

Air Pollution: Its Perilous Chronic Hygienic Impacts

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ABSTRACT A number of environmental problems are already very serious and they call for immediate attention. The paper mainly concentrates on the impacts of indoor and outdoor air pollutants especially on health, with ultimate result that human hygiene may be deteriorated, economic productivity may be declined and pleasure satisfaction gained from any unspoiled environment often termed as its 'amenity' value may also be absent to the present and future human welfare. It has been concluded that intervention of the government has become indispensable to implement strong environmental policy and taking care of growing threats on air pollution in more institutionalized, regular and automatic basis is inevitable.

INTRODUCTION

The achievement of sustainable and equitable development remains the greatest challenge before the 21st century. Although the desirability of growth is globally accepted and recognized, recent years have provided testimony to rising anxiety about whether environmental constraints will limit development or whether development will cause serious environmental degradation. A number of environmental problems are already very serious and they call for immediate attention.

Environmental threats evolve because of both resource depletion and negative externalities caused by development process and projects. With a view to achieving the objects of sustainable development, it is inevitable to do with both types of problem adequately. Negative externalities like air pollution impose severe welfare losses and decrease output as well. However, in this paper an effort has been made to assess the magnitude and impacts of air pollution on health. Air pollution may be termed as the presence of one or more pollutants or combinations of these pollutants in such quantity and for these pollutants, which may prove to be injurious to human, plant or animal life or even to property around. The paper mainly concentrates on the impacts of indoor and outdoor air pollutants especially on health, with ultimate result that human hygiene may be deteriorated, economic productivity may be declined and pleasure satisfaction gained from any unspoiled environment often termed as its 'amenity' value may also be absent to the present and future human welfare.

The paper is organized as follows. Section II

deals with indoor air pollution with bio-fuels which are used by rural households in India and its role in growing national disease burden. The hygienic effects of outdoor air pollution caused by vehicle emissions, burning of agricultural wastes and industry emissions have been highlighted in section III. The strategic measure for minimizing indoor and outdoor air pollution has been recommended in both sections separately. In last section, remedial policy packages for controlling air pollution and role of government in this regard has been focused.

INDOOR AIR POLLUTION: GROWING BURDEN OF DISEASE

Indoor air pollution with bio-fuels is an issue that requires to be addressed through health policy. Some of highest concentrations of pollutants occur due to the use of bio-fuels for cooking in rural indoor environment. They emerge from burning of bio-fuels like wood, agriculture crop residues and dung cake, which are used by mass rural households in India. Women and children below five years are mostly affected due to pollutants released during the burning of bio-fuels for cooking. In this section an effort has been made to display the health impacts of bio-fuels for cooking and strategies to reduce the effect.

According to 1991 census, about 75% of Indian households use bio-fuels such as wood, dung cake and crop residues for cooking purposes. Burning unprocessed bio-fuels in conventional stoves creates huge amount of air pollutants. From the health point of view, particulate, carbon mono-oxide and a series of organic components are important. Studies reveal that

pollutants released indoors are more hazardous than those released outdoors. High exposure to indoor air pollutants has been associated with serious health hazards. Major diseases associated with it are acute respiratory infection (ARI), chronic obstructive lung diseases such as chronic bronchitis, lung cancer and possibly tuberculosis, adverse pregnancy outcomes, blindness, heart disease and asthma. In India, most important disease with indoor air pollution is probably ARI. ARI plays a vital role in the Indian national burden of disease. It is single largest disease category nationally, being responsible for around one-eighth of national burden disease and affects mainly young children. The survey result of National Family Health Survey (NFHS) of India 1992-93 shows that children under age three living in households who use wood and animal dung as their basic source of cooking fuel have almost on-third higher risk of ARI than the children living in households who use cleaner fuel. As per the illustration provided by startling statistic, ARI in Indian children under 5 alone is responsible for 2% of the entire global burden of disease. Analysis of NFHS data reveals that adults over 30 years living in households using biomass fuel has around 30% more partial blindness and 170% higher tuberculosis rate than those living in households using clean fuel. Estimates available from a recent study on annual premature death to children under 5 years of age and adult women are in the range of 4,10,000 – 7,90,000 (Table 1). These estimates are however only for specific diseases, there are certainly effects on other population groups and from other disease also.

Strategies for Control

- Improving the ventilation in the cooking area so as to reduce the suspended particulate matter concentration.
- Designing and using better stove in cost effective manner, which need less fuel and generate less smoke.
- Increasing access to clean fuels such as biogas, solar stoves, kerosene, liquid petroleum gas or electricity.
- Substituting household biomass fuels with coal.
- Redesigning petroleum policy such that kerosene is easily available to people at affordable price.

