

Air Pollution Hazards to Environmental Health and Inadequacy of Legal Preventives in India

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The problem of environmental health, which initially started with the appearance of man on the earth, grew extremely acute in the developed as well as in the developing countries. The instinct of self preservation is inherent in men and it motivates them to lay down certain rules and to take corresponding measures in an attempt to protect public health. The remarkable work done by ancient Romans in providing towns with water supply, waste disposal systems and with other amenities is a striking example of the urge of the society to establish favourable conditions for men to live in. The essentials of environmental sanitation took shape in many countries of ancient world like China, India, Central Asia, Egypt and Greece. Dhanvantari, an outstanding physician and philosopher of ancient India, drew attention towards the importance of good air and good water and emphasized upon the necessity of proper sanitation in the civic life of man. Avicenna, a physician philosopher of Central Asia, many centuries ago, put forward an idea of interaction between the environment and man and made striking guesses as to the role played by unseen substances that could cause diseases and which were transmitted through air and water. As early as 5th century A.D. the Egyptians adopted various techniques of sanitation which included the design of buildings, urban sewage disposal and drainage of soil. General sanitary rules for the preservation of health were also laid down for the Hebrews in Mosaic Law. They dealt with almost every aspect of private and public life, working conditions, recreation, clean soil and water and clean air.

With the transition from feudal system to industrial capitalism problems of environmental sanitation and inter-relationship between man and his external environment assumed colossal importance. The development of mechanised techniques in various fields rendered it necessary to study all those

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industrial and special phenomena that disturb the normal physiological working of the human body and consequently, in numerous ways, affect human health. Thus the industrial revolution of 19th century which led to environmental pollution, overcrowding and unfavourable working conditions, posed serious problems to human health. It affected morbidity and threatened increased cases of mortality among the population. The large scale urbanisation resulted in population density and it complicated the problem of collecting, processing and disposing of liquid and solid wastes. The lack of adequate waste disposal facilities led to pollution of air, water and soil. It led to the breeding of flies, mosquitos, rodents and other transmitters of diseases. This problem is particularly acute in developing countries like India, where majority of towns do not have adequate system of sewage collection and disposal. These countries also lack the expertise, equipment, and time to develop their own scientific foundation for the establishment of standards and legislation.

The development of chemical industries during the past twenty five years has also affected the environment. Substances that are often highly toxic and dangerous to human health are discharged into the atmosphere and into the water courses. There are now a large number of new forms of pollutants from such sources as factories, tower stations, and motor-vehicles which, besides direct link with respiratory diseases, also have indirect effect on the health and well-being of people.

The sources of air pollutions, in general, may be classified into several broad categories, like the consumption of coal and oil in domestic and industrial heating and steam generating plants, emissions from motor vehicles, industrial effluents and miscellaneous commercial and community activities such as burning of solid wastes, solvent losses, pesticides and agricultural chemicals. Besides these, in congested towns of our country, unhygienic living conditions, open dirty *nali* system, unplanned construction of buildings, absence of proper sewage system, collection of cowdung emitting bad smell become sources of atmospheric pollution. Many pollutants are invisible and odourless and some can be very dangerous. A large number of cases of long term respiratory tract effects with a suspected relationship for our pollution have been reported in several countries. In England, researches have disclosed that bronchitis, morbidity, and mortality have been partly related to air pollution. In some other countries from epidemiological studies it has been found that air pollution has been a causative factor in chronic bronchitis and general deterioration in health. The symptoms of chronic cough and sputum occur more frequently in cigarette smokers than in non-smokers. Experiments in Japan have shown that chronic respiratory conditions are more frequent in polluted areas. Anaemia, morbidity and altered development are

also associated with air pollution diseases of diverse nature and acute illness and deaths in susceptible groups of population occur on account of air pollutions.

The scientific group of the World Health Organisation conducted researches into environmental pollution¹ and came to the conclusion that the control of air pollution is ultimately an engineering problem. It pointed out that in principle it should be possible to reduce environmental air pollution below the levels recommended by air quality guides by applying one or more of the following procedures :

- (a) Containment, i.e., prevention of escape of toxic substances into the ambient air;
- (b) Replacement of certain technological processes or fuels by new ones that produce less air pollution; or
- (c) reduction of the concentration of toxic substances in air dilution.

