Air Pollution and Its Impact on Environment under Swachh Bharat Abhiyan: A Study

Dr. Madhusudana, H. S

Associate Prof of Economics, Govt. First Grade College,Mulbagal, Kolar District, Karnataka

Introduction

The word 'Pollution' has its origin in Latin: 'Polluere', which means contaminate any aspect of nature or environment. Pollution is defined as contamination of the environment in such a way that it creates hazards or potential hazards to the health, safety and welfare of the living and non-living species. Pollution takes place when dirty or harmful substances combine with air, water, land etc., so that it is no longer pleasant to use them. India's environmental problems are mainly due to its high population presence and limited natural resources India accounts for 15 per cent of the world's population but has only 2.4 per cent of the world's land area. Our development process has not only ignored environmental consideration but has been an unjust and imbalanced development. Our natural resources are getting depleted at alarming rates. Some 1.5 million hectares of land turn barren every year because of deforestation.

According to the report of the National Commission on Floods (1980) the annual expenditure on flood and drought relief is more than Rs. 1,500 crore which is in addition to the colossal loss of life and property. In India, every year 2.5 million hectares of land turns into waste land due to environmental degradation. Besides these, Industrial activities, Motor transport and burning of fossil fuels have been emitting large quantities of pollutants into the atmosphere. Even rivers are also polluted by untreated effluents from industries reducing the availability of drinking water. All these are the environment problems existing in India.

Need for Good Environment

Environment is defined physical and biological surroundings of a living being. All living beings require certain conditions for their sustained living; for this, the environs in which they live matter much. The Government of India took initiative appropriate laws in order to provide safe environmental conditions. The Government has recognized the need for land' and water resources management and the protection of environmental resources to be included in the constitution since 1977. The constitution (42nd Amendment) Act of 1977 obligates the Government to protect and improve environment for the good of the society as a whole.

India's first national law on environment was the Insecticides Act enacted in 1968 for regulating the import, manufacture, sale, transport, distribution and use of insecticides in order to reduce harm to human beings or animals. The Act however, did not provide for any compensation or damages arising out of poisoning from insecticides and failed to check the growth of misbranded and spurious products.

The year 1972 was a land mark in the history of environmental management in India. India in this particular year attempted the first national efforts to address environmental protection through the formation of the National Committee of Environmental Planning and Co-ordination. The NCEPC was setup in 1972 to prepare reports on the state of environment in India for the Human Environment Conference at Stockholm in June 1972. It was setup to promote greater co-ordination and integration in environmental policies and programmes. This Committee was mandated to advise the government on environment problems and assess environmental consequences of large development projects. In the same year (1962), the Wild Life Protection Act was enacted to provide the protection of wild animals and birds. The act provided the constitution of a Wild Life Advisory Board for each state regulation of the hunting of wild animals and birds and specified procedures for declaring areas as sanctuaries and national parks. This is followed by enactment of the first National law for air pollution control in 1974. The Water (prevention and control of pollution) Act of 1974 marked an important milestone, in environment legislation in India.

What Is Air Pollution?

Air is found everywhere. Air may get polluted by natural causes, for example, volcanic activity, which releases ash, dust and Sulphur compounds; forest or grass fires caused by lightning; or by man-made causes such as industrial and vehicular emissions. Main sources of air pollution comprises of gases, liquids or solids present in the atmosphere in high enough levels to harm humans, other organisms or materials. Pollutants in the air may be in the form of solid particles or gases. The solid particles that remained suspended in the air are called suspended particulates. They may reduce visibility or damage human health. Air can also be polluted by trace metals such as lead, nickel, iron, zinc and copper. There are several types of gaseous pollutants which have different impacts on human health and the environment. Air pollutants are often divided into two categories: Primary and Secondary- Primary air pollutants are emitted or discharged from the source directly into the atmosphere, such as sulphur dioxide and nitrogen oxides from the burning of coal in thermal power plants. Secondary air pollutants are the products of chemical reactions involving primary air pollutants. For example, as the emissions from coal-based power plants are carried away by-winds, chemical reactions take place which convert the emissions into secondary pollutants - nitrogen dioxide, nitric acid vapour, and droplets containing sulphuric acid, sulfate and nitrate salts. The acidic chemicals come down to the earth's surface as acid rain-The sources and effects of air pollution are varied and complex. Some sources of man-made air pollution are vehicular emissions, industrial processes and the burning of fuels in homes.

Indoor air pollution is one of the largest health risk factors in the world. Research shows that about 6 per cent of all deaths each year result from breathing elevated levels of indoor smoke from biomass fuels. Over 80 per cent of the people in the rural areas of India rely mainly on solid biomass fuels for cooking and heating. This produces large amounts of smoke and other air pollutants in the confined space of the home, resulting in high exposures.