Table 1: Estimated annual premature deaths from indoor air pollution in India

(I) Strong Evidence	3,10000 – 4,70000
ARI	Children age below 5 years
Chronic Obstructive Pulmonary Disease	Women
Lung Cancer from Coal Use	Women (few in India)
(II) Moderate Evidence	5,0000 – 1,30000
Blindness	Women (no death)
Perinatal Effects	Insufficient data for estimates
Tuberculosis	Women
(III) Suggestive Evidence	50,000 – 1,90000 Women
Cardiovascular Disease	Women
Asthma	Women (few in India)
Gross Total of all three Categories	4,10000 – 7,90000

Source: Compiled from the Study made by Smith, K.: (1998) published in *Economic and Political Weekly*, XXXIV(9) 5: 540 (1999).

OUT DOOR AIR POLLUTION AND HEALTH: A REVIEW

The presence of one or more contaminants in the outdoor atmosphere is turned as air pollution like dust, fumes, gas, moist, odour or smoke in quantities such as to be injurious to human, plant and animal life or to property around. The worst pollutants of air are carbon monoxide, sulphur dioxide, nitrogen oxide, hydrocarbons and particulate. Automobiles, industries and electric power plants are the main sources of outdoor air pollution and their emissions break out various air borne diseases like pneumonia, bronchitis, asthma and even lung cancer along with many other hygienic problems. This section displays especially the effects of the major outdoor air pollution caused by vehicle emissions, burning of agricultural wastes and industry emissions and a few strategies to prevent the damaging impacts.

(a) Vehicle Emissions

Vehicle emissions have been identified as the greatest environmental danger in a large number of cities in developing countries. As far as carbon dioxide emissions are concerned, India's percentage in the world scenario was 4.4 % in 1996, while in case of Kenya and Sri Lanka it was nil (Table 2). Studies run by National Environmental Engineering Research Institute (NEERI) reveals that the level of pollution due to round the clock automobile emissions in Indian cities is on the

Table 2: Percentage of carbon dioxide emissions in 1996

Country	Million Metric tons	Percentage of World
India	997.4	4.4
Indonesia	245.1	1.1
Kenya	6.8	0
Malaysia	119.1	0.5
South Africa	292.7	1.3
Sri Lanka	7.1	0

Source: Compiled from World Development Report 1999/2000, p.222.

rise, if compared to other cities of the world.

Particulate emitted by vehicles pose a hazard to the health of human being, animals and also to longevity of the property. However, the damage due to particulate is rather indirect and slow. But, among the gaseous components, oxides of nitrogen and nitrated organic are considered to be most hazardous. Even very small quantities of these chemicals cause problems like irritation of eyes, nose and other delicate membranes of the body. While not so dreadful, carbon monoxide is also hazardous to human beings and animals. It reacts and neutralizes a portion of the hemoglobin in the blood and thus reducing respiratory capacity. When in a large concentration of 100 p.p.m. or more it can cause death with relatively short exposures. Thus, from the health point of view, oxides of nitrogen and carbon monoxide are pollutants of dangerous concern.

Strategies for Control

- Manufacturing such vehicles, which do not degrade the atmosphere beyond permissible limits.
- Taking early action by central and various state boards to develop instrumental and manpower competence for carrying out vehicular pollution monitoring.
- Enforcing provisions of the law strictly.
- Devising a cheap gadget by technologists for fixing on the existing vehicles so that there is no pollution these vehicles beyond the permissible levels.

(b) Burning of Agricultural Wastes

Harvest burning creates widespread problems particularly related with air pollution. The straw and stubble in the farm is mostly disposed by burning so as to prepare for next crops. However,

for the public it is an unmitigated nuisance. The problems related with harvest burn are as follows-

- Smoke and general nuisance.
 - Damage to property.
 - Threat to wild life.
 - Effects on human hygiene :
- i) Smoke causes suffocation and thus breathing problems and irritation to eyes.
 - ii) Suspended particulate matter like fly ash causes public nuisance and injury to eyes.

Despite these problems, straw and stubble burning are wide spread in India and is one of the burning hurdles. Therefore, it calls for immediate attention of the Government and pollution control boards to take appropriate action to control and minimize the problem.

Strategies for Control

- Harvest survey should be carried out.
- Making by-laws for straw burning is indispensable.
- The method of ploughing is straw should be adopted.
- Development and exploitation of alternative uses like straw as animal feed straw in papermaking, chemicals from straw etc. to be encouraged.

