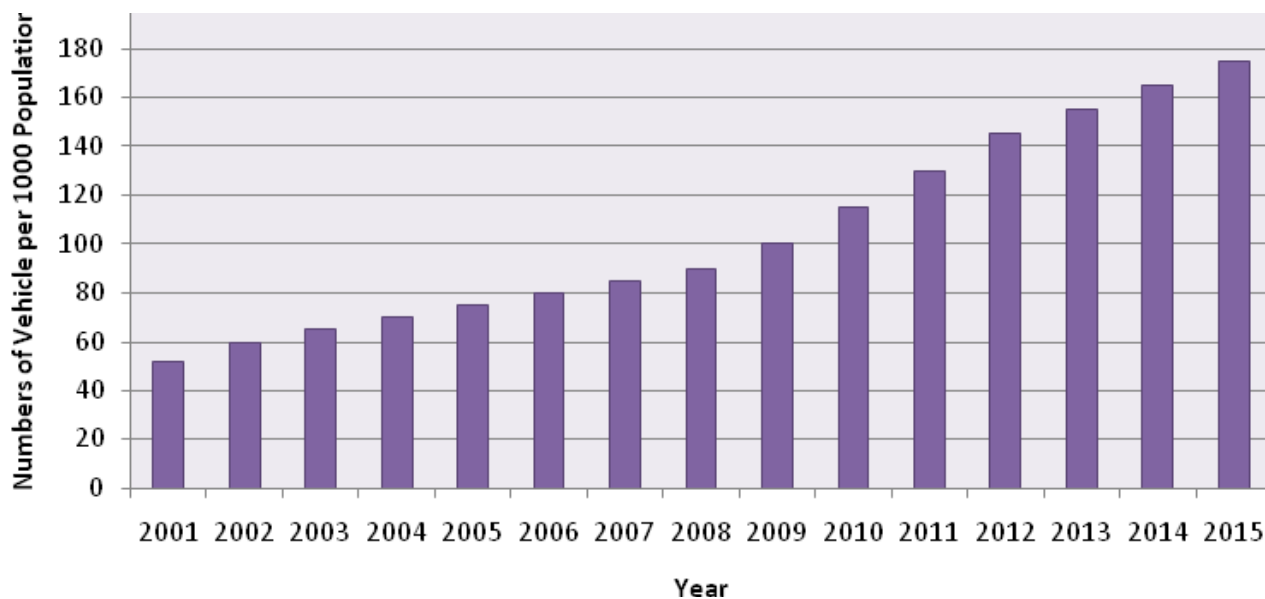
IMPACT ON AIR POLLUTION IN HUMAN HEALTH

The Centre for Science and Environment report, "Body Burden: Lifestyle Diseases", estimated that India had 22.2 million chronic COPD patients and around 35 million chronic asthma patients in 2016. Air pollution causes 30 % premature deaths in the country, a report released on Monday by the Centre for Science and Environment (CES) has revealed.

A state level disease burden report released last week had found that household air

pollution is responsible for 5% of the total disease burden and outdoor air pollution for 6%. "Lack of social support, changing diets and economic instability are the main triggers of mental disorders. Increased intake of sugar too has been linked to mental illness, making it imperative to find ways of reducing intake. An increase of PM 2.5 in the environment by 4.34 microgram/cubic metre can increase the risk of Alzheimer's", the report says.

Number of registered motor vehicles across India from 2001 to 2015 (per 1000 population)



Source: www.data.gov.in
Growth of Vehicles in Tamil Nadu

| Year | Transport Vehicles | Non-Transport Vehicles | Total |
|------|--------------------|------------------------|-------------|
| 2001 | 4,21,365 | 47,40,717 | 51,62,082 |
| 2002 | 4,32,106 | 52,25,991 | 56,58,097 |
| 2003 | 4,57,448 | 57,51,589 | 62,09,037 |
| 2004 | 4,72,172 | 62,80,301 | 67,52,473 |
| 2005 | 4,93,926 | 74,03,744 | 74,03,744 |
| 2006 | 5,81,106 | 82,21,730 | 82,21,730 |
| 2007 | 6,08,325 | 91,03,620 | 91,03,620 |
| 2008 | 7,06,869 | 1,00,69,010 | 1,00,69,010 |
| 2009 | 7,84,714 | 1,10,40,369 | 1,10,40,369 |
| 2017 | 1234360 | 22610704 | 23845064 |

Source: Govt. of Tamil Nadu State Transport Authority

Motor vehicles emit toxic and carcinogenic compounds that are known to cause cancer in humans. Hydrocarbons and nitrogen oxides contribute to smog, which damages lung tissues and aggravates respiratory disease. Smog can also inhibit plant growth and damage crops and forests. Motor vehicle pollution also contributes to the formation of acid rain and global warming.

