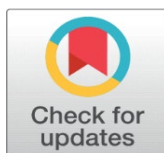
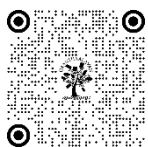


SUFFOCATING DELHI: - DELHI AIR POLLUTION, ITS CONSEQUENCE ON HUMAN HEALTH IN SPECIFICATION WITH, HINDERENCE TO RIGHT TO LIFE

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ABSTRACT

Over the past few years, pollution-related health concerns have affected India, a member of the UN. A recent analysis by the UNEP examined how human rights include the right to a healthy environment. As a champion and supporter of human rights, the UN launches initiatives, policies, and plans to support and uphold peace, collaboration, and human rights among its member nations. Delhi air pollution is still a matter of concern and is associated with health difficulties, respiratory ailments, and lung-related disorders among Delhiites, despite the government's efforts to mitigate the impacts of pollution and smog. Smog and particle matter have long been problems for Delhi, the capital city of the country, and Delhi NCR.

Keywords: Air Pollution in Delhi, Hindrance to Right to Life, Causes of Delhi Pollution, Human Health, and Environmental Consequences of Delhi Pollution

1. INTRODUCTION

Eliminating emissions from burning fossil fuels is crucial for maintaining a healthy environment and promoting human well-being. The challenges posed by air pollution have increased because to nation states' expanding urbanization needs, economies, and infrastructure development. A healthy environment is therefore a human right, according to recent remarks made by the United Nations about pollution concerns. When compared to the contemporary array, the idea of the right to life had a different connotation, in the past. John Locke, an English philosopher who lived in 1632 and is regarded as one of the proponents of the right to life, gave it a specific meaning that has been expanded through numerous interpretations, comments, and political contributions as a result of shifting societal needs and circumstances. It is common knowledge that the right to life encompasses more than just the ability to survive; it also involves the right to a clean and healthy environment, a life with dignity, and other things.

The meaning and justification of the right to life vary depending on the geographical limits, however it is understandable that the concept of the right to life goes beyond mere existence when one looks at different constitutions, international organizations, and nongovernmental organizations. Organs such as the United Nations Environment Programme (UNEP) carry out their functions based on international norms and policies. Based on data presented by

UNEP in 2016, the UNEP operates in the areas of climatic change, environmental protection, and peace, rights, cooperation, coordination, and solidarity among nations. Because carrying out all of its activities is a huge task, the UN has various specialized organs with dignitaries, authorities, and specialized expertise. According to a list of cities with extreme pollution, New Delhi and Delhi NCR in India are the most polluted locations. Undoubtedly, there is no denying that pollution is a threat not only to the environment but also to human health. It may lead to respiratory disorders, eye burning, and other major health problems that make it difficult for people to survive.

Although Delhi pollution was not as bad as it is now, there are worrying contributing factors. The major cause of Delhi air pollution is cracker burning during the Diwali festival and stubble burning in states like Punjab and Haryana, but is that the only reason for Delhi air pollution? To the best of my knowledge, not many studies have come up discussing the impacts of air pollution in Delhi on old people. Till now, the studies have focused on the impact of aerosols and meteorology on gaseous nitrogen oxide (nox). [i] Impact of transport vehicles over air pollution in Delhi and effectiveness of machine learning algorithms such as SARIMAX to analyze the air quality in Delhi, emissions of greenhouse gases, and impact on human health. Studies have less focused on impact of air pollution on elderly people in delhi specifically the from most polluties cities of delhi.[ii] The aim of the study is to identify the impact of Delhi pollution on elderly citizens residing in the region of Greater Noida West, which is a division of Delhi NCR.To explore the relation between air pollution in Delhi and respiratory related diseases on elderly citizen. To identify the reasons for Delhi air pollution. The hypothesis are respectively the to find significant association between Delhi air pollution and respiratory diseases among Delhiites.

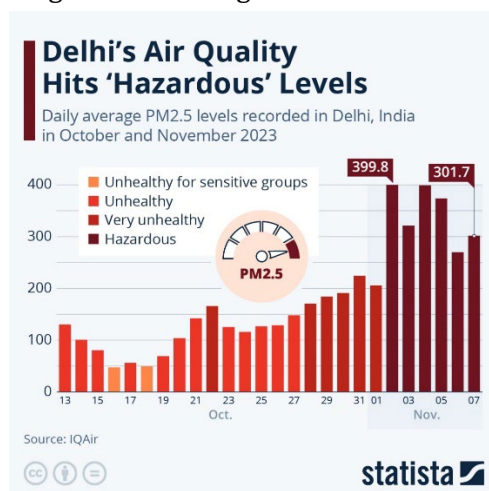
2. METHODOLOGY

The current research article is descriptive and empirical in nature, a sample of 100 people has been collected from polluted city of Delhi for study purpose.