(c) Industry Emissions

The pollutants emitted by selective industries like cement, leather, paints, aluminum, fertilizers, sugar and paper have damaging effects on human health, cattle health, forests and biodiversity. The diseases namely asthma and chronic bronchitis, respiratory troubles, teeth and gum problems, eye and ear diseases and so on frequently attacking the people of industrial regions are attributable to the air pollution caused by industries. The health damage due to environmental pollution has been identified in many studies. Meanwhile, all most all state pollution control boards have found pollutants of selective industries and their adverse impacts on human health (Table 3).

Strategies for Control

- Producer and consumers should aware about the industry pollutants and their hazardous impacts.

Table 3: Adverse impacts of industrial pollutants on human health

<i>Industry</i>	<i>Pollutants</i>	<i>Damaging Impacts on Health</i>
Cement Leather Paints	Cement dust Sulphur oxide and other acid gas Sulphur dioxide, hydrogen sulphide and suspended particulate matter	Asthma and other bronical problems Suffocation, bronical problems. Suffocation, irritation of throat and eyes, irritation of lung, blockage of oxygen.
Aluminium	Ash, acid waste and sewage water	Blood poisoning, suffocation, lung cancer, heart diseases
Iron & Steel	Slag, dust and sludge	Headache, eorrosion of teeth, cold, eye defects, lung diseases.
Fertilizer	Urea dust, ammonia, phosphate, solid waste-fly ash	Suffocation, bronchitis, edema of lungs, irritation of throat

Source: Compiled from Choudhury, A., and Sahu, N.C.: Environmental excise duty and emission tax: A comparative analysis in the context of India. *Finance India*, **XII(1)**: 129-130 (1999).

- A proper blending of environmental excise duty and environmental charge along with direct controls are necessary for India.
- In academic and policy circle, efforts are to be made to devise a suitable market based strategy for protection of industry emissions.
- The source of industry pollutants must be taken into account in setting air quality standard.

CONCLUDING REMARKS

Both indoor and outdoor air pollutants are a growing public health worry even though they may not constitute immediate and direct threats. The pollutants released due to use of bio-fuels for cooking cause serious health problems to women and children below five years of age, while outdoor air pollutants may be directly emitted into the atmosphere from the identifiable sources and include carbon particles, cigarettes and industrial or vehicular smoke with a negative impact on human hygiene too. Since, complete elimination of air pollution requires heavy expenditure, a short and medium term solution is to be framed for controlling the existing level. In India, several regulatory statues have already evolved regarding air pollution control and environmental encouragement. However, in order to add momentum to the development process and to implement strong environment policies, the intervention of the government has become indispensable in the present circumstances.

Generally, two sets of policies are often advocated to assault the underlying causes of air pollution and both are equally important. The first set of policy packages includes promoting education, facilitating air pollution management

training and research etc. The object of second set of policy packages is to bring the positive links between development and environment. The most common among them involves targeted policies to change behaviour. In second set, policy packages are based on both incentives and quantitative restrictions. The government adopts various fiscal measures taking into account incentives based policy to control air pollution. Among them use of environmental taxes is regarded as a part of an integrated policy that has become a subject of considerable interest in most of the countries. The government often takes measures to encourage economic efficiency on both national and international level to minimize the degree of air pollution. But, apart from the government machinery to enforce, taking care of growing threats on air pollution in more institutionalized, regular and automatic basis is inevitable.

REFERENCES

- Choudhury, A. and Sahu, N. C.: Environmental excise duty and emission tax: A comparative analysis in the context of India. *Finance India*, **XII(1)**: 117-134 (1999).
- Garg, M.R., Basal, V.K. and Tiwari, N.S. (Eds.): *Environmental Pollution and Protection*. Deep & Deep Publications, New Delhi (1997).
- Parik, J., Smith, K. and Laxmi, V.: Indoor air pollution: A reflection on gender bias. *Economic and Political Weekly*, **XXXIV (9)**: 539-544 (1999).
- Sarkar, S. and Bandyapadhyay, T.: Growing threats on environment: A challenge before 21st century. *Paper Presented at the UGC Sponsored National Conference, Organized by P.D. Women's College, Jalpaiguri, West Bengal* (2000).
- Shukla, S.K. and Srinivastava, P.R.: *Environmental Pollution and Chronic Diseases*. Commonwealth Publication, New Delhi (1992).
- World Bank: *Entering the 21st Century*. World Development Report, Washington, D.C. (1999).