These three engineering methods may be supplemented by restricting the use of substances that may become air pollutants. It is worthwhile to mention that certain technical means have also been worked out for controlling air pollution. These may be summarised thus :

(1) Development of arrestors—As a result of technical researches there has been discovery and improvement of such equipments as inertial separators, electrostatic precipitators, scrubbers and fabric filter. The abstracting services devoted directly to air pollution matters can be considered as making a major contribution to the control of atmospheric pollution.

(2) Control of emissions from motor vehicles—Motor vehicles contribute to air pollution by emitting hydro carbons, carbon monoxide and oxides of nitrogen; these emissions occur both from the exhaust and from the crank-case ventilators tube. Diesel engines, when mis-used and badly adjusted, generally emit black smoke. A number of means are being developed to deal with these forms of pollutions.

Several technical devices have been developed to control emissions from the crank-case and to control hydrocarbon emissions in the exhaust. Work

1. Environmental health criteria :— *Report of W.H.O. Scientific Group* (Unpublished document EP/73.2) Ch. 5; *The WHO Environmental Health Criteria Programme* (unpublished document EP/73.1) Ch. 6.

has also been undertaken on the use of liquid petroleum gas as a fuel for internal combustion engines with the aim of reducing hydrocarbon emissions. The smoke from the diesel engine can be eliminated by careful control of the conditions of use and maintenance of the engine. Several countries have instituted a programme of regular inspection to ensure that diesel engines travelling on roads are properly maintained. India also needs a legislation to this effect.

(3) In countries like India where, for historic and economic reasons, the major atmospheric pollutant is smoke from domestic sources, efforts shall have to be made for the development of efficient domestic equipments for the burning of coal. Adequate emphasis should be laid on solid fuels resulting in the production of reacting coke for burning in open fires. Law should be clearly made providing for the use of the smokeless combustion of coal in industrial furnaces.

The Expert Committee of the WHO examined indirect means of reducing air pollution and made the following observations :

“A number of technical changes and development have in some countries contributed towards a reduction of atmospheric pollution by smoke and in some cases, by sulphur dioxide. They are as follows :—

(i) Increased use of hydroelectric power and of electricity from atomic power stations.

(ii) The supply of heat to whole districts by hot water or steam from central thermal stations.

(iii) Greatly increased use of natural gas electricity and high quality oil for heating, cooking and sometimes lighting and in some places for generation of electric power.

(iv) The use of electric power and efficient diesel engines for traction.

(v) The development of satellite town in which no fuel is used that produces pollution.

(vi) The recognition that the avoidance of air pollution is an important factor in town planning.

(vii) The establishment of a green-belts between industrial areas and residential areas in newly established towns.

(viii) The use of meteorological warning systems to enable temporary

steps to be taken to reduce the emission of pollutants during period of intense atmospheric stagnations.

(ix) Improvements in traffic management to reduce pollution from vehicles".²

An appraisal of the above sources of air pollution makes it abundantly clear that the environmental pollution is becoming an ever more complex and important problem. It is no longer only a public health problem but also a social and economic one with far reaching legal, administrative, and political repercussions. The time may not be far away when the problem of excessive air pollution may become a factor limiting productivity and hindering social and economic development. In several parts of the world, air pollution is regarded as an intolerable nuisance and measures to abate it have already been taken. Most of the countries in Europe have set up monitoring systems for the measurement of air pollution levels, the number of stations in each country depending upon the seriousness of the problem. In developing countries the problem of air pollution deserves special attention. It is to be constantly watched that power stations, industrial plants and domestic sources of pollution do not "overload" the air.