IMAGES OF DELHI DURING SMOG



Figure 1.1(left) and Figure 1.2(right) images from Delhi greater Noida



Source Chart: Delhi's air hits 'hazardous' levels by Martin Armstrong, November 8 2023

3. DELHI POLLUTION AN ANALYSIS FROM 2016

The Central Air Quality Index Board marks 40–60 as the range of PM 2.5 and PM 10 for cubic meters ($\mu\text{g}/\text{m}^3$), but a hike in air pollution over Delhi and Delhi ncr marked in September 2016 reaching PM 2.5 and PM 10 > 100–200 over several locations in Delhi. The pollution level reaching an alarming stage seemed concerning. Meetings were conducted by the central pollution committee on November 16 and 17th, 2016 and further On December 2, 2016, the Central Pollution Control Board of Delhi submitted a plea to the Supreme Court of India regarding severe air pollution in Delhi. As a response, the Delhi Supreme Court has directed a meeting over Delhi air pollution to discuss and redress the issue the issue and receive various suggestions and petitions.

On November 25, 2023, the central pollution control board presented certain suggestions's over-graded responses to pollution levels as per the air quality index. The CPCB (central pollution control board) kept forward the key fact that severe pollution measures were seen from the winter season, that is, November to December, and largely poor pollution measures were seen during the summer season, February to May. Taking into account all of these variables, it is important to realize that industrialization has ingrained itself into every country as a means of economic expansion. Chemical spills and burning crackers can also contribute to the development of smog in a state with a population of thirty million. Alternatively, air pollution may be caused by many sources.

3.1. GEOGRAPHICALLY HISTORICAL BACKGROUND OF DELHI & FACTORS THAT LED TO DELHI POLLUTION

With a population of 30-35 million, the nation's capital, New Delhi, is situated in the heart of the Indian subcontinent between latitudes 28-24-17 in the north and 28-53-00 in the east. This territory, which is 1483 square kilometres in size, has borders with Uttar Pradesh and Haryana. Here, one of the primary causes of the build-up of smog in the region must be understood in relation to the state's geographic location. To have a thorough understanding of the situation, it is important to know the background information on the laws and regulations in question.

Green revolution, Preservation of subsoil act water act and stubble burning: The government of India faced many challenges after gaining independence, chief among them being food crises. The Bengal famine of 1943 was a major blow to the country's economy, as nearly 75% of the population was dependent on agriculture. Despite this, there were food crises and low productivity, forcing the government to rely on food aid from other countries to India. Recognizing the need for self-sufficiency in food production, the government looked for solutions, and in order to address this challenge, the government of India, along with agronomist and agricultural scientist M.S. Swami Nathan, developed the concept of the "green revolution," which replaced .However, farmers in Punjab, Haryana, and Uttar Pradesh were reluctant to adopt new machinery and techniques, so in order to boost food production, they were given a minimum support price. However, the main drawback of this price was that it was only available for two crops: wheat and rice. Since these two crops are known to be water-intensive, farmers in Punjab and Haryana had to grow more of them in order to prevent the region from becoming decertified, created the Preservation of Subsoil Act of 2009, which limited farmers to growing crops in accordance with government-mandated seasons. Consequently, farmers began burning stubble in order to expedite crop cultivation techniques between crops, which is one of the main causes of air pollution in Delhi.

Temperature inversion in Delhi: The second cause is related to Delhi's geography and climate; primarily, there are four distinct seasons in Delhi's climate: winter, summer, rainy, and spring. It is alarming that stump burning in nearby states is contributing to pollution in Delhi. Winter officially begins in November and lasts till January. During this time of year, Delhi has relatively low wind speeds. Since October is the month when stubble burning occurs in Punjab, Haryana, and Uttar Pradesh, the contaminated air from these three states travels via Delhi and becomes stuck in the area because of Delhi's slow wind speed.

