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HEALTH AND ECONOMIC IMPACT OF AIR POLLUTION:NATIONAL CAPITAL REGION

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ABSTRACT:
The WHO report of ambient air pollution, 2014, ranks Delhi as the most polluted city in the world. There is now an increasing global concern over the public health impacts attributed to environmental pollution. Many epidemiological studies have confirmed a link between air pollution and disease such as asthma, cardiovascular diseases, immature births, Parkinson's diseases, Alzheimer's disease, lung cancer and even depression. There is also an economic cost of high levels of air pollution in Delhi in terms of medical expenses lost wages and averting expenditure to prevent exposure. This paper makes a modest attempt to analyse the health and economic impact of a pollution in National Capital Territory.

KEYWORDS
Air Pollution, NCT, Delhi Pollution, Cost of Pollution, Health Impacts of Pollution.

INTRODUCTION:

Economic growth in Delhi has been above national average over the years, so has been the population growth, largely due to migration. According to 2011 census of India, population of Delhi was around 16,753,235 and is expected to rise 40 per cent by the year 2020. There has been tremendous development in transport, education and other facilities offered by the government and other agencies in Delhi.

As a rapidly expanding city, demands for transportation, energy generation, construction, waste generation, domestic cooking and heating, and industrial activity grew significantly resulting in the impact on Delhi's ecosystem. To add to Delhi's woes vehicular pollution also grew steeply contributing to high air pollution across the city. In fact, the WHO report of ambient air pollution, 2014, ranks Delhi as the most polluted city in the world.

'Air Pollution' is contamination of atmosphere by substances that directly or indirectly adversely affect human health or welfare. It is now an established fact that high concentrations of lower atmospheric pollution (e.g. ozone, lead and particulate matter) pose a serious threat to human health. The threats to human health are due to morbidity and mortality problems. Prolonged exposure to air pollution may lead to asthma, allergy, lung diseases, chronic bronchitis, COPD, heart damage and even lung cancer. Air toxics such as benzene, toluene, dioxin, lead and mercury cause serious health problems. There is now clear evidence which supports that long-term exposure to traffic related air pollution affects brain functions and even cognitive and learning abilities of children. In addition, there is also overwhelming evidence that air pollution leads to increased rate of heart attacks, hardened arteries and numerous cardiovascular diseases.

Pollution not only has negative physical impact on environment but also has economic costs arising through the loss in productivity, loss in working days due to illness, treatment costs for illness and finally loss of wages.

Changes in the life support capacity of the environment brought about by reducing the pollution of air can lead to decreases in the incidence of disease, reduced impairment of activities, or perhaps increased life expectancy.

Environmental pollution that impairs human health can reduce people's well-being through at least the following five channels: (1) medical expenses associated with treating pollution-induced diseases, including the opportunity cost of time spent in obtaining treatment; (2) lost wages; (3) defensive or averting expenditures associated with attempts to prevent pollution induced disease; (4) disutility associated with the symptoms and lost opportunities for leisure activities; and (5) changes in life expectancy or risk of premature death.

If the air quality is improved, and individual benefits from being able to reduce the monetary expenditures, the lost wages and the opportunities for leisure that are associated with defending against the health impacts of air pollution. There is a need to establish economic relationship between health cost and air pollution in National Capital Region.

HEALTH IMPACT

Over the past three decades, there has been increasing global concern over the public health impacts attributed to environmental pollution. The World Health Organisation (WHO) estimates about a quarter of diseases facing mankind today occur due to prolonged exposure to environmental pollution.According to the organisation, air pollution has emerged as the world's single largest health risk, having caused seven million deaths in 2012 (80 per cent of which were from heart attack and

stroke). It further found that one in eight global deaths were linked with air pollution. WHO has now categorised air pollution as Group I carcinogenic, a cancer causing agent in the same category as tobacco smoke, UV radiation and Plutonium.