The world Health Organisation has done commendable work in this direction. It received requests from many developing as well as developed countries to lay down guidance as to the levels of ambient air pollutants that constitute hazards to health. Many of these countries lack the expertise. It is not only the health hazard consideration that the governments of concerned states have to take into account, but they have also to give consideration to the impact of air pollution on climate, animal life as well as on the living conditions of human beings. Air pollution also has tangible economic consequences which can be precisely estimated. It affects visibility, with sometimes severe repercussions on transport efficiency; it affects vegetation; it causes soiling and damage to all kinds of property. In the growing world population there would be increasingly diverse products from innumerable industries in modern times and the emission of some pollutants will inevitably increase. "Increased emissions have already on several occasions and in several places led to ground level concentrations that were associated with dramatic rises in mortality. There is abundant evidence that high levels of air pollutants may be generally harmful to human beings and there is no evidence that pollutants at any level are beneficial".³

2. *World Health Org. Tech. Rep. Series 297 (1965).*

3. *See, Report of WHO Expert Committee, Tech. Rep. Series No. 506 (1972).*

The Expert Committee of WHO made certain recommendations in 1972 on "Air quality criteria and guide for urban air pollutants" to be adopted by the member states through legislation. The recommendations⁴ are as follows :—

(1) The government of concerned states should establish and keep under review national air quality standards as part of their programmes for air pollution control. The air quality standards should aim primarily at the protection of health; in the Committee's opinion the levels of air pollutants and the corresponding effects discussed in the present report may provide useful guidance towards the attainment of the objective.

(2) Long term goals should also be set, and the progress made towards achieving them should be periodically reviewed in the context of socio-economic developments and other public health problems.

(3) In establishing air quality standards, in addition to health effects, governments should give consideration to the impact on climate, vegetation, animal life, and materials as well as on the aesthetic quality of the environment. These effects have significant social, cultural and economic implications, and are sometimes more sensitive indicators of air quality than are the effects on health.

(4) In addition to stating the concentration limit for the pollutant, air quality standards should specify methods of measurement, the average time over which concentrations should be measured and the frequency with which the limit may be exceeded. A detailed plan for the implementation of standards should be developed at the same time including appropriate monitoring schemes to permit assessment of the exposure of the population.

(5) In view of the inadequacy of presently available data, more studies should be performed on specific populations subject to comparatively high or low exposure to pollutants using comparable study designs and uniform methods for measuring pollutant levels and biological response.

6. Further experimental work should be conducted on human volunteers and animals in order to clarify the mechanism of action of environmental pollutants and to develop new or more reliable indices for use in epidemiological studies.

4. *Ibid.*

(7) WHO should take the initiative in developing and adopting reference methods for the measurement of air pollutants and for epidemiological methodology. This should help to eliminate some of the difficulties experienced in containing and evaluating available data on health effects.

(8) An appropriate mechanism should be developed to enable WHO on a continuing and systematic basis, to collect information on the health effects of environmental pollutants, to review the information for its relevances to criteria and guides for environmental air quality standards, and to survey new technological processes and new chemicals in order to identify possible environmental pollutants.

In view of these recommendations of WHO it is required that the countries of the world should take up the issue on priority basis in the implementation of their national development schemes. England, France, Australia, Canada and the U.S.A. have already realised the gravity of the problem and have adopted legislative measures to abate the nuisances of air pollution. But in other countries laws are yet to be enacted for the realisation of this objective. However, it is worth while to note that the legislation on air pollution is to be extended beyond the mere control of smoke and fumes from factories and domestic fire places. The legal definition of atmospheric pollution should also be widened so as to cover radiant energy, noise and vibrations.

In England, a distinction is made between atmospheric pollution caused by effluents from chemical and other manufacturing plants and smoke, whether produced by industrial or urban domestic premises. The first is governed by the Alkali etc. works Regulations Act, 1963 and the second by the Clean Air Act of 1956. The Alkali Act is enforced by a small body of highly qualified Alkali inspectors appointed by and responsible to the Ministry of Housing and Local Government in England and Wales. These inspectors have the task in particular, of deciding what constitutes for any given process "the best practical means" for preventing the discharge of noxious or offensive gases.

The Clean Air Act, 1956, lays down the conditions under which the Minister of Housing and Local Government may make regulations on technical details of the pollution control. Under this Act local authorities are given wide powers to deal with domestic smoke. Since coal cannot be burned smokelessly in an open domestic grate, the local authority may declare an area as smoke control area in which the householders will have to stop using coal and change over to smokeless solid fuels such as cokes, or to electricity gas or oil. The provisions of the Clean Air Act, 1956, which prohibits the

emission of dark smoke apply also to railway locomotives, to ships in inland water, and sea going ships in docks estuaries *etc.*

It is noteworthy that the Clean Air Act, 1956, does not apply to motor vehicles which are governed by the Motor Vehicles (Construction and Use) Regulations, 1955. These regulations stipulate that motor vehicles must be constructed, maintained and operated in such a way as to prevent the avoidable emission of smoke or visible vapour.