Transport pollution and greenhouse gas emission: Commencing with vehicle emissions, an atmospheric pollution research study found that auto rickshaws emitted the most pollutants ($266 \pm 102 \mu\text{g}/\text{m}^3$) compared to $89 \pm 30 \mu\text{g}/\text{m}^3$, non-ac cars ($149 \pm 13 \mu\text{g}/\text{m}^3$), and Delhi Metro, which recorded the least emissions of greenhouse gases. Burning solid waste was identified as another significant source. Three landfills in Delhi in 2021—Bhalswa, Okhla, and

Ghazipur—according to a paper published in the Journal of Climatology and Weather Forecasting. As one of the sources of methane generation, a greenhouse gas, these three landfills have achieved an average height ceiling of 30 cm. A developing nation must have industrialization, and Delhi has had it for 200 years (Bergsta et al., 2018; Chattopadhyay, 2012). Delhi has a greater concentration of small and medium-sized businesses. Delhi's air is contaminated by the majority of these toxic discharges from industry. A projection from 2021 estimates that there are over 13.2 million registered cars in Delhi, which contributes to the city's air pollution.

4. A CHALLENGE TO RIGHT TO LIFE, ENVIORNMENT AND HUMAN HEALTH

When considering the state of Delhi during the past few years, quotes from international agencies such as the World Health Organization that state that "the right to life loses its meaning without the right to health" make more sense. The right to life simply refers to a human being's ability to live with dignity, not only the right to exist. Delhi's contaminated air is home to methane (CH₄) and carbon dioxide (CO₂), two greenhouse gasses. Breathing in large amounts of methane and carbon dioxide can lead to a number of health problems, including lung ailments, respiratory disorders, mood swings, nausea, vomiting, According to their size, they are classified as particulate matter. They are described as microscopic airborne particles that enter human respiratory systems. Particulate matter (10, or smaller than 10 micrometres) and 2.5, or less than 2.5 micrometres, are the two categories of particles. These particulates may infiltrate the respiratory system of humans, creating harmful substances and inflaming the lungs, making it harder for the immune system to respond and perhaps leading to heart attacks, lung cancer, and inflammation.

Human life expectancy might be lowered by 28%, according to reports provided by the World Health Organization. India has ratified international treaties such as the ICCPR and ICESCR, with the goal of implementing the rights outlined in the agreements in a sincere manner. Article 12 of the ICESCR guarantees everyone the best possible bodily and mental health, obliging all state parties that have joined international agreements to do so. This includes the right to health. With the help of several climatology specialists, the Central Pollution Control Board (CPCB), and relevant agencies, the Delhi government took action to lessen the effects of pollution. According to the reports revealed by the Pollution control board during October and November Greater Noida was considered as the most polluted city in Delhi NCR with AQI index showing reports of pollution level 695 which is considered as the severe danger level, followed by Jhangirpuri. Reports represented by WHO, around 14 cities among India are listed in top most polluting cities among world, nearly 67,000-68,000 deaths are marked due to ambient air pollution cases as cause of death. Apart from, stubble burning, rapid industrialisation, increase in vehicles are causes of air pollution. Downside located cities of Delhi such as Gaziabad, Gautama Budha Nagar, Faridabad, Gurugram are in forefront among deteriorated air pollutant cities of Delhi. Chronic morbidity and Mortality among people are resulted due to increased particulate matter in atmosphere. According to various results and reports put forward. It was understood that all areas were not affected equally.

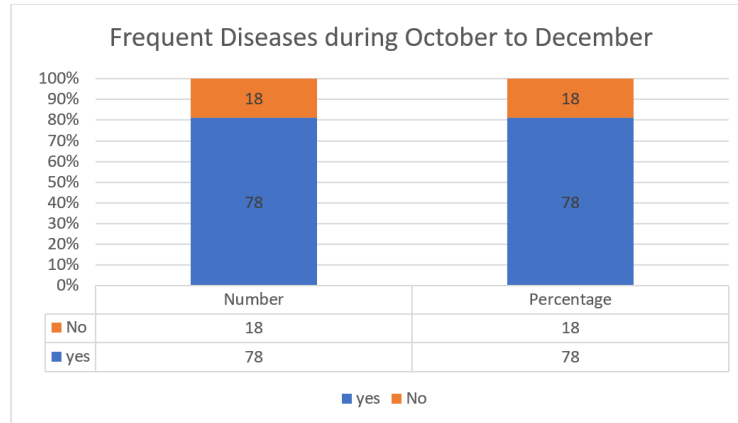
5. DATA ANALYSIS

SELECTION OF RESPONDENT FROM GREATER NOIDA WEST	FREQUENCY
Sector 1 and 2	
Male	50
Female	50
total	100