There is now substantial scientific evidence on the adverse effects of air pollution on human health. Epidemiological studies such as Block et al. (2012) provide a convincing link between air pollution and damage to the central nervous system which may manifest in the form of decreased cognitive function, low test scores in children, and increased risk of autism and of neuro- degenerative diseases such as Parkinson's and Alzheimer's. They also cite studies that show that air pollution causes cardiovascular disease (Brook et al., 2010), and worsens asthma (Auerbach and Hernandez, 2012). More recent research in economics by Currie and Walker (2011) finds that exposure to vehicular emissions increased the likelihood of pre-mature births, and also caused low birth weight. Moretti and Neidell (2011) show that respiratory ailments resulting from exposure to ozone in the Los Angeles Bay area resulted in annual hospitalization costs of at least $44 million. Some other studies that document the adverse health consequences of air pollution include Chay and Greenstone (2003),Neidell (2004), Currie and Neidell (2005), Currie, Neidell and Schmieder (2009), andLleras-Muney (2010).

Delhi Government has taken steps various such as phasing out of more than 15-year-old commercial vehicles, implementation of Bharat Stage III/IV, switching to CNG fuel mode for public transport, tax concession for battery operated vehicles and stringent emission norms for industries and power stations located in the capital. However, the pollution in the air continues to rise and adversely affect the health of the inhabitants of Delhi.

According to an EPCA Report of 2014, Delhi has lost the gains of its CNG programme. Its air is increasingly becoming more polluted and unbreathable, bringing back the pre-CNG days when diesel driven buses and autos had made it one of the most polluted cities on earth. Due to substantial price difference between diesel & petrol, the number of diesel vehicles plying on Delhi roads has increased tremendously adding to the already grim air situation. Diesel vehicles are known to emit higher smoke, particles and NOx than their petrol counterparts. According to WHO and other international regulatory and scientific agencies, diesel particulates are carcinogens. Even the so-called 'clean' diesel running on fuel with 350 ppm of sulphur, allows higher limits for NOx and particulate emissions compared to petrol cars. The Delhi Metro – a non-polluting mode of travel is growing, but it wasn't planned sufficiently in advance to meet the growing city's transport needs.

The economic costs of the health impacts of air pollution can be given by the sum of three different categories (Hunt and Ferguson, 2010).

1.Resource costs: Represented by the direct medical and non-medical costs associated with treatment for the adverse health impact of air pollution plus avertive expenditures. That is, all the expenses the individual faces with visiting a doctor, ambulance, buying medicines and other treatments, plus any related non-medical cost, such as the cost of childcare and housekeeping due to the impossibility of the affected person in doing so;

2.Opportunity costs: Associated with the indirect costs related to loss of productivity and/or leisure time due to the health impact;

3.Disutility costs: Refer to the pain, suffering, discomfort and anxiety linked to the illness.

The methods for obtaining monetary values for improvements in health can broadly be categorised as those that rely either on observed behaviour and choices (revealed preferences) or on responses to hypothetical situations posed to individuals (contingent valuation or bidding games). The

first category includes all those techniques that rely on demand and cost functions, market prices, and observed behaviour and choices. The second category includes asking people directly to state their willingness to pay or accept compensation for a postulated change, how their behaviour would change, or how they would rank alternative situations involving different combinations of health and income or consumption. One approach can be using estimates of dose-response or exposure-response relationships. This describes the change in effect on an individual costs by differing levels of exposure (or doses) to a stressor (usually a pollutant) after a certain exposure time.

A simplified version of general health cost function used byMurthy et al. (2003) is specified as:

S=S(Q, A,Z)

Where, S is health cost to an individual, Q signifies the Air Quality andA is Averting activities which means attempts to reduce exposure to pollution such as number of days stayed indoor to avoid exposure, extra miles travelled in a day to avoid polluted areas in the city, using a gas mask while travelling, etc. S is negatively related to A. Z is socio economic characteristics of the individual like individual's baseline health(previous lifestyle diseases such as diabetes,hypertension) which in turn affects individual's ability to offset exposure to pollution through averting activities.The dependent variable in this case is presumed to be the total economic cost while the independent variable are household characteristics such as air quality, averting activities and socio economic characteristics of the individual.

CONCLUSION

Faced with a similar situation India's neighbour China has already undertaken urgent steps to deal with the pollution crisis. Delhi with its huge population being continuously exposed to greater levels ofpollution, needs to wake up and take immediate steps to make the Delhi air healthier. A healthy workforce is also a prerequisite for a growing economy such as India. The government needs to formulate a long-term comprehensive policy of not only moving to superior Euro fuel norms but also of strengthening the public transport, closing schools and other institutions when the pollution exceeds the safe limits, preventing open burning of leaves, plastic and garbage, installing air-purifier is in crowded areas as well as discouraging diesel as a fuel.

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