In Australia, several states have passed such statutes to control atmospheric pollution. For instance, in 1957, the State of Victoria passed the Clean Air Act, providing that the dark or dense smoke must not be emitted from industrial chimneys, subject to certain exceptions to be laid down. Furthermore, no new industrial fireplaces can be installed unless it is, so far as is practicable, smokeless when burning the type of fuel for which it is designed.

A characteristic feature of the Act is to provide for the establishment of a Clean Air Committee whose functions are to carry out studies on air pollution problems, to make recommendations to the minister concerning such problems, and to investigate and report to the minister on any specific matter relating to atmospheric pollution which is referred to the committee by the minister.

In Canada, the control of atmospheric pollution is the concern of individual provinces and there is no federal legislation for this purpose. The province of Ontario passed an Act in 1958 known as Air Pollution Control Act which gives power to the Minister of Health to encourage researches in the field of atmospheric pollution. It also delegated to the municipal authorities the power to pass bye laws to prohibit or control emission from any source of any type of air contaminant. Provincial officers or the municipal authorities under the appropriate bye-laws can also enter and inspect any premises.

In France, Poland and other European countries also adequate legislative measures have been taken to prevent atmospheric pollution and the changes in the natural properties which are caused by dust, gases, smoke, odours, radiant energy, noise or vibrations. These sources of atmospheric pollution have dangerous effect on human health and cause discomfort to man and animals. They are also detrimental to plants. Since a vast dimension of danger to human health is involved, appropriate legislative instruments have been adopted towards the avoidance of such atmospheric pollutions. The need is still more pressing in developing countries like India where cities and towns abound in unhygienic and unscientific living conditions.

During the past two decades with the growth of industrialisation and urbanisation, the problem of atmospheric pollution in Indian cities and indus-

trial towns have become increasingly acute. They are facing slums, dirty *nali* systems, poor living conditions, industrialisation and concentration of population by mass exodus from villages. The growing number of industries and chemical plants are emitting huge quantity of atmospheric pollutants in big towns and their surroundings. There is considerable degree of air pollution by the emissions from motor vehicles and diesel engines. No positive efforts have been made to prevent smokes coming out from varied sources. There has been no serious consideration on the prevention of domestic sources of smoke and on the development of efficient domestic equipments for the burning of coal. We have not been able to develop any effective technical methodology for controlling the diverse sources of pollution. Adequate legislative measures have not so far been provided in the country whereby techniques and methods of air pollution control could be enforced. There is no separate legislation either on the pattern of Alkali *etc.* Works Regulation Act, 1863 or on the pattern of Clean Air Act, 1956 of England, which may comprehensively deal with all possible areas of atmospheric pollutants and provide effective machinery to control them. We find only stray provisions in certain legislations where measures to control air pollution have been provided. For example, the Indian Factories Act, 1948, enables the state governments to take measures for the disposal of wastes and effluents⁵. The Act provides for the disposal of dust and fumes in order to prevent hazards to public health.⁶ Under section 37 of the Act provisions have been made to regulate the explosives or inflammable dust and gases for providing safety to the people. It also provides for all such practicable measures which

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5. S. 12 of the Indian Factories Act, 1948 as amended in 1976 provides (1) Effective arrangements shall be made in every factory for the treatment of wastes and effluents due to the manufacturing process carried on therein, so as to render them innocuous and for their disposal. (2) The State Government may make rules prescribing the arrangements to be made under sub-section (1) or requiring that the arrangements made in accordance with sub-section (1) shall be approved by such authority as may be prescribed.
 - 6 S. 14 of the Act provides (1) Every factory in which, by reason of the manufacturing process carried on, there is given off any dust or fume or other impurity of such a nature and to such an extent as is likely to be injurious or offensive to the workers employed therein or any dust in substantial quantities effective measures shall be taken to prevent its inhalation and accumulation in any work-room, and if any exhaust appliance is necessary for this purpose, it shall be applied as near as possible to the point origin of the dust, fume or other impurity, and such point shall be enclosed so far as possible. (2) In any factory no stationary internal combustion engine shall be operated unless the exhaust is conducted into the open air, and no other internal combustion engine shall be operated in any room unless effective measures have been taken to prevent such accumulation of fumes therefrom as are likely to be injurious to workers employed in the room.