There are more than 7, 50,000 man-made chemicals present in our environment and to this 1,000 to 2,000 new ones are added every year. And, all the pollutants put together 2 billion tons of air pollutants are released every year. On a global scale 2,900 Million Tons Per Annum (MTPA) of particulates, 480 MTPA of NOX, 106 MTPA of CO2, 3800 MTPA of CO, 260 MTPA of SOX, 4 MTPA of H2S, 5300 MTPA of ammonia and 1600 MPTA of hydrocarbons are released.

Table 1.1: Sources of Air Pollution (%)

Pollutant	Industries	Combustion	Solid waste	Transportation
SPM	30	30	20	20
SO_2	15	80	Nil	5
NO_2	4	48	Nil	48
CO	7	20	7	66

Source: Air Pollution and Control, Kaushal &Co., 51-10-10, Sattemmagudi Street, Jagannaickpur, Kakinada.

Man can survive for 5 weeks without food, 5 days without water and less than 5 minutes without air. This is attributed to the fact that he breathes, on an average, 25,000 times a day at a rate of 1-2 liters of air per breath. Compared to the consumption of drinking water of about 2 liters a day (2 kg/day) man consumes about 20,000 times more of air by volume and 25 times more by weight. Thus man requires enormous quantities of air for his survival. In addition, the air he breathes goes into direct contact with the most sensitive organs of the human body-the respiratory tract and the lungs. Thus the quality of air he breathes has a direct bearing on his health and well being. Unfortunately, man is not equipped with household or portable air cleaning devices unlike water filters etc. and thus demands a clean ambient air which is more than a luxury today. 'That is the reason why the

concentrations of pollutants should be Xvery small in air when compared to the corresponding concentrations in water. A concentration of more than 0.3 mg/1 or 3,00,000 mg/m3, of lead in water is considered harmful to man but a concentration of 1.5 mg/m3 of lead in air is deadly harmful.

Effects of Air Pollution on Environment in India

The Centre for Science and Environment updated the estimate and found that the situation had worsened as a person was dying for every 53 minutes because of air pollution, especially due to diesel run vehicles in India.

Majority of air pollutants like sulphur dioxide, nitrogen dioxide, ozone, ammonia etc. have a direct effect on man, material and vegetation. Air pollution can affect the environment on a global scale. Carbon dioxide as a green house gas causes global warming, increases mean sea level submerges millions of hectares of fertile land and brings famine thus leading eventually to destruction of life on this planet. Sulphur dioxide and nitrogen dioxide can bring acid rains which can completely upset the delicate balance between the various biotic and abiotic components of the biosphere. The Chlorofluorocarbons (CFCs) can destroy the ozone layer; man's protecting umbrella, and spread incurable diseases among human beings and other animals. PAN and other oxidants can completely destroy vegetation. These pollutants one way or other, have already damaged the art treasures and cultural and heritage of man. The Parthenon of Athens to our Taj Mahal, all art treasures withstood the ravages and plunders of the fury of nature for centuries but is showing signs of decay due to atmospheric pollution in this century. It is no hyperbole to say that if man continues his activities of Globalisation and Development of Backward Areas discharging thousands of tons of a variety pollutants into the atmosphere he would be left, with no breathing spaces for tomorrow and needs a sanctuary to protect him! A proper place for a sanctuary also may be beyond his reach.

The success or failure of respiratory defense system depends, in part upon the size of the particulates inhaled and the depth of their penetration into the respiratory tract. About 40 per cent of the particles 1-2 um in size are retained in bronchioles and alveoli particles ranging in size from 0.25 to 1 um show a decrease in retention. Little information is available on the detrimental effects of particulate matter on vegetation. Dry cement kiln dust appears to cause little damage if deposited on a leaf surface, yet in the presence of moisture, such dust imparts damage and consequential growth inhibition to plant tissues. The dust coating on leaves reduces photosynthesis and the increased plugging of stomata reduces plant growth. Particulate matter can damage materials by soiling clothing and textiles, corroding metals, eroding building surfaces, and discoloring and destroying paint surfaces.

"No need to commit suicide if there is carbon monoxide". 'CO' is very dangerous for human health. This slow poison is odorless, colorless and non-irritating. The affinity of CO is 200 times greater than that of oxygen and hence the body tissues are deprived of their oxygen supply. SO_2 irritates mucous membrane and damages the respiratory tract. Hydrocarbons are known to be carcinogenic. The most significant particulates are bacteria, lead, mercury and asbestos. SO_4 particulates are responsible for reducing visibility by 80 Per cent in U.S.A. In Mexico City, for more than 50 per cent of the particulates, the origin is 'human faces'. Lead of petrol generated from automobiles is a neurotoxin and a metabolic poison. Its accumulation causes mental retardation in 20 per cent of the children who often like lead fumes. 'Mercury' is released into the atmosphere by the fungicides in the paints, coal based power plants and incinerators burning batteries from houses etc. Mercury fumes (<2um) damage respiratory tissues. Asbestos dusts and cigarette smoke are carcinogenic. Cigarette smoke increases 10 times the desire for sex but also decreases the efficiency of participation in sex by 100 times. Photochemical smog has the acrid and biting odor of ozone, brownish colour of NO2, toxicity of CO and turbidity of smoke. In urban areas, astronomers cannot observe sky and its stars due to light pollution from buildings, dust pollution, outdoor advertisements etc.