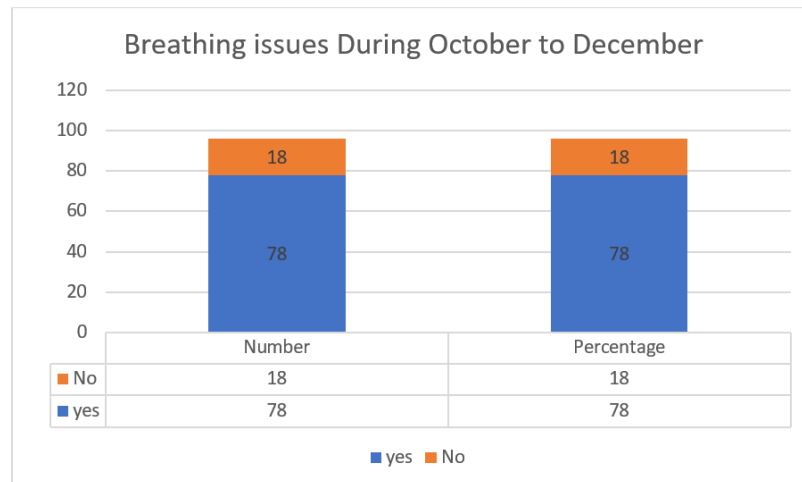
The above table 1.1 shows the sample collection from regions of greater Noida, have been selected from sector 1 and 2, 50 males and 50 females to get accuracy and reliability in data.

S.NO	AGE OF RESPONDANT	FREQUENCY	PERCENTAGE
1	18 to 30	31	31
2	31 to 50	53	53
3	51 and above	16	16
		100	100

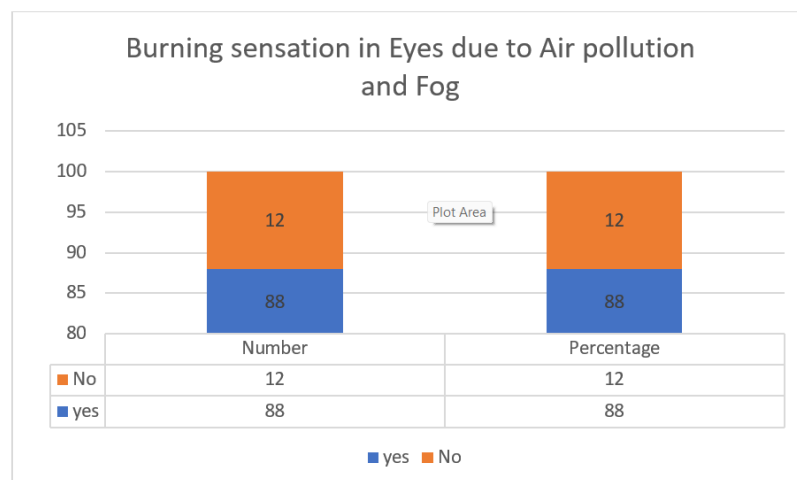
The above given table represents the distribution on basis of age group according to the data 31 percentage of the respondent belong to age category of 18 to 30 and 53 percentage of respondent belong to 31 to 50 percentage of category 16 percentage of respondent 51 and above.



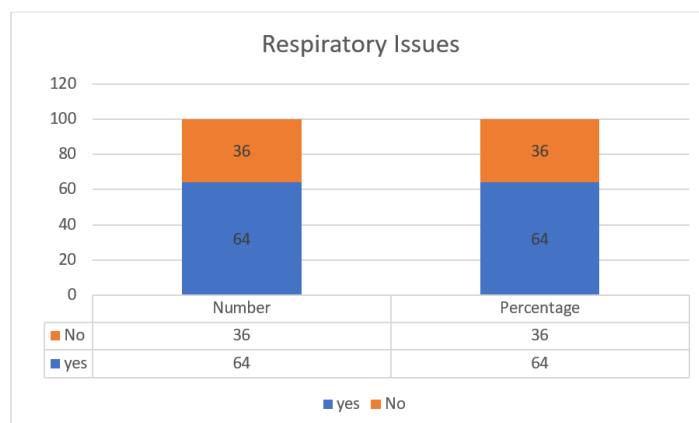
The above table represents the distribution on basis Occurrence of diseases according to data 78 percent people experienced frequent occurrence of diseases during the month of October November and December and 18 percent people did not experienced occurrence of diseases.