are necessary for the prevention and removal of explosion of any inflammable materials⁷. In the provinces of Bombay and West Bengal Smoke Nuisances Acts were passed in 1905 and 1912 respectively in order to provide measures for controlling air pollution. It is evident that time has gone much ahead of the years of enforcement of such legislation in these provinces and many new sources of obnoxious gases have appeared in the environment, the control of which could not have been foreseen by the legislators of the time. Hence no effective control of air pollution can be expected from these legislations. Moreover, laws having more comprehensive contents on similar lines are needed in several other provinces where possibilities of air pollution have considerably increased.

It is to be noted further that the Motor Vehicles Act, 1939 does not make any provisions to control emission of smoke, hydrocarbons, carbon monoxide and oxides of nitrogen from motor vehicles and diesel engines. These air pollutants can be eliminated and avoided by the improvement of the mechanical devices, careful construction, maintenance and operation of motor vehicles. The Motor Vehicles Act, 1939 may suitably be amended to adopt the measures to control the air pollutant substances emitting from motor vehicles. The Act should clearly provide for a programme of regular inspection to ensure that vehicles travelling on the high-ways are properly maintained.

In the end it is submitted that a separate full fledged legislation on the line of the Water (Prevention and Control of Pollution) Act, 1974 is the urgent need of the time in India. The Act may contain the provisions on the pattern of the Alkali *etc.* Works Regulations Act, 1863 and the Clean Air Act, 1956 of England. The broad features of the desired Act may be noted as under :—

(1) The central and state governments should appoint boards in the centre and in the states with full time chairman having special knowledge or practical experience in the matter of atmospheric pollutants and their prevention. The board should also consist of such members who have expertise on the varied sources of pollution and are competent to make researches and suggest measures for their elimination.

(2) The boards should carry out studies on air pollution problems to make recommendations to the central government and state governments concerned. They should be required to investigate and report on any specific matters which are specifically referred to them by the government concerned.

7. See s. 37 of the Indian Factories Act, 1948.

(3) The board should also encourage researches in the fields of atmospheric pollution and plan a comprehensive programme for the prevention, control or abatement of pollution of air.

(4) The municipal authorities should be specially empowered to pass bye-laws to prohibit or control emissions from any source of any type of air contaminant.

(5) A body of highly qualified government officers specially appointed for the purpose and municipal authorities should be empowered under the Act to enter and inspect any premises where air pollution hazards exist. These officers should have the task in particular, of deciding as to what constitutes the best practical means for preventing the discharge of noxious or offensive air pollutants.

(6) The board should plan and cause to be executed a nation-wide programme for the prevention, control or abatement of air pollution.

(7) The central and the state governments should be given some special powers to take emergency measures to carry out such operations as they may consider necessary for the purposes of removing, remedying or mitigating atmospheric pollutants and issuing orders immediately restraining all the responsible agencies from discharging any poisonous, noxious or polluting matters.

(8) Failure to comply with the directions issued under the Act by the boards and other authorised bodies should be rendered punishable under the law.

(9) The definition of atmospheric pollution should be extended beyond the mere control of smoke and fumes from factories/motor vehicles and domestic fire places. It should be widened to cover radiant energy, noise and vibrations.

Lastly, it is submitted that some guidance for the desired legislation may be taken from the Report of the Expert Committee of WHO⁸ which suggested that legislation should be directed towards :—

(a) The control of causes of pollution by specifying the types of industrial and other processes which should operate under supervision by

8. The Committee submitted its report in 1958.

controlling authorities, and the type of emission which should be kept to a maximum value;

(b) the institution of town planning practices in which due attention is given to the planning and zoning of industrial sites for the purpose of reducing air pollution, providing always that such action makes the conduct of industry prohibitively costly or even impossible;

(c) the provision of regulations controlling the types of fuel to be burned in the installations where combustion emissions are not otherwise controllable.