Air pollution accounts for about 6% of deaths each year in Austria, France and Switzerland, according to a study published in the Lancet medical journal. The study found that half of the those deaths can be attributed to pollution from vehicles. The researchers also calculated that the health cost of vehicle pollution in the three countries totaled 1.7% of the gross domestic product.

The effect of air pollution on health are very

complex as there are many different sources and their individual effects vary from one to the other. It is not only the ambient air quality in the cities but also the indoor air quality in the rural and the urban areas that are causing concern. In fact in the developing world the highest air pollution exposures occur in the indoor environment. Air pollutants that are inhaled have serious impact on human health affecting the lungs and the respiratory system; they are also taken up by the blood and pumped all round the body. These pollutants are also deposited on soil, plants and in the water, further contributing to human exposure. As you read on you can learn about health impacts of specific air pollutants.

Highlights

- A report by CSE stated that air pollution is responsible for 30% of premature deaths

- More than 1.73 million new cancer cases likely to be recorded each year by 2020, air pollution, tobacco, alcohol and diet change are primary triggers, said the report.
- The report established that unless environmental risk factors are acknowledged and dealt with, India will not be able to curb Non-Communicable Diseases.
- CSE in its report mentioned that 52% of them below the age of 70 and over 61% of all deaths in India attributed to lifestyle or non-communicable diseases (NCDs) instance Body Burden, as per the latest nation's health report released here by CSE.
- CSE report also mentioned that every 12th Indian is a diabetic. "India ranks second in the list of countries with highest diabetes patients," the report quoted.
- As per the findings of World Health Organization (WHO) there are four major risk factors for NCDs, instance- alcohol, tobacco, poor diet intake and lack of physical activity.
- The WHO also said that by investing just US \$1-3 per person per year, countries can dramatically reduce illness and death from NCDs.
- Though the WHO has identified the major risk factors for NCDs, it is still coy in calling out the real enemy foods that are high in salt, sugar, fat and low in nutrition. It wants to play it as safe as possible so that it does not have to confront the real players and demand a restraint on their products, not through voluntary action but through government policies that restrict and restrain and put a premium on nutrition, not

CONCLUSION

Air pollution currently affects the health of millions of people. We have presented evidence on the effects of pollutants on patients with limitations in their respiratory capacities. For example, O₃ and PM may trigger asthma symptoms or lead to premature death, particularly in elderly individuals with pre-existing respiratory or cardiovascular disease. In addition, pollutants enhance the release of allergenic pollen grains, which results in an increased prevalence of pollen-induced asthma.

Thus, the case for action to reduce air pollution is overwhelming and this action can take many forms. Some of these include urban planning, technological developments (e.g. the design of new vehicles that produce less pollution), and at the government level, the introduction of new laws. It has been estimated that reducing both black carbon and O₃ levels would prevent over 3 million premature deaths and increase crop yields by around 50 million tones

annually. Improvements to cooking stoves would also decrease demand for firewood and reduce deforestation in the developing world. Similarly, improved brick kilns that are used in parts of Latin America and Asia use 50% of the fuel used by traditional kilns.

If air pollution levels in heavy traffic areas were reduced, the incidence of asthma and other respiratory diseases would be significantly reduced. While it is generally accepted that efforts to reduce air pollution will prevent further environmental changes, they will not reverse existing warming. Interestingly, an increasing number of studies show that in individuals with low anti-oxidant levels, dietary supplements could be used as a promising approach to reducing susceptibility to air pollution, and providing an alternative strategy for neutralizing the effects of pollutants on health.

REFERENCES

1. World Health Organization India update of WHO SEARO sheets 9 Nov 2011.
2. Vijayalaxmi kinhal, ecologist type of air pollution.
3. Air pocalypse assessment of air pollution in Indian cities, the hindu explains from india to JFK.
4. Environmental pollution centers.org/air/.
5. Explainthatstuff.com/air-pollution-introduction.html.
6. Uvm.edu/-empact/air/cars.php3.
7. Center for science and environment report.
8. The pioneer – epaper 17 Jan 2018.
9. Open government data platform india blog.
10. CSE report – Times of India.
11. www.thelancet.com/journals/lancet/article/PIIS0140-6736(16)31679-8/fulltext.
12. Edugreen.teri.res.in/explore/air/health.htm.
13. www.uvm.edu/-empact/air/cars.php3
14. www.businessinsider.com/events?ir=c
15. www.siamindia.com/statistics.aspx?mpgid=8&pgidtrail=9.