The above table represents the distribution on basis of breathing issues from October to December according to data 78 percent people experienced breathing issues during the month of October November and December and 18 percent people did not experienced breathing issues.



The above table represents the distribution on basis of burning sensation in eyes due to pollution and fog, according to data 88 percent people experienced burning sensation in eyes during the month of October November and December and 12 percent people did not experienced burning sensation in eyes.



The above table represents the distribution on basis of respiratory issues due to pollution and fog, according to data 64 percent people experienced respiratory issues during the month of October November and December and 36 percent people did not experience respiratory issues.

Chi square test was performed to test the hypothesis to state the significant association between air pollution and respiratory diseases among Delhiites. Critical region marked greater than 3.842, calculated chi square value obtained 33.31482. The value of chi square calculated belongs to critical region, therefore, H_0 is rejected at a 0.05 significance level. the variable s is not independent.

6. MITIGATING CONSEQUENCE

The extreme levels of air pollution in 2016 prompted numerous meetings aimed at reducing pollution in Delhi. Based on suggestions and petitions from a variety of experts, the Central Pollution Control Board (CPCB) presented the Graded Response Action Plan (GRAP), which was designed to grade pollution on different levels. The GRAP was implemented under the authority of the Environment and Pollution Control Board and measured at the levels of particulate matter index. Later, in 2022, the Centre for Quality Air Management (CQAM) implemented the GRAP, evaluating the pollution condition of Delhi using the air quality index ratio. Based on the air quality index, pollution levels in Delhi were measured by analyzing a range of pollution levels.

The Air Quality Index Ratio is divided into six categories: excellent for values between 0 and 50, moderate for values between 51 and 100. 101–200 is harmful to sensitive populations, 201–300 is harmful, 301–400 is severe, and 401–500 is hazardous.

Four phases of GRAP were executed, each based on an AQI. GRAP 1 begins in the 201–300 AQI range during the initial stage of In four stages, GRAP was deployed based on the AQI. The first stage of GRAP-1 begins at an AQI of 201–300. Restrictions were put in place to reduce pollution emissions, including prohibiting building activities, banning vehicles from entering the Delhi NCR up to BS 4, raising parking fees to discourage private vehicle parking, and encouraging people to take the Delhi Metro, which emits fewer greenhouse gases. Furthermore, stage 2 and 3 of GRAP impose additional restrictions. When air pollution reaches stage 4, or the most severe level, schools are forced to close for a specific amount of time, encouraging people to work from home. Private vehicle usage is also reduced, and BS 4 vehicles in the Delhi NCR are prohibited. Additionally, wood burning and stump burning are completely stopped.

7. CONCLUSIONS

GRAP has helped to reduce measures of pollution in Delhi and Delhi NCR to an extent, burning crackers, pollution emitted from vehicles and industries are not the only cause for air pollution in Delhi, geographical location of Delhi also a reason for pollution increase and severe air quality index. An integrated strategy incorporating both short- and long-term measures is needed to mitigate Delhi's air pollution. To solve the urgent situation, immediate measures including enforcing construction restrictions, encouraging public transit, enforcing stronger vehicle emissions requirements, and

restricting agricultural burning are necessary. A better environment may also be achieved over time by making investments in renewable energy sources, improving green areas, and raising public understanding of the value of sustainable living. To successfully tackle Delhi's air pollution issue, cooperation between governmental organizations, businesses, communities, and people is essential. All Delhi residents may benefit from cleaner air and a higher standard of living if proactive steps are taken and a shared commitment to environmental stewardship is encouraged.

CONFLICT OF INTERESTS

None.

ACKNOWLEDGMENTS

None.

REFERENCES

- Agarwal, A., A. Sharma, and A. Roy Chowdhury. 1996. *Slow Murder: The Deadly Story of Vehicular Pollution in India*. New Delhi: Centre for Science and Environment
- Ackermann, I.J., Hass, H., Memmesheimer, M., Ebel, A., Binkowski, F.S., Shankar, U., 1998. Modal aerosol dynamics model for Europe: development and first applications. *Atmospheric Environment* 32,2981–2999.
- Armstrong, P., Lekezwa, B., & Siebrits, K. (2008). Poverty in South Africa: A profile based on recent household surveys, Stellenbosch Economic Working Papers: 04/08 .Stellenbosch: Department of Economics, University of Stellenbosch.
- Artinano, B., Salvador, P., Alonso, D.G., Querol, X., Alastuey, A., 2003. Anthropogenic and natural influence on the PM₁₀ and PM_{2.5} aerosol in Madrid (Spain). Analysis of high concentration episodes. *Environmental Pollution* 125, 453–465
- Chemical characterization of PM in the Apulia Region: local and long-range transport contributions to particulate matter. *Boreal Environment Research* 16, 251–261.
- Auffhammer, M., A.M. Bento, and S.E. Lowe. 2005. Delegation of Power, Lobby Formation and the Implementation of the 1990 Clean Air Act Amendments. Paper presented at the California Occasional Workshop in Environmental and Resource Economics, October, 2005, UC-Santa Barbara, CA.
- Balachandran, S., B.R. Meena, and P. Khillare. 2000. Particle Size Distribution and its Elemental Composition in the Ambient Air of Delhi. *Environment International* 26: 49–54.
- Bond, P., & Tait, A. (1997). The failure of housing policy in post-apartheid South Africa, *Urban Forum*, 8(1):19-41.
- Central Pollution Control Board (CPCB). 2001. *Vehicular Pollution Control in Delhi—Initiatives & Impacts*. New Delhi: Ministry of Environment & Forests, CPCB.
- Central Road Research Institute (CRRI). 2002. *Urban Road Traffic and Air Pollution in Major Cities*. New Delhi: Central Road Research Institute.
- Chang, J.C., Hanna, S.R., 2004. Air quality model performance evaluation. *Meteorology and Atmospheric Physics* 87, 167–196.
- Chelani, A.B., Devotta, S., 2005. Impact of change in fuel quality on PM₁₀ in Delhi. *Bulletin of Environmental Contamination and Toxicology* 75,600–607.
- Chen, F., Dudhia, J., 2001. Coupling an advanced land surface–hydrology model with the Penn State–NCAR MM5 modeling system. Part I: model implementation and sensitivity. *Monthly Weather Review* 129, 569–585.
- Chikulo, B.C. (2003). Development Policy in South Africa: A Review, *DPMN Bulletin*, .X (2). <http://www.dpmf.org/pub-bulletin.html>. Accessed 20 March 2009.
- CPCB (Central Pollution Control Board), 2009. National Ambient Air Quality Standards (NAAQS), Gazette Notification, New Delhi.
- Davison, O., Tiyani, L., & Afrane-Okesse, Y. (2002). Climate Change,

- Delhi, 2013. <http://www.maharashtraweb.com/India/union%20territories/delhi/newdelhigeography.htm>, accessed in 2023
- DiGiovanni, F., Fellin, P., 2013. Transboundary Air Pollution, Environmental Monitoring, Encyclopedia of Life Support Systems, EOLSS Publishers Co., UK, 12 pages.
- Case Study of Delhi. New Delhi: Department of Environment, Government of NCT of Delhi & Delhi Pollution Control Committee.
- Dubey, B., Pal, A.K., Singh, G., 2012. Trace metal composition of airborne particulate matter in the coal mining and non-mining areas of Dhanbad Region, Jharkhand, India. *Atmospheric Pollution Research* 3, 238–246.
- Energy Sector Management Assistance Program (ESMAP). 2004. Urban Air Quality Management in South Asia. Washington, DC: The World Bank.
- Environment Pollution Prevention & Control Authority for the National Capital Region (EPCA). 2004a. Special Report on the Non-Destined Transit Trucks Using Delhi: A Report in Addition to the Bypass Report Submitted to the Hon'ble Court in August 2004. EPCA Report Number 12. New Delhi: EPCA.
- Ezzati, M. and Kammen, D. (2002) The health impacts of exposure to indoor air pollution from solid fuels in developing countries: knowledge, gaps, and data needs. *Environmental health perspectives* 110, 1057-1068.
- A comprehensive performance evaluation of MM5–CMAQ for the Summer 1999 Southern Oxidants Study Episode–Part I: evaluation protocols, databases, and meteorological predictions. *Atmospheric Environment* 40, 4825–4838.
- Zwi, S., Davies, J.C.A., Becklake, M.R., Goldman, H.I., Reinach, S.G. and Kallenbach, J.M. (1990) Respiratory health status of children in the eastern Transvaal highveld. *SAMJ* 78, 647-653.