Materials are damaged by air pollution by abrasion, chemical action, absorption, adsorption, corrosion or by deposition and removal. Factors such as temperature, precipitation, sunlight, humidity, air movement, stability of atmosphere and mainly the concentration and duration of pollutant play a vital role in the damaging action. Textiles loss their tensile strength due to SO_2 and are soiled by SPM i.e. Suspended Particulate Matter. H2S and SPM damage paints; SO_2 causes discoloration and embrittlement of paper and leather; wood is softened by ammonia; metals are corroded by acidic mists, chromium and SO_2; oxidants like O3, PAN, NH3, and NO_2 cause cracking of rubber while SOX, NOX and H_2S can affect even the miniature electronic circuits, solid state devices and computers and high voltage wires and electrical insulations.

Air Pollution in India

The National Environmental Engineering Research Institute (NEERI) has established air monitoring stations in Mumbai, Kolkatta, Chenna.i, Hyderabad, Kanpur, Jaipur, Ahmedabad and Nagpur in order to measure control of air pollution in India.The surveys reported that air pollution by sulphur dioxide is highest in Bombay and air pollution by suspended particulate matter is highest in Delhi.Another study of NEERI reveals a gradual but steady increase in levels of Suspended Particulate Matter (SPM) in Kolkatta since 1977 with 9.6 per cent increase since 1970.

The Global Environmental Monitoring System (GEMS) also reports highest SPM concentration in Kolkatta during 1976-1980. On Dec 2nd -3rd, 1984 Bhopal witnessed an unprecedented tragedy caused by massive leakage of methye-iso-cyanate (MIC) from the Union Carbide pesticide plant MIC was used by the plant to produce saving, a pesticide.

To control air pollution, in India, the 42nd Amendment of the constitution has provided under articles 48A and 51A the legal foundation of environmental protection. Further the air (prevention and control or pollution) Act 1981, prescribes emission standards for air polluting industries.

In the Panchayat Raj system, health is the responsibility of the Zilla Parishad (ZP). The Primary Health Centers (PHCs) with its sub centers should serve as a focal point through which integrated curative preventive and promotive health care should be provided to the entire population, especially to the families below the poverty line, under its jurisdiction (N.S. Deodhar, 2000). As in the case of the sub-centers, primary health centers may require jurisdictional adjustments to facilitate better service quality and coverage. It is important to recognize that, at present, most of the primary health centers do not function properly.

Conclusion

The Central Pollution Control Board (CPCB) is the national apex body for assessment, monitoring and control of water and air pollution. The executive responsibilities for enforcement of the Acts for Prevention and Control of Pollution of Water (1974) and Air (1981) and also of the Water (Cess) Act, 1977 are carried out through the Board. Twenty-three states and union territories have already adopted the Act and respective state pollution control boards have been constituted.

Enactment of the Environment (Protection) Act, 1986, has further extended the scope of the activities of the Board. Under the E (P) Act, 1986, effluent and emission standards in respects of *55* specific industries have been notified. So far, 84 laboratories have been recognized as environmental laboratories. Minimum National Standards (MINAS) for effluents and emissions from specific industries have been formulated and control measures are being implemented in a phased manner. Seventeen categories of heavily polluting industries have been identified namely, cement, thermal power plants, etc. Based on the designated best use of criteria CPCB has identified 13 grossly polluted stretches of Sabarmati, Subernarekha, Godavari, Krishna, Indus (tributaries), Sutlej, Ganga (tributaries), etc. Besides, the Ministry,

in consultation with state governments, has identified 19 critically polluted areas in the country such as Vapi (Gujarat), Kotba (Madhya Pradesh), and Digboi (Assam0 etc. which need special attention for control of pollution. These are Vapi (Gujarat), Singrauli (UP), Kotba (Madhya Pradesh), Digboi (Assam), The progress in abatement of pollution in these areas is being reviewed from time to time.

References

1. B.N. Ahuja, "Advanced Essays for College and Competitive Exams", Goodwill Publishing House, New Delhi.

2. C.S. Rao, "Environmental Pollution Control Engineering", Whiley Eastern Ltd, New Delhi, 1991.

3. Cunningham P., Williumand Barbara W. Saigo, Environmental Science", 3rd Edition,WM.C.Brown Publishers, Dubuque, USA, 1995.

4. IUCNN Publications of 2002 (International Union for Conservation of Nature and Natural Resources).

5. K.V.S.G, Murali Krishna, "Air Pollution and Control", Kaushal & Company, Kakinada, 1999.
6. K.V.S.G. Murali Krishna, "Atmospheric Pollution", Monthly Telugu Academy, Hyderabad, July 1993

7. Khopkar, S.M., "Environmental Pollution analysis", New Delhi: New Age International Ltd